Transport Synergies Between Eastern Indonesia and Northern Australia

Report

This research project was designed to explore the potential for economic synergies between the two regions and the role that transport might play in their development. The project was undertaken in conjunction with the Research and Development Agency of the Indonesian Ministry of Communications. This Report presents the results of the work of the Australian project team, focusing on northern Australian aspects.

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FOREWORD

Growth triangles involving countries in our region have developed at a rapid rate in recent times. The geographic proximity of Eastern Indonesia and northern Australia suggests that a similar initiative could be of mutual benefit to Australia and Indonesia.

This research project was designed to explore the potential for economic synergies between the two regions and the role that transport might play in their development. The project was undertaken in conjunction with the Research and Development Agency of the Indonesian Ministry of Communications.

Some initial work on the project was undertaken early in 1995, and the project was formalised in a Memorandum of Understanding between the Indonesian Ministry of Communications and the then Australian Department of Transport in December 1995.

This report presents the results of the work of the Australian project team, focusing on northern Australian aspects. However, the project had a broader brief than this. The analytical tasks set for the project team were used as a vehicle to provide training opportunities for the Indonesian members of the project team. A large part of the training was funded by AusAID under the Government Sector Linkages Program.

The report includes projections of international visitors to northern Australia (completed in mid-1997), and live cattle exports from northern Australia (completed in the first half of 1997). Because the projections were completed prior to the onset of the massive disruptions to Asian financial markets, the short-term projections will be overstated. It is too early to say what the long-term impacts will be.

The Australian project team was led by Neil Gentle. During the course of the project several BTCE staff contributed to the research. In chronological order the major researchers were: Tim Winn, Shiji Zhao, Catharina Williams and Johnson Amoako. Simon Clegg, Ted Mikosza and Richard Fahey also made important contributions.

Jen St Clair
Research Manager

Bureau of Transport and Communications Economics
Canberra
December 1997

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John Koldowski of the Northern Territory Tourist Commission, Richard Power of Townsville Enterprise Limited, Brian O'Gallagher of the then Office of Northern Development, Graham Kirby of the Northern Territory Department of Primary Industry and Gaye Scott of the Cairns Port Authority assisted the project by their generous supply of data.

Valuable assistance was given in the form of comments on draft chapters of the report by Chris Hughes (Austral Livex), Brian O'Gallagher (Northern Territory Department of Transport and Works), Graham Kirby (Northern Territory Department of Primary Industry), Sara Pitterle (Northern Territory Tourist Commission), Ian Kennedy (Pacific Asia Travel Association), Richard Power (Townsville Enterprise Limited), staff of the Office of National Tourism and Phil Cross (Northern Territory Department of Transport and Works).

Many valuable discussions were held with representatives of the live cattle exporting industry, the tourism industry, transport operators, and government and business organisations. The BTCE is appreciative of the time they willingly gave to discuss the issues with the project team.

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ABBREVIATIONS

AAL	Austral Asia Line
ABS	Australian Bureau of Statistics
AMLC	Australian Meat and Livestock Corporation
ANU	Australian National University
AQIS	Australian Quarantine Inspection Service
BIMP–EAGA	Brunei–Indonesia–Malaysia–Philippines–East Asia Growth Area
BTCE	Bureau of Transport and Communications Economics
BTR	Bureau of Tourism Research
CALM	computer aided livestock marketing
CPI	consumer price index
DTM	Domestic Tourism Monitor
GDP	gross domestic product
GNP	gross national product
GRP	gross regional product
ICS	International Cargo Statistics
IEDB	International Economic Data Bank
IVS	International Visitor Survey
JAL	Japan Air Lines
NCSTT	National Centre for Studies in Tourism and Travel
NTPT	National Transport Planning Taskforce
NTTM	Northern Territory Travel Monitor
SACCS	Sea and Air Cargo Commodity Statistics
RPT	regular public transport
TEL	Townsville Enterprise Limited
TFC	Tourism Forecasting Council

EXECUTIVE SUMMARY

Bilateral relations between Australian and Indonesian government departments have deepened in recent years. The Indonesian Government's policy of increasing the pace of development in Eastern Indonesia suggests that northern Australia, because of its closeness to Eastern Indonesia, may have a role to play in that development.

Countries that are geographically close tend to trade with each other, but the trade is facilitated if there are cultural and language similarities and if transport and communications costs are minimised. Eastern Indonesia and northern Australia are geographically close, but they have very different cultural and language backgrounds. However, there is more to defining two or more areas as an economic region than close proximity.

If northern Australia and Eastern Indonesia are to be considered as an economic region, then at least one of two conditions needs to be satisfied. The first is that there should be a relative difference (or complementarity) in resource endowments (natural, capital and human). If two areas had identical resource endowments, there would be little opportunity for trade between them, and they would be more likely to be competitors than considered as a single economic region.

The second condition is the potential for scale economies through the enlargement of the market, and this condition is possibly the most important. The larger market possible through economic cooperation allows access to a wider mix of factor endowments and facilitates increased trade and investment.

Northern Australia is rich in mineral resources and many of these are being exploited by efficient resource companies. As a consequence, northern Australia derives much of its economic activity from mining compared with the national economy and much less from manufacturing

and services (apart from those associated with tourism). For example, northern Australia derives at least 20 per cent of its gross regional product from mining, compared with just under 5 per cent for Australia as a whole.

Northern Queensland has a relatively strong manufacturing base compared with the rest of northern Australia, with much of it based on the mining industry.

The economy of Eastern Indonesia is predominantly based on agriculture and forestry, with mining being important in some provinces.

The differences in resource endowments suggest that there could be synergies in the areas of mining support, human resources development and live cattle exports. The importance of tourism to both regions suggests that there may be potential for the exploitation of economies of scale in tourism.

MINING SUPPORT

The importance of mining to the economy of northern Australia has resulted in a significant support base for the industry in the larger population centres throughout the region. There are possibilities for the mining support base in northern Australia to also be used to support mining ventures in Eastern Indonesia. Mining support is already happening in Cairns, which has developed strong links as a support base for the Freeport mine in Irian Jaya. The availability of high-quality training and health services in the major population centres of northern Australia enhances the potential of the region to develop support services for mining in Eastern Indonesia. An analysis of the potential of northern Australia as a base for mining support could be a topic for further examination.

HUMAN RESOURCES DEVELOPMENT

As the Eastern Indonesian economy develops, there will be an increased demand for skilled people to manage, plan and operate transport systems in the region. Northern Australia has the facilities to provide the necessary training and suitable facilities are not readily available in Eastern Indonesia. As transport systems develop in Eastern Indonesia, opportunities for the provision of training services are expected to increase.

TOURISM

Tourism has potential for significant growth in both Eastern Indonesia and northern Australia. There appears to be potential for economies of scale in the joint marketing of the tourist attractions and the possible joint development of tourist products in both regions. The Arafura Tourism Zone is a current example of the possibilities, although it had not developed much beyond the concept stage by mid-1997.

The factors that influence the number of tourists visiting northern Australia include income, cost of travel, availability of transport and accommodation, government policies, consumer confidence, unemployment rates and the cost of travelling to alternative destinations. Econometric models developed in this study focused on income and cost of travel. The effects of specific events, such as the pilots' strike in 1989–90 and the bicentenary celebrations in 1988, were incorporated into the models where their inclusion added to the explanatory power of the model. Models based on time series analysis were developed where econometric analysis was not appropriate.

International visitors

In 1990, visitors to northern Australia came mainly from the United Kingdom and Ireland (19 per cent); Europe, other than the United Kingdom and Ireland (23 per cent); and North America (22 per cent). Visitor numbers from Japan have grown faster than from other countries and by 1992 Japan became the major source of visitors to northern Australia. In 1995, Japan provided 29 per cent of visitors to the region.

Generally, the results of the econometric analysis indicate that leisure travel is sensitive to income levels. The short-run income elasticity for holiday visits ranged from 1.62 for visitors from New Zealand to 4.11 for visitors from Japan. The elasticity of living costs for holiday visitors ranged from –0.54 for visitors from the United States and Canada to –1.90 for visitors from New Zealand. As expected, tourist visitors are more sensitive to living costs in northern Australia and income than other visitors.

The number of international visitors to northern Australia is projected to grow faster than the total number of visitors to Australia so that, by the year 2004, 24 per cent of international visitors visiting Australia will include northern Australia in their itinerary, compared with about 20 per cent in 1995. In 2004, the total number of international visitors to northern

Australia is projected to be around 1.8 million, about one-third of whom are expected to come from Japan. Europe (other than the United Kingdom and Ireland) is expected to be the second most important source of tourists to northern Australia in 2004.

Of the 1.8 million international visitors to northern Australia expected by the year 2004, 55 to 65 per cent are expected to visit northern Queensland. The Northern Territory is expected to attract 30 to 40 per cent and northern Western Australia about 7 per cent. The results for northern Western Australia should be treated with some caution as the data available allowed only a rudimentary analysis.

Domestic visits

Domestic visits made to northern Australia for holiday purposes over the period 1989 to 1994 dominate the tourism market compared with international visits made during the same period. This mirrors the national trend that also indicates more domestic tourists than international. Although domestic tourism dominates the market, international visits to northern Australia have grown by about 12 per cent annually over the 1989 to 1994 period compared with 7.7 per cent growth annually for domestic visits over the same period.

Northern Australia, unlike other domestic destinations, is more commonly accessed from the south of Australia by air. The difference between the perceived cost of air and car travel narrows for long-distance trips, making air travel more attractive because of the superior travel time it offers.

The total number of domestic visits to northern Australia in 2004 is likely to be in the range of 3 to 4 million. Visits to northern Queensland will comprise an estimated 73 to 77 per cent, compared with 18 to 23 per cent to the Northern Territory and 4 to 7 per cent to northern Western Australia.

LIVE CATTLE EXPORTS

Total Australian exports of live cattle increased from 97 600 head in 1990 to 723 100 head in 1996—an average annual compound growth rate of almost 40 per cent. Growth has not only remained strong but has also accelerated consistently and significantly over the period to 1995. Between 1990 and 1991 the growth rate was 28 per cent and it increased

to 67 per cent in 1995. Between 1995 and 1996 the growth rate moderated to a still substantial rate of 42 per cent.

Northern Australia dominates the live cattle export market. In 1996, 73 per cent of all Australian live cattle exports were exported through the four ports of Wyndham, Darwin, Karumba and Townsville. Prior to 1996, the ports of Wyndham, Townsville and Karumba had only a minor role in live cattle exports, but in 1996 the numbers exported through these ports increased significantly.

Although Darwin is by far the major live cattle export port, in 1996 just under 50 per cent of live cattle exported through Darwin originated in the Northern Territory. Queensland supplied 49 per cent, with the remainder coming from Western Australia and other States.

As incomes increase in Indonesia, consumers are expected to demand higher quality meat and more hygienic methods of presenting and selling it. Generally, the higher end of the market is met through the import of frozen beef. A small but increasing proportion of beef produced from Australian live cattle imported into Indonesia enters the higher end of the market. Both the wet and cold chain markets are expected to grow as per capita incomes increase, leading to increased demand for live cattle as well as beef from Australia.

Average consumption of meat in Indonesia is still small, although it has been increasing consistently. In 1993, the per capita meat consumption of 7.9 kilograms in Indonesia was only about one-fourth of the consumption level in Malaysia and one-tenth of meat consumption in Singapore and other economically developed countries.

Historical data suggest that chicken is a major competitor for beef in the Indonesian market. The 1960s and 1970s were periods when chicken-feeding technology made significant progress and intensive feeding became common throughout the world. As a result, the cost of producing chicken reduced considerably, which, combined with market competition, led to a significant reduction in the price of chicken relative to that of beef. The change in the price was equivalent to a rise by more than 100 per cent in the price of beef relative to that of chicken.

Between 1970 and 1992, the expenditure elasticity of demand for beef remained reasonably stable, although it exhibited a slight upward trend. On average, it was close to unity (1.073). This result implies that consumers in Indonesia did not fundamentally change their taste for beef over a long period of time, and in fact their preference for beef has

slightly strengthened over time. The result suggests that as total expenditure on meat rises, with other factors held constant, Indonesian consumers will increase their beef consumption by a slightly greater proportion.

The expenditure elasticity of demand for chicken declined somewhat over the period from 1970 to 1992, although it remained above unity. The strength of the expenditure elasticity suggests that Indonesian consumers retained a strong preference for chicken over a long period of time. As a result, the consumption of chicken is most likely to increase as the total expenditure on meat increases, with other factors constant.

The average own-price elasticity of demand for beef for the period between 1970 and 1992 was estimated to be –0.38, meaning that a 1 per cent increase in the price of beef (relative to all other meats) led to a 0.38 per cent decline in the consumption of beef. However, the own-price elasticities gradually changed from –0.698 in 1970–74 to –0.033 in 1985–92, which indicates that the response to price changes weakened over time.

The cross-price elasticities of demand for beef with respect to chicken increased over time from 0.438 in 1970–74 to 1.189 in 1985–92. As Indonesian consumers were highly sensitive to changes in the relative price of beef with respect to chicken, a decline in the price of chicken resulted in a fast and significant decline in the share of beef in total meat consumption. Beef could continue to lose ground to chicken if the price of chicken (relative to beef) declines further in the future.

Demand for beef in Indonesia is expected to increase to between 348 000 tonnes and 435 000 tonnes by 2010. Beef demand can be satisfied by the slaughter of domestic herds and the importation of beef as well as the importation of live cattle. Taking these factors into account, live cattle exports to Indonesia from northern Australia in 2010 are expected to range between 630 000 and 810 000.

The emergence of Karumba as an export port has challenged Darwin's pre-eminent position in the live cattle export market. Karumba is much closer to the source of Queensland cattle than is Darwin, but further away from the main export destinations of Indonesia and the Philippines. Transport costs from Cloncurry in north-west Queensland are critical in defining the Queensland catchment area of the two ports. Our assumptions led to the conclusion that, from Cloncurry, Darwin had an advantage for exports to Indonesia and Karumba had a small advantage for exports to the Philippines.

Cattle that are transported over long distances by land transport to the export port require time to regain condition before loading on-board ship. The absence of suitable holding facilities at Karumba limits the size of the catchment area currently available to Karumba.

TRANSPORT INFRASTRUCTURE

Because of the small population and resultant small-scale manufacture in northern Australia, residents are in some sense more dependent on reliable long-distance transport than those in southern Australia. Exporters in northern Australia are also just as dependent on an efficient transport system, especially if inputs into their export production are provided from distant southern suppliers. The large area and dispersed population in northern Australia mean that many areas depend on air transport as the major link with larger population centres.

Cairns is the fastest growing airport in northern Australia and has developed over a comparatively short time into a major international gateway for tourists. In terms of passenger movements, Cairns is currently the sixth largest airport in Australia and is anticipated to become the fourth largest airport in Australia by 2014.

Other airports with a large proportion of tourists in their passenger throughputs include Darwin and Alice Springs. Townsville airport previously attracted international tourists but has now lost this role through the development of Cairns.

Seaports in northern Australia range from some of the largest ports in Australia in terms of throughput to some very small ports serving isolated communities.

The road network in northern Australia provides the most important link for the movement of freight. The intercity roads, including the National Highway System, are almost entirely two-lane roads, reflecting the generally low traffic volumes throughout much of northern Australia.

Railways play an important role in the transport of freight in northern Queensland and in the transport of iron ore in the Pilbara area of Western Australia. In addition, Alice Springs is served by rail from South Australia. The iron ore railways in Western Australia are privately owned and all the other railways are publicly owned. In 1993–94, the major freight movements on the northern Queensland system were about 1.1 million tonnes from Mount Isa to Townsville (mostly minerals),

800 000 tonnes from Townsville to Mount Isa (mostly coal for power generation in Mount Isa), and about 6 million tonnes of coal on the line from Newlands to Bowen and the coal export port of Abbot Point.

The volume of iron ore moved on the iron railways is huge by any standard. The lines are operated by three companies. The total iron ore freight task is around 125 million tonnes annually carried over an average distance of 300 kilometres.

Demand forecasts were undertaken for Cairns and Darwin airports and Cairns, Townsville and Darwin seaports. Other airports had been found in previous BTCE work not to present potential infrastructure problems and more recent data suggest that no change to that assessment is required. The rapid growth rate in passenger movements through Cairns airport and the lower, but still significant, growth rate at Darwin airport were substantially above previous forecasts and suggested that a further assessment was warranted. The seaports were chosen because they are the ports in northern Australia with the most significant trade with Indonesia and, at the same time, are the major general cargo ports in northern Australia.

The demand forecasts for Cairns and Darwin airports took account of terminating and transit passengers and the number of passengers carried per aircraft movement. In Cairns there is an expectation that the number of international transit passengers per aircraft movement is likely to decline, and past trends indicate that the number of passengers per aircraft movement is increasing. The net effect is that the number of aircraft movements at Cairns is anticipated to increase at a slower rate than the number of passengers, especially for international movements. There was no evidence available to the BTCE that the proportion of transit passengers per international aircraft movement would change significantly at Darwin, nor was there evidence of major change in the number of passengers per movement.

Taking these factors into account resulted in a projection of 6.6 million passengers and 66 500 aircraft movements through Cairns in 2005–06. The projection for the same year in Darwin is 1.8 million passengers and 38 000 aircraft movements.

Townsville seaport is expected to have the most significant growth due to an increase in nickel ore imports and exports of mineral ores. Trade through Cairns and Darwin is expected to grow moderately, with live cattle exports showing strong growth at Darwin.

Overall, the transport infrastructure in northern Australia is either adequate or existing plans are expected to meet projected demand.

CONCLUSION

Although there are potential synergies in the areas of mining support and human resources development, the major potential development with impacts on the transport system is the development of tourism in Eastern Indonesia. Live cattle exports are booming in northern Australia and these will have some impact on port infrastructure in northern Australia. However, live cattle exports at this stage do not go to Eastern Indonesia in large numbers and are not expected to do so until income levels in Eastern Indonesia increase significantly.

Due to data limitations, the analysis in this report could only go part of the way in exploring the potential synergies arising from the development of tourism in Eastern Indonesia. Further work is required to complete the analysis and to this end a second stage of the project is planned to address the development of tourism in Eastern Indonesia and the impact that that will have on tourism demand in northern Australia and the associated transport infrastructure.

CHAPTER 1 INTRODUCTION

Links between Australia and Indonesia have existed for many years, and bilateral relations between government departments of the two countries have deepened in recent times as a result of the exploration of issues of mutual interest. This study arose as part of the developing relationship between the Australian Department of Transport and Regional Development and the Indonesian Ministry of Communications. The Indonesian Government's policy of increasing the pace of development in Eastern Indonesia indicated that a closer look at the existing and potential links between Eastern Indonesia and northern Australia was warranted.

Eastern Indonesia and northern Australia have a number of common characteristics. They are both geographically distant from the major cities and towns of their nations. Eastern Indonesia depends on an extensive network of sea and air transport links for inter-island transport and transport to the more developed Western Indonesia. Transport for both people and cargo is either slow by sea or expensive by air.

Northern Australia is separated from the more densely populated south-eastern region of the country by large areas with few people and few centres of significant economic activity. Transport links are mostly by air for passengers and by road for freight.

Against this background, the study had two objectives. The first was to assess whether the economic characteristics of the defined areas of Eastern Indonesia and northern Australia have the basic features of a regional economy. The second was to provide an opportunity for Indonesian project team members to develop skills in economic analysis and computing to successfully complete this and similar projects on transport infrastructure.

Because of the large area encompassed by northern Australia and the range of economic activities undertaken, the project was limited to an

initial examination of the region so that existing and potential economic links with Eastern Indonesia could be identified. The initial examination would then be a guide to where further more in-depth research would be warranted.

CONSIDERATION AS A REGIONAL ECONOMY

The concept of an economic region generally implies that the components are geographically close. Countries that are geographically close tend to trade with each other, but the trade is facilitated if there are cultural and language similarities and if transport and communications costs are minimised (Thant 1996, p. 11). Certainly, Eastern Indonesia and northern Australia are geographically close, but they have very different cultural and language backgrounds. Transport between the two regions is an issue examined in this report. However, there is more to defining two or more areas as an economic region than close proximity.

A major consideration in the definition of an economic region is the concept of economic complementarity. The theory of international trade suggests that a relative difference (or complementarity) in resource endowments (natural, capital and human) is a major cause of trade. As economic interaction through trade and possible investment intensifies, the components of the region become increasingly interdependent. It is the economic interdependence that is commonly used to define an economic region. In contrast, if two areas had identical resource endowments, there would be little opportunity for trade between them, and they would be more likely to be competitors than considered as a single economic region.

Scale economies can also play a role in determining inter-regional trade. The market enlargement as a result of economic integration through trade and investment is likely to have an impact on both supply and demand (EAAU 1995; Tang & Thant 1994). The larger market possible through economic cooperation allows access to a wider mix of factor endowments and facilitates increased trade and investment. Scale economies also have implications for economic growth, improvement of welfare and demand for transport infrastructure.

If northern Australia and Eastern Indonesia together had the characteristics of a regional economy and successfully operated as one regional economy, we could expect that there would be economic activities that would not be undertaken, or would be undertaken on a smaller scale, if the two regions acted independently.

The degree of complementarity in resource endowments is not always reflected in existing trade flows and other types of economic interaction. There may exist a variety of barriers to trade which Drysdale and Garnaut (1989) refer to as objective barriers such as tariffs and transport costs, or subjective barriers such as institutional or cultural factors.

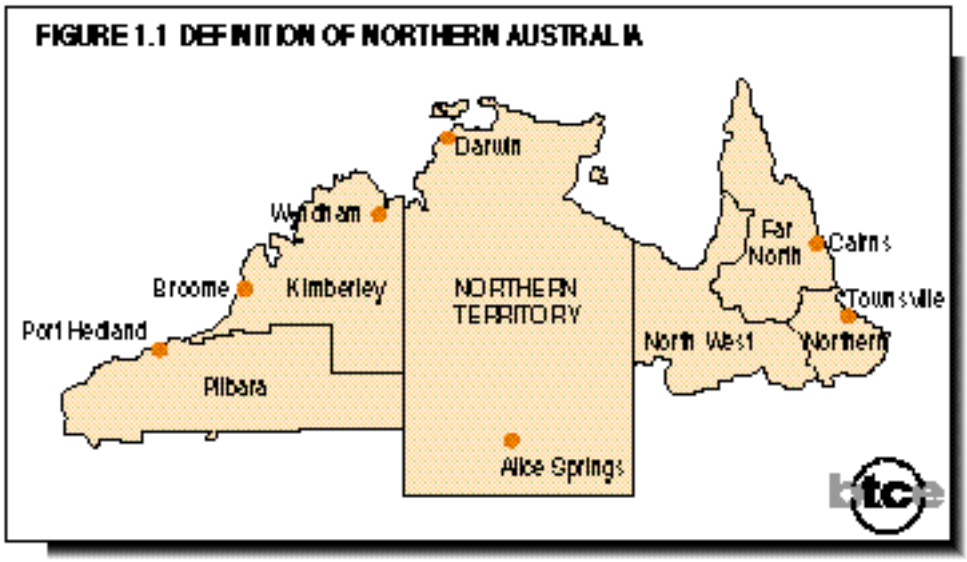
Transport costs can be influenced by the distance between the two geographic regions. However, of more importance to this study is the impact of the technology employed and the adequacy of the infrastructure. Nevertheless, the role of transport in the economic development of the region cannot be considered in isolation from other possible barriers to trade. Therefore, the role of transport in the broader context of other potential barriers is an important element of the study.

DEFINITION OF THE REGION

Before the study's first objective could be tackled, northern Australia had to be defined. This was not a simple task as there is no simple definition of what comprises northern Australia. The definitions in use vary from organisation to organisation, depending on particular organisational objectives. The BTCE took two considerations into account in developing the boundaries to the region:

- the defined area should have, or could potentially have, some economic complementarity with Eastern Indonesia; and
- the defined area should preferably correspond to Australian Bureau of Statistics (ABS) statistical divisions, to facilitate the use of official statistics.

Taking these two considerations into account, the BTCE defined the region as shown in figure 1.1. In Western Australia, the region includes the statistical divisions of Kimberley and Pilbara. The Pilbara division provides a convenient border for our purposes as there is a clear division between the production of minerals and cattle in the Pilbara division and the grain production that commences further south. In addition, air links between Port Hedland and Indonesia have been established for a number of years. Although the Indian Ocean Territories of Cocos Island and Christmas Island are reasonably close to Western Indonesia, the chances of them having economic complementaries with Eastern Indonesia are remote in the medium term. Therefore they were not included in the definition of northern Australia.



All of the Northern Territory is included in conformity with most definitions of northern Australia.

The choice of the parts of Queensland was more difficult. Along the coastal regions of Queensland there is no clear demarcation between the statistical divisions in terms of production, so any border to define the region has some sense of arbitrariness. The BTCE choice was to include the Northern,[1] Far North and the North West statistical divisions. This total area includes the North West Mineral province, a large slice of Queensland's cattle producing areas and a significant part of Queensland's sugar production.

GENERAL DESCRIPTION OF RESOURCES

During the summer months northern Australia is subject to monsoonal weather conditions, which produce high rainfall in coastal regions. Rainfall decreases with increasing distance from the coast, so that much of the inland area is arid or semi-arid. Areas close to the coast are generally the only ones suitable for crops or horticulture. Inland areas are more suited to pastoral industries, especially beef cattle.

1. In this report, a distinction is made between 'northern Queensland', which is the sub-region of northern Australia that includes the three ABS statistical divisions of Northern, Far North and North West Queensland, and 'Northern Queensland', which is the name of one of the ABS statistical divisions.

Northern Australia is rich in mineral resources and has major deposits of iron ore, silver, lead, zinc, copper and bauxite. Significant resources of oil and gas are found offshore and in the Northern Territory. Gold is also produced in significant quantities from a number of mines.

The unique natural features of northern Australia and its cultural history have a large potential to attract tourists. Substantial numbers of tourists visit a large number of resorts throughout the region. Tourism appears to be one of those activities that could benefit from economies of scale if Eastern Indonesia and northern Australia were considered as one economic region.

Population is an obvious point of difference between Eastern Indonesia and northern Australia. In 1992, the population of northern Australia as defined for this project was estimated to have been 646 000 compared with 28 million in Eastern Indonesia (or 43 times the population of northern Australia). The population densities are also very different. The 646 000 people in northern Australia are scattered throughout an area of almost 3 million square kilometres, giving a population density of 0.22 persons per square kilometre. The Eastern Indonesian population is distributed over a much smaller area of just over 1 million square kilometres, giving a density of 28 persons per square kilometre or a density 127 times that of northern Australia.

The semi-arid nature of much of northern Australia precludes the development of population densities of any significant magnitude. Nevertheless, the differences in population and land use suggest that, in the longer term, there are likely to be some economic complementarities that could be exploited.

EXISTING TRADE VOLUMES

Between 1965 and 1993, Australia's exports to Indonesia grew at an annual rate of 20 per cent, from a mere US$7.2 million in 1965 to US$1205.8 million in 1993 (see table 1.1). During the same period, imports from Indonesia grew at 9.2 per cent per annum, from US$70.8 million to US$833.9 million. The strong growth of Australia's exports to Indonesia implies that Indonesia has become an increasingly important market for Australia. At the same time, the importance of Australia as a market for Indonesia has been relatively stable over the period. This is reflected in the changes to the bilateral shares. Indonesia's share of Australia's exports increased significantly from only 0.24 per cent in 1965 to 3.21 per cent in 1993, and Indonesia's share of Australia's imports remained in the range of 1 to 2 per cent. Indonesia's bilateral trade data reflect a similar trend.

TABLE 1.1 AUSTRALIAN BILATERAL TRADE WITH INDONESIA,1965 TO 1993

	Exports			*Imports*		
	Bilateral trade			*Bilateral trade*		
Year	*(US$m)*	*Share (%)*	*Total (US$m)*	*(US$m)*	*Share (%)*	*Total (US$m)*
1965	7	0.2	2 971	71	2.1	3 353
1970	37	0.8	4 482	39	0.9	4 482
1975	201	1.7	11 646	27	0.3	9 831
1980	351	1.7	21 279	385	1.9	19 870
1985	245	1.1	21 735	172	0.7	23 094
1990	1 020	2.8	36 022	407	1.0	39 740
1991	1 107	2.9	37 772	701	1.8	39 460
1992	999	2.6	38 081	923	2.2	42 140
1993	1 206	3.2	37 583	834	1.9	43 454

Note Bilateral share is defined as the ratio of Australian–Indonesian trade to total external trade. For example, the bilateral share of Australia's export is the ratio of Australia's exports to Indonesia to Australia's total exports.

Source IEDB, ANU.

Although trade with Indonesia is strong, trade between northern Australia and Eastern Indonesia does not show as being significant in ABS statistics. However, the available statistics almost certainly understate the true volume of trade because Eastern Indonesia is served mainly through Jakarta and Surabaya. Transhipment through these ports may not always be identified in the available trade statistics. Nevertheless, the rapid growth in trade between Indonesia and Australia provides an encouraging environment for the development of a regional economy (interdependence) between Eastern Indonesia and northern Australia.

ANALYSIS METHOD

The study proceeded in the following four stages:

1. identifying the major economic activities in the defined area of the study;

2. identifying those economic activities in northern Australia that are complementary to economic activities in Eastern Indonesia or have the potential for generating economies of scale through cooperative action (synergistic activities);

3. analysing in greater depth the synergistic activities identified in the second stage and developing growth projections for them; and
4. analysing the impacts of the future levels of the synergistic activities on transport infrastructure.

The report generally follows the pattern set out by the four stages. It focuses on Australian conditions and opportunities. A complementary report was produced by the Indonesian Research and Development Agency of the Ministry of Communications. A summary of the Indonesian work presented at a meeting of the Transport Working Group of the Australian Indonesian Development Area is at appendix II. An extension of the study focusing on tourism in Eastern Indonesia started in October 1997.

CHAPTER 2 ECONOMIC STRUCTURE OF NORTHERN AUSTRALIA

The three sub-regions of northern Australia (northern Western Australia, the Northern Territory and northern Queensland) have relatively low populations, but very different population densities. Northern Western Australia has the lowest density of the three with about one person to every 13 square kilometres (see table 2.1). Northern Queensland has a population density about eight times that of northern Western Australia.

The low population density of northern Australia as a whole has a major impact on the economic activities carried out in the region. Figure 2.1 illustrates the differences in gross regional product (GRP) between the statistical divisions of northern Australia. Population numbers and GRP are seen to be closely related, except for the Pilbara and Kimberley divisions in Western Australia, and the North West division in northern Queensland. In these divisions, the GRP is much larger than would be expected from the size of the population because of the contribution to GRP from mining activities. In northern Western Australia, iron ore mining and the production of oil and gas in the Pilbara division, and diamond mining in the Kimberley division, make major contributions to GRP, and the North West division in Queensland is noted for its base metals.

Table 2.2 compares the structure of the northern Australian and national economies for 1992–93.[1] It is evident from the table that size and economic structure differ enormously among the three sub-regions and that the economic structure of northern Australia differs significantly from the national economy.

1. There are methodological difficulties in the estimation of GRP at the statistical division level of disaggregation. Nevertheless the estimates of GRP are sufficient to allow broad comparisons to be made between sub-regions of northern Australia and with the national economy.

TABLE 2.1 POPULATION AND GROSS REGIONAL PRODUCT OF NORTHERN AUSTRALIA, 1989–90 TO 1992–93

	1989–90	*1990–91*	*1991–92*	*1992–93*
Northern WA				
Area (km^2)	929 100	929 100	929 100	929 100
Population	72 613	69 925	69 974	70 000
Density (population/km^2)	0.078	0.075	0.075	0.075
GRP ($m)	2 825	3 821	4 050	4 223
GRP/head ($)	38 905	54 645	57 879	60 322
Northern Territory				
Area (km^2)	1 346 200	1 346 200	1 346 200	1 346 200
Population	163 700	165 500	167 100	168 300
Density (population/km^2)	0.122	0.123	0.124	0.125
GRP ($m)	3 683	4 045	3 983	3 953
GRP/head ($)	22 498	24 441	23 836	23 488
Northern Queensland				
Area (km^2)	679 330	679 330	681 088	681 088
Population	403 043	402 201	408 890	417 587
Density (population/km^2)	0.593	0.592	0.600	0.613
GRP ($m)	7 949	8 143	8 433	9 210
GRP/head ($)	21 419	20 204	20 968	22 526

Source South Australian Centre for Economic Studies 1995.

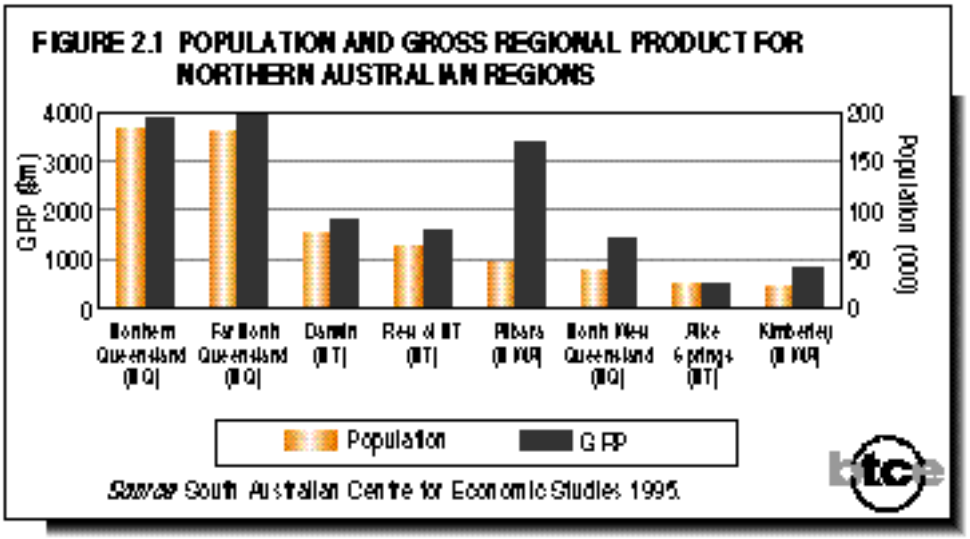


TABLE 2.2 STRUCTURE OF THE NORTHERN AUSTRALIAN ECONOMY, 1992–93

	Northern Western Australia		*Northern Territory*		*Northern Queensland*		*National*
Industry sectors	*(A$m)*	*(%)*	*(A$m)*	*(%)*	*(A$m)*	*(%)*	*(%)*
Public administration, defence & community services	305	7.2	837	21.2	1050	11.4	15.2
Manufacturing	82	1.9	176	4.5	969	10.5	14.3
Agriculture	39	0.9	132	3.3	780	8.5	3.4
Mining	2852	67.5	828	20.9	1659	18.0	4.6
Recreation, entertainment & personal services	98	2.3	221	5.6	526	5.7	5.8
Services	237	5.6	711	18.0	1295	14.1	26.3
Other	610	14.5	1048	26.5	2931	31.8	30.4
Total	*4223*	*100.0*	*3953*	*100.0*	*9210*	*100.0*	*100.0*

Source South Australian Centre for Economic Studies (1995).

The national economy derives a much higher proportion of its gross domestic product (GDP) from manufacturing and services (other than recreational, entertainment and personal services) than northern Australia. In contrast, northern Australia is very much more dependent on mining than is the national economy.

Mining is especially strong in northern Western Australia where it dominates, contributing two-thirds of GRP. If mining is excluded, the economy of northern Western Australia is similar to the Northern Territory economy.

Northern Queensland's economy is more like the national economy than the economies of the Northern Territory and northern Western Australia. The larger population density of northern Queensland, at least in the Northern and Far North divisions, has allowed the development of economic sectors other than mining.

The economic structure of northern Australia is to some extent reflected in the trade pattern. Table 2.3 shows the export and import values through the ports of the region in 1994–95. The 'other' category mainly consists of minerals that are not specified due to commercial sensitivity.

TABLE 2.3 TRADE THROUGH NORTHERN AUSTRALIAN PORTS, 1994–95

	Agriculture		*Minerals*		*Manufacturing*		*Other*	
	($b)	*(%)*	*($b)*	*(%)*	*($b)*	*(%)*	*($b)*	*(%)*
Exports								
Northern Territory	0.12	10.0	0.20	16.7	0.05	4.2	0.83	69.2
Northern Queensland	0.18	11.8	0.09	5.92	0.13	8.6	1.12	73.7
Northern Western Australia	0.04	0.8	3.72	71.4	0.01	0.2	1.44	27.6
Northern Australia	*0.34*	*4.3*	*4.01*	*50.6*	*0.19*	*2.4*	*3.39*	*42.7*
Imports								
Northern Territory	0.00	0.2	0.04	8.2	0.12	23.9	0.33	67.8
Northern Queensland	0.00	0.6	0.23	43.0	0.24	45.2	0.06	11.3
Northern Western Australia	0.00	0.0	0.04	12.3	0.24	73.8	0.04	13.8
Northern Australia	*0.00*	*0.3*	*0.31*	*23.0*	*0.60*	*44.3*	*0.44*	*32.4*

Note The figures in the table include all the ports in the Northern Territory, Cairns, Townsville, Weipa, Mourilyan, Thursday Island, Lucinda in Northern Queensland and Port Hedland, Wyndham, Broome, Dampier in Western Australia.

Source SACCS, Department of Transport 1995.

In 1994–95, minerals (including commodities in the 'other' category) dominated the merchandise exports (93.3 per cent), followed by agricultural goods (4.3 per cent). Manufacturing exports were the least significant (2.4 per cent). The dominance of minerals was particularly strong in northern Western Australia. Northern Queensland had a more balanced export pattern, with agricultural products accounting for 11.8 per cent of exports and manufactured goods for 8.6 per cent. Agricultural exports were also significant for the Northern Territory (10 per cent).

More than half of the value of merchandise imports was from mineral-based products including petroleum products ('minerals' plus 'other' in table 2.3). However, manufactured products represented a significant proportion of the total imports into the whole region (44.3 per cent). It was particularly true for northern Western Australia (73.8 per cent), followed by northern Queensland (45.2 per cent) and the Northern Territory (23.9 per cent).

The strengths of the northern Australian economy are thus in mining, services and agriculture. Because of its low population base and distance

from Australian domestic markets, the northern Australian economy is not strong in manufacturing, except for manufacturing that is related to the mining industry. These generalisations provide some clues to the potential source of synergies with Eastern Indonesia.

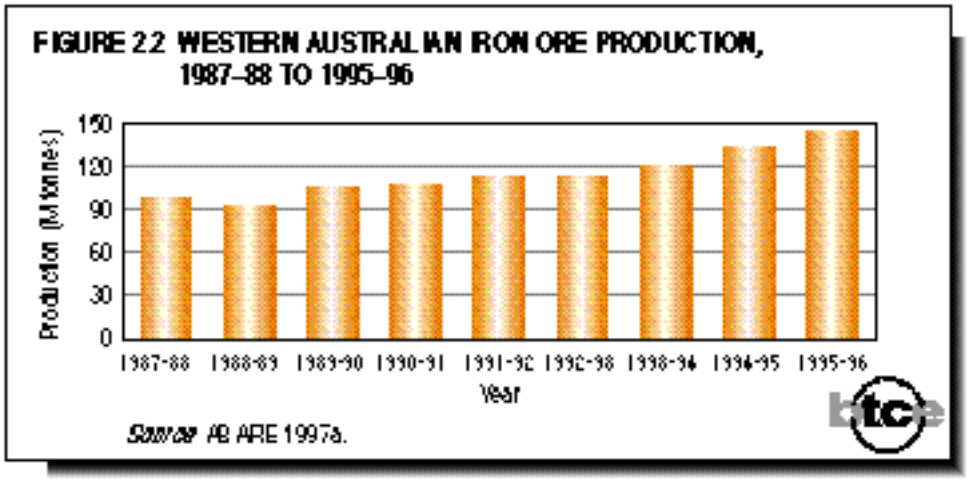
MINING

Northern Australia is rich in a wide range of minerals. Iron ore, oil and gas, and diamonds contribute over 90 per cent of mineral production value in northern Western Australia. In the Northern Territory, the main products are oil and gas, gold, manganese, bauxite and uranium. Zinc, lead and silver production are increasing in value with the development of the McArthur River mine. In northern Queensland, the most important minerals are copper, gold, lead, zinc and coal.

Although gold production is of major importance to the northern Australian economy, it generally occurs in a number of small mines that place few demands on the transport system.

Iron ore

The Pilbara division of Western Australia is the major iron ore producing region in Australia and is one of the major producing regions in the world. Production has increased at an average annual rate of 4.9 per cent between 1987–88 and 1995–96 (see figure 2.2). ABARE (1997b, p. 178) expects production to increase by 4 million tonnes in 1996–97 and by a



further 5 million tonnes in 1997–98. Projects that could result in a production increase of over 60 million tonnes are currently under investigation (ABARE 1997b, p. 231).

Most iron ore is exported, with the main markets being in East Asia and Europe. There is very little trade in iron ore with Indonesia.

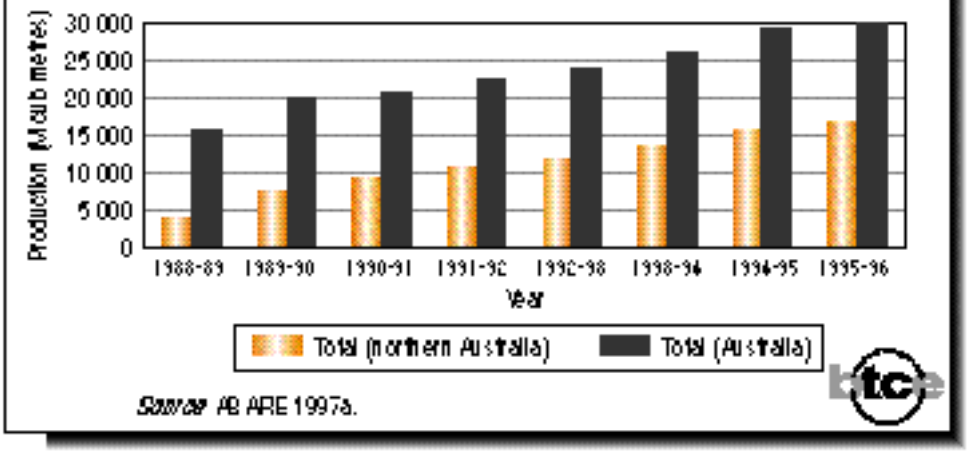
Oil and gas

The Northern Territory and northern Western Australia both have substantial resources of natural gas and crude oil.

Australian natural gas production has grown steadily since 1988–89 at an average annual rate of 9.6 per cent. However, production has grown much more rapidly in northern Australia at an average annual rate of 22 per cent. As a result, northern Australia's share of Australian production has increased from 27 per cent in 1988–89 to 56 per cent in 1995–96 (see figure 2.3).

The North West Shelf in Western Australia is the major site of natural gas production in Australia and most of its output is exported to Japan. Some gas from the North West Shelf is transported by pipeline to the south-west of Western Australia and a recently completed pipeline transports gas to the Western Australian goldfields, where it is used for power generation. Gas produced in the Alice Springs area of the Northern Territory is sent by pipeline to Darwin and the McArthur River mine for power generation.

FIGURE 2.3 PRODUCTION OF NATURAL GAS IN AUSTRALIA, 1988–89 TO 1995–96



Source ABARE 1997a.

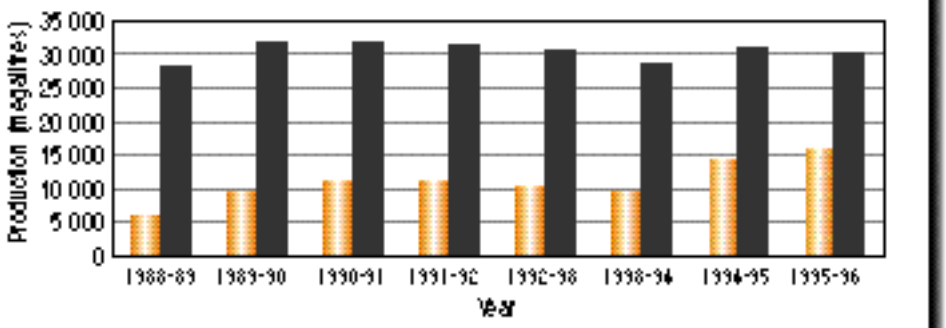
Australian production of oil and condensate, in contrast to natural gas, has remained at a relatively constant level of around 30 000 megalitres annually since 1988–89. However, production in northern Australia has increased at an annual rate of 15.6 per cent over the same period. The proportion of Australian production in northern Australia increased from 20 per cent in 1988–89 to 52 per cent in 1995–96 (see figure 2.4).

All of the committed projects for the expansion of crude oil and gas production are located in northern Australia. The projects involve the development of new production facilities in the Timor Sea off the coast of the Northern Territory (including the Zone of Cooperation area) and the Carnarvon basin in Western Australia. Most of the potential projects that are the subject of feasibility studies are also in northern Australia (ABARE 1997b, pp. 235–6).

Of particular interest is the development of natural gas production facilities in the Timor Sea. The feasibility of constructing a large natural gas processing and exporting facility in Darwin is being investigated.

In general, natural gas is exported, although some is used domestically for power generation—frequently in mining areas where it results in significant reductions in mine operating costs. The existence of large energy resources in northern Australia raises the possibility of the establishment of energy-dependent industries in the longer term (Chinnery 1997).

FIGURE 2.4 PRODUCTION OF OIL AND CONDENSATE IN AUSTRALIA, 1988–89 TO 1995–96



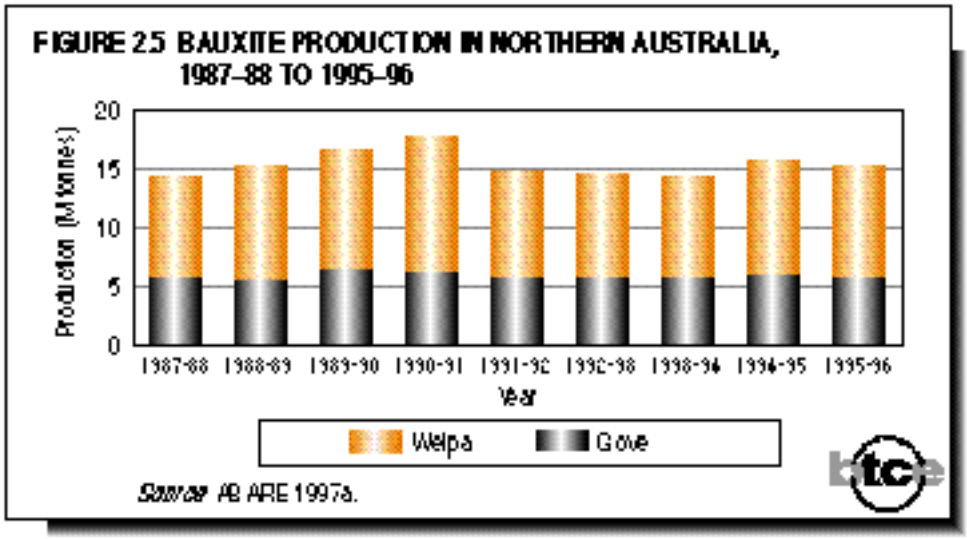
Source ABARE 1997a.

Production in the Zone of Cooperation is a source of joint activity with the Indonesian Government as a result of the Timor Gap treaty in 1989. The treaty provides a mechanism for sharing resources in the previously disputed area. As a result of the treaty, the Timor Gap region was divided into three zones. The southern zone (Area B) is subject to the Australian Resource Tax regime and the northern region (Area C) is subject to the Indonesian Production Sharing regime. The central region (Area A) is a hybrid of both regimes with the Australian and Indonesian Governments sharing the tax revenue generated by production in the area (*Petroleum Gazette* 1995). The first production from the Zone of Cooperation is expected in 1998 from the Elang–Kakatua oil field (ABARE 1997b, p. 235).

Bauxite

Large-scale production of bauxite occurs at Gove in the Northern Territory and at Weipa in northern Queensland. Weipa typically produces just over 9 million tonnes per annum and Gove produces just under 6 million tonnes per annum (see figure 2.5). There is an alumina refinery at Gove with a production capacity of between 1.65 and 1.7 million tonnes of alumina per annum.

Bauxite from Weipa is mostly shipped to Gladstone for refining into alumina, with some bauxite being exported. All of Gove's production of bauxite and alumina is exported. Indonesia is generally not involved in the trade in Australian bauxite or alumina.



Base metals

Zinc, lead and silver deposits are found over an extended region of north-west Queensland and adjoining areas of the Northern Territory. The longest established mine is at Mount Isa in north-west Queensland. The McArthur River mine in the Northern Territory recently commenced production and Cannington, which is a new mine near Cloncurry, is expected to commence production late in 1997. The Century mine, north-west of Mount Isa, is expected to commence production by the end of the decade.

A new zinc refinery is under construction in Townsville and is expected to be completed in 1999 with a capacity to produce 170 000 tonnes of refined zinc per annum.

Concentrates from the McArthur River mine are exported via Bing Bong on the coast of the Gulf of Carpentaria, and the Century mine output is planned to be exported through the Gulf of Carpentaria port of Karumba. Output from the other mines in north-west Queensland is exported through Townsville.

Mount Isa has large deposits of copper but they are found at a considerable depth and are difficult to mine. Mount Isa Mines (MIM) has developed the Ernest Henry mine near Cloncurry, which is expected to produce about 95 000 tonnes of copper concentrate per annum for processing at Mount Isa. It is planned to lift the capacity of the Mount Isa copper smelter from 190 000 tonnes to 200 000 tonnes per annum to accommodate output from the Ernest Henry mine (MIM 1995). During 1995–96, 14 900 tonnes of refined copper were exported to Indonesia through Townsville (Townsville Port Authority 1996).

The existence of the Mount Isa copper smelter and the construction of a gas pipeline from south-west Queensland to Mount Isa has led to the development of a phosphate mine and fertiliser plant at Phosphate Hill, south of Mount Isa. The gases from the copper smelter will be used to manufacture sulphuric acid required for the production of fertiliser. The availability of locally produced sulphuric acid and the lower cost power available from the supply of natural gas were important factors in the decision to proceed with the project.

Other minerals

Other important minerals in northern Australia include diamonds at Mount Argyll in northern Western Australia, manganese at Groote Eylandt and uranium at the Ranger mine in the Northern Territory, and coal in northern Queensland. These minerals generally have dedicated

transport facilities or place few demands on the transport system. There is little trade in these minerals between northern Australia and Indonesia.

A nickel refinery in Townsville is dependent on imported ore for its operation. Around 1 million tonnes of ore are imported each year from Eastern Indonesia. Industry sources indicate that imports from Indonesia will remain at this level for the foreseeable future.

Services to the mining industry

The extensive mining activity in northern Australia has led to the development of service industries to support mining. In addition, the companies operating the mines have developed considerable expertise in operating mines in remote areas. The available service industries and skills provide the potential to support mining activities in Eastern Indonesia.

Some mining activities in Eastern Indonesia are already being supported from northern Australia. The most notable example is the Freeport mine in Irian Jaya, which is supported from Cairns. The company sources about $100 million worth of supplies from the Cairns region each year (Freeport International Purveyors pers. comm. Dec. 1996), indicating that mining support is of great value to the local community.

AGRICULTURE, FISHING AND AQUACULTURE

Agriculture's contribution varies across northern Australia. In 1992–93, the contribution ranged from just under 1 per cent in northern Western Australia to 8.5 per cent in northern Queensland (see table 2.2). The national average was about 3.4 per cent during the same year.

Horticulture

In northern Western Australia, the Ord River area is the major part of the sub-region suitable for cultivation. In 1994, 5750 hectares of the total 6000 hectares in the sub-region under cultivation were in the Ord River area. Production in this area has increased rapidly over the last decade (see table 2.4). Fruit (mainly mangoes and bananas) and vegetables are produced for both domestic and export markets. However, due to the lack of air freight capacity from the region, produce is sent by road to Perth for connection to services to South-East Asia.

TABLE 2.4 AGRICULTURAL PRODUCTION IN NORTHERN WESTERN AUSTRALIA, 1985, 1990 AND 1994

	Production		
Production	*1985*	*1990*	*1994*
Crops and pastures for hay (t)	1 843	1 144	2 834
Grains and cereals (t)	754	7 006	16 655
Vegetables (t)	2 777	9 908	19 108
Fruit (t)	144	51	5 006
Cattle ('000)	764	793	651

ABS 1996.

The Ord River irrigation scheme is being expanded by a further 64 000 hectares, with part of the second stage of the scheme located in the Northern Territory.

In the Northern Territory, the gross value of horticultural production in 1995 was $44.8 million, or 9 per cent greater than in 1994 (Department of Primary Industries and Fisheries 1996). A large proportion of the output is transported to other States for consumption. Only a small proportion is exported to overseas markets, principally to Singapore and Hong Kong (ABS 1994, p. 59). Limitations in transport to overseas destinations from Darwin inhibit the export of horticultural products.

The major crops produced in northern Queensland are sugar and bananas, which together comprise 73 per cent of the value of northern Queensland crops. Almost all of the bananas are produced in the Far North statistical division. However, the Northern division produces over 80 per cent of northern Queensland production of other horticultural products.

Northern Queensland exports a large proportion of its horticultural output. During 1994–95, 107 000 tonnes were exported from northern Queensland and a further 93 000 tonnes were transported to domestic markets (Henderson Consultants 1995, appendix 2).

Fishing and aquaculture

Fishing and aquaculture are substantial industries in their own right in northern Australia. In the Kimberley Regional Transport Strategy it was

estimated that the value of fishing and aquaculture production is around $130 million, with pearls contributing $120 million (WA DoT & Kimberley Development Commission 1995, p. 14).

In the Northern Territory, the value of fishing and aquaculture has grown rapidly during the 1990s. Production was valued at $111.5 million in 1995, $45 million of which was due to aquaculture.

In general, northern Australia has the potential to increase its horticultural production and aquaculture and to sell much of it to Asian markets. Because of the isolation of large parts of the productive areas, transport links are not always adequate to service the overseas markets. Development of transport links would help these industries, but it is unlikely that they would develop purely to meet the needs of horticultural and aquacultural producers.

Cattle

Cattle production is one of the most important agricultural industries in northern Australia. Exports of live cattle grew rapidly during the 1990s, with exports to Indonesia growing especially fast. Indonesia now takes the largest share of Australia's live cattle exports. All regions of northern Australia participate in the trade, but over 50 per cent of Australia's live cattle exports pass through the Darwin port. Wyndham, Karumba and Townsville are other northern Australian ports that export significant numbers of live cattle.

Chapter 4 of the report provides an analysis of the live cattle export trade with Indonesia.

SERVICE INDUSTRIES

Services make a significant contribution to the northern Australian economy. Table 2.5 illustrates the contribution of services to GRP for each of the three sub-regions compared with the contribution of services to national GDP. The percentages in table 2.5 are based on total GRP or GDP less the contribution due to mining, to make the figures for northern Western Australia comparable with those for the other sub-regions.

Even after correcting for the contribution of mining, services contribute less to the economy of northern Queensland and northern Western Australia than they do to the national economy, and the contribution is about the same for the Northern Territory. The main difference is in the contribution of finance and business services. Providers of these services are generally based in the major capital cities and many of the major

TABLE 2.5 CONTRIBUTION OF SERVICES TO THE NATIONAL AND NORTHERN AUSTRALIAN ECONOMIES, 1992–93

(Per cent)[a]

Service sector	*National*	*Northern WA*	*NT*	*Northern Qld*
Finance & business services	10.7	5.0	8.3	5.9
Recreation, entertainment & personal services	4.7	7.7	7.1	7.0
Wholesale & retail trade	14.4	12.2	14.4	11.2
Total	*29.9*	*24.9*	*29.8*	*24.1*

a. Percentages are based on total GDP or GRP less contribution from mining.

Source South Australian Centre for Economic Studies 1995; ABS 1997.

companies operating in northern Australia also have their head offices located in the capital cities, so that many of the financial services for northern Australia are provided from outside the region.

Tourism is included in the category of recreation, entertainment and personal services. The contribution of this category of services is relatively larger in northern Australia (average 7.1 per cent) than nationally (4.7 per cent). Tourism is especially important to the economy of Far North Queensland, where it contributes nearly 10 per cent to GRP, even before correcting for mining.

In the Kimberley Regional Transport Strategy it was estimated that tourism in the Kimberley area is valued at $140 million per annum, making tourism second only to mining in its contribution to the Kimberley economy (WA DoT & Kimberley Development Commission 1995, p. 15). Tourism makes a smaller contribution to the economy of the Pilbara division, but both areas of northern Western Australia anticipate a rapid growth in tourist numbers in the future (WA DoT & Pilbara Development Commission 1997).

Both the Northern Territory and northern Queensland are well known for their tourist attractions and Cairns is probably the most important tourism area in northern Australia. Passenger numbers through Cairns airport have grown rapidly as a result of the development of the tourism industry in Far North Queensland.

Tourism clearly has a large potential in northern Australia and is one industry for which there are potential synergies between northern Australia and Eastern Indonesia. Chapter 3 focuses on tourism in detail.

POTENTIAL ECONOMIC COMPLEMENTARITIES AND OTHER SOURCES OF JOINT ACTIVITY

The northern Australian economy is largely based on mining and mineral processing. Although there is much potential in the development of horticulture, the most important agricultural activity is the rearing of beef cattle. Tourism is a major force in the economy of far northern Queensland and is a growing force in the Northern Territory and northern Western Australia.

There are some obvious economic complementarities between northern Australia and Eastern Indonesia. Two examples are the current sourcing of nickel ore from Eastern Indonesia for the Townsville nickel refinery and the very rapid development of live cattle exports to Indonesia.

The trade in nickel ore is well established and likely to remain at current levels for the foreseeable future. There do not appear to be any transport issues involved in the trade and no further work by the BTCE was necessary for this project.

Live cattle exports have grown at a rapid rate, but for how long can such growth rates be sustained? Significant movements of cattle from Queensland to Darwin for export and the development of Karumba as a possible alternative export port to Darwin suggest that growth in the trade will have potential impacts on transport infrastructure in northern Australia. This is examined in more detail in chapter 4.

The importance of mining to the economy of northern Australia has resulted in a significant support base for the industry in the larger population centres throughout the region. Mining is also a developing industry in Eastern Indonesia. There are possibilities for the mining support base in northern Australia to also be used to support mining ventures in Eastern Indonesia. The availability of high-quality training and health services in the major population centres of northern Australia enhances the potential of the region to develop support services for mining in Eastern Indonesia. Mining support is already happening in Cairns, which has developed strong links as a support base for the Freeport mine in Irian Jaya. An analysis of the potential of northern

Australia as a base for mining support could be a topic for further examination.

Tourism has potential for significant growth in both Eastern Indonesia and northern Australia. There appears to be potential for economies of scale in the joint marketing of the tourist attractions and the possible joint development of tourist products in both regions. The Arafura Tourism Zone is a current example of the possibilities although, at mid-1997, it had not developed much beyond the concept stage. Chapter 3 takes up this theme and develops forecasts of tourism demand in northern Australia.

CHAPTER 3 TOURISM DEMAND IN NORTHERN AUSTRALIA

Tourism makes an important contribution to the economy of Northern Australia. In the main tourist areas of the region during 1992–93 (the most recent year for which GRP data are available), the contribution of entertainment, recreation and personal services was significant, ranging from 5.5 per cent of GRP in the Kimberley statistical division to almost 10 per cent of GRP for the Far North division of Queensland (South Australian Centre for Economic Studies 1995). The significance of tourism in northern Australia is also illustrated by the fact that 21 to 23 per cent of all international visitors to Australia visit northern Australia.

Northern Australia and Eastern Indonesia have much in common as far as tourism is concerned. Both regions have a large potential for tourism, with a wide variety of natural features and indigenous cultures to attract visitors. Population levels are low in northern Australia and incomes are low in Eastern Indonesia, so that neither region generates a large volume of travel. The establishment of aviation links is dependent on visitors from outside the regions travelling to locations within them.

Although tourist facilities are relatively well developed in northern Australia, there is much that can be done in Eastern Indonesia. Tourists visiting northern Australia generally do not include Indonesia on the same trip, much less Eastern Indonesia. Similarly, visitors to Indonesia generally do not continue their trip in northern Australia.

The development of tourism in Eastern Indonesia opens up a possible market for attracting tourists that either visit northern Australia and continue their journey in Eastern Indonesia, or vice versa. If this happened, there would be potential economies of scale in jointly marketing tourist attractions in northern Australia and Eastern Indonesia.

The data to adequately analyse the potential are not currently available. As a start, the BTCE estimated future demand for tourism in northern Australia. To the extent that synergies exist between Eastern Indonesia and northern Australia, the demand projections will form a lower bound to the future demand on northern Australia's transport infrastructure. The Research and Development Agency of the Indonesian Ministry of Communications is undertaking a similar exercise for Eastern Indonesia.

Projections of the numbers of visitors to northern Australia are most easily undertaken by separating out international and Australian domestic tourism demand and developing separate projections for each group of tourists.

FRAMEWORK FOR ANALYSIS

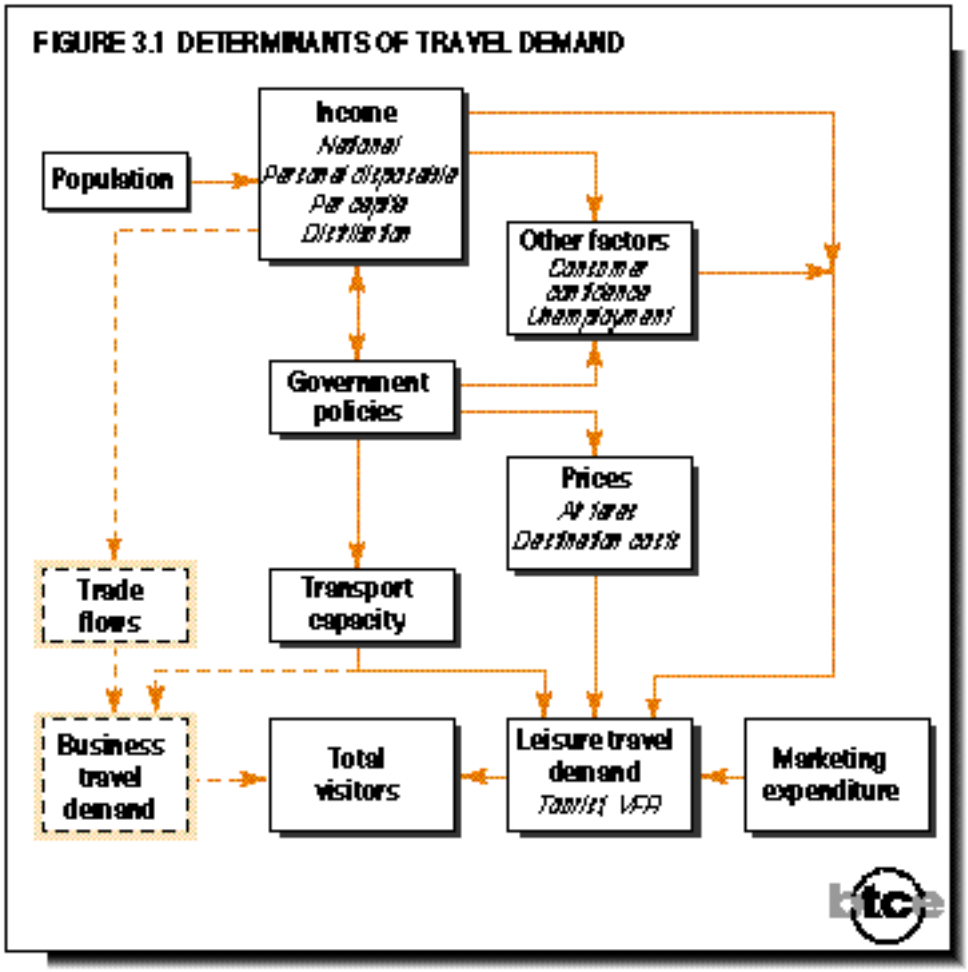
Demand for tourism, which includes holiday travel, has features that distinguish it from demand for other travel purposes. It may be said that leisure travel does not carry severe consequences if not undertaken—unlike business travel, where business or financial opportunities could be lost if a trip is not made.[1] Leisure trips are often undertaken by a whole family as a planned holiday and are constrained by the holiday time available to the family members. Expenses are paid from personal or family incomes—unlike business travel, where expenses are paid by the employer.

The factors influencing travel demand are illustrated in figure 3.1 and are discussed below. For completeness, figure 3.1 also includes business travel; however, no separate analysis was undertaken for that sector of travel demand.

The factors illustrated in figure 3.1 are those suitable for inclusion in econometric models. The BTCE developed such models where appropriate data were available for a suitable time period.

The alternative approach was to use time series analysis. In some instances, time series forecasts are more accurate than sophisticated econometric analysis (Martin & Witt 1989). Time series analysis involves breaking down past data according to trend, seasonality, cycles and random variation. Depending on the method, these four categories of information are normally used to project future values. The main limitation is that time series analysis does not answer the question of why things happen in the way they do.

1. In some instances, video conferencing would be a substitute.



Although all of the factors in figure 3.1 can influence the level of travel demand, data are not readily available for all of them. In addition, the factors have varying degrees of influence on travel demand and their inclusion in an econometric analysis depends on the explanatory power of each factor and the availability and quality of the data.

Cost of travel

Travel costs fall into two categories: the return transport cost from the point of origin to the destination and the living cost (which includes local transport, food, accommodation, entertainment, souvenirs etc.) at the chosen destination in northern Australia. Both costs are major factors in the selection of a holiday destination, particularly in the case of a

family holiday where the cost is almost multiplied by the size of the family.

Other discretionary expenditure on items such as home improvement or a new or second car competes with the leisure travel budget (BTCE 1995c). Because it is easily substitutable, leisure travel is generally more sensitive to the cost of travel than business travel. Even though expenditure on many non-holiday products competes with holiday travel expenditure, cost increases tend to cause individuals who have opted to take a holiday to switch destinations to keep the trip within budget, rather than forgo the holiday (BTCE 1988).

Income

Empirical studies have clearly established a relationship between leisure travel and national income. The higher the national income, the greater the output of goods and services, the better off people are, and the more they will travel for pleasure or for business purposes. Aggregate national income can be measured by either gross national product (GNP) or GDP, depending on conditions in the country concerned. For example, in a developing country where there is substantial foreign participation in the economy resulting in the repatriation of domestic income earnings by foreigners, GNP will reflect more accurately the economic wealth of the nationals.

If population growth is rapid, a more appropriate measure would be GNP or GDP per capita. In developing countries, income per capita may not be an accurate measure of the number of people with sufficient income for travel. The distribution of income is important, as often a small proportion of the population benefits from improvements in the national economy. For an individual, the most appropriate measure of the propensity to make a leisure trip is personal disposable income.

Population

Any increase in the population has the potential to increase total demand, subject to economic factors such as income and its distribution. Population is not often used as an explanatory variable in econometric models because population tends to correlate highly with national income. The correlation inhibits the estimation of the independent effect of either population or income on visitor numbers. Population is more often used to derive per capita income and the proportion of travellers in the total population.

Government policy

Government policies, either by encouraging or discouraging travel, can influence demand for leisure travel. For example, other things being equal, countries that require nationals to obtain exit permits or have stringent entry visa requirements for tourists will have fewer tourists than countries that have more flexible arrangements. Government policies can also affect transport capacity, such as airport capacity or aircraft seats available on specific routes.

Marketing

National and regional tourist organisations engage in sales promotion activities specifically to attempt to persuade potential tourists to visit Australia. These promotional activities take various forms, including media advertising, public relations and trade-related promotions, and may be directed to the promotion of specific locations. It is therefore expected that promotional expenditure would play a role in determining the level of tourism demand.

Substitute prices

Economic theory suggests that the price of substitutes may be an important determinant of demand. For example, an increase in the price of travel to Australia from the United Kingdom may increase the number of tourists from the United Kingdom visiting the United States or South Africa, or increase domestic tourism within the United Kingdom. Instead of forgoing their holidays, tourists choose relatively cheaper destinations. For international tourism, the most important substitution is between international travel and domestic travel (Witt & Witt 1995).

Other factors

When consumer confidence is low, tourism is one source of discretionary expenditure that is likely to be forgone or deferred. Although there are various measures of consumer confidence, it is difficult to include this variable in forecasting models due to its subjective nature. The unemployment rate is related to consumer confidence—potential tourists are less likely to travel if they believe their own employment is uncertain.

INTERNATIONAL TOURISM DEMAND

The number of international visitors (leisure and business) to Australia has grown rapidly over the past decade. Between 1985 and 1996, visitor arrivals in Australia increased by an annual average rate of 12.5 per cent. Since 1990, the average annual growth has been slower, at 11.1 per cent. In 1996, a record number of 4.2 million visitors came to Australia (see table 3.1). Thirty-five per cent of these international visitors were from Japan and New Zealand, while the majority—51 per cent—were from the Asian region. The Tourism Forecasting Council (TFC) forecasts that the number of international visitors to Australia is likely to grow at a

TABLE 3.1 INTERNATIONAL VISITOR ARRIVALS, 1989 TO 2006

('000)

	North America	*Europe*	*New Zealand*	*Japan*	*Other Asia*	*Rest of world*	*Total*
1985	237	300	245	108	163	89	1143
1986	292	347	337	146	204	103	1429
1987	362	412	427	216	255	113	1785
1988	389	531	534	352	308	135	2249
1989	315	531	449	350	321	114	2080
1990	304	549	418	480	348	116	2215
1991	325	531	481	529	389	116	2370
1992	312	577	448	630	506	131	2603
1993	332	637	499	671	704	154	2996
1994	344	721	480	721	927	169	3362
1995	363	752	538	783	1118	172	3726
1996	378	799	672	813	1311	192	4165
1997	403	838	685	850	1489	206	4471
1998	416	883	693	929	1686	222	4829
1999	436	961	702	1026	1897	242	5265
2000	475	1040	747	1134	2109	266	5771
2001	509	1113	756	1241	2335	287	6241
2002	533	1194	765	1327	2585	309	6714
2003	541	1283	775	1399	2865	331	7194
2004	551	1379	784	1448	3169	354	7685
2005	562	1481	794	1495	3501	378	8212
2006	586	1604	803	1557	3877	407	8834

Note Shaded figures are forecasts.

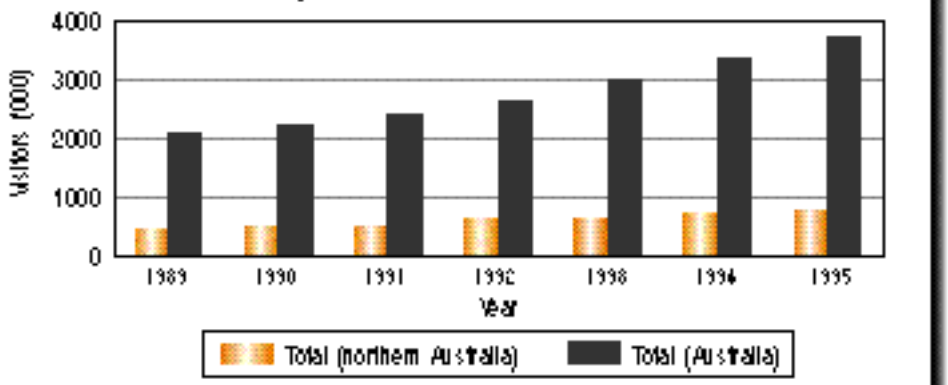
Source TFC 1997a.

lower, but still significant, rate over the next decade, reaching 8.8 million visitors in the year 2006. Visitors from Asia (including Japan) are expected to dominate. The influx of visitors is expected to translate into nearly $34 billion (in 1996 dollars) in export earnings in 2006. In addition, tourism (domestic and international) directly accounts for just under 7 per cent of employment and if indirect effects are included, the total impact on employment is close to 14 per cent (TFC 1997b). These figures clearly show that tourism is a major contributor to the Australian economy, and they lend support to the promotion of tourism in Australia as a high-priority sector in national growth strategies.

As shown in figure 3.2, a steadily growing number of visitors to Australia include northern Australia on their itinerary. Between 1989 and 1994, the number of international tourist visits to the region grew at an average annual rate of 10.3 per cent, almost equalling the national average growth rate for the same period. Although the average growth rates are similar, there are differences in the annual growth patterns. For the northern region, the annual growth rate fluctuated between 5 and 24 per cent, while national growth was relatively steady.

Northern Australia possesses some of the most attractive tourist locations in the world, including the Great Barrier Reef in northern Queensland, Uluru and Alice Springs in the Northern Territory, and the Kimberley region of Western Australia. In 1993, the Great Barrier Reef, Uluru and Alice Springs featured in the top ten locations in Australia that were visited by international tourists.

FIGURE 3.2 INTERNATIONAL VISITORS TO AUSTRALIA AND NORTHERN AUSTRALIA, 1989 TO 1995



Source BTR IVS; TFC 1997a.

Figure 3.3 shows the country of origin of visitors to northern Australia in 1990 and 1995. Visitors from Europe and North America were prominent in both years. However, the number of visitors from Japan exceeded the number of visitors from both North America (the United States and Canada) and Europe (excluding the United Kingdom and Ireland) from 1992 onwards (BTR IVS data).

Even though northern Australia is geographically close to Asia, visitors from Asia, with the exception of Japan, are the least likely to visit the region. Visitors from Europe (including the United Kingdom and Ireland), the United States and Canada are the most likely to visit the northern region (see figure 3.4).

Figure 3.5 shows that holiday visitors dominate the market. In 1994, 96 per cent of Japanese visitors to northern Australia were holidaying; in 1995 the proportion of holidaying visitors from the United Kingdom and Ireland was 72 per cent and from the United States and Canada, 78 per cent. The remaining visitors were those visiting friends and relatives, attending conferences or visiting for other purposes.

Tourism demand in northern Australia was estimated in two stages. In the first stage, total international visitor numbers to northern Australia were estimated for each international market—that is, demand was estimated on the basis of the origin of the visitors. Econometric models were developed to estimate demand for four regions (the United States

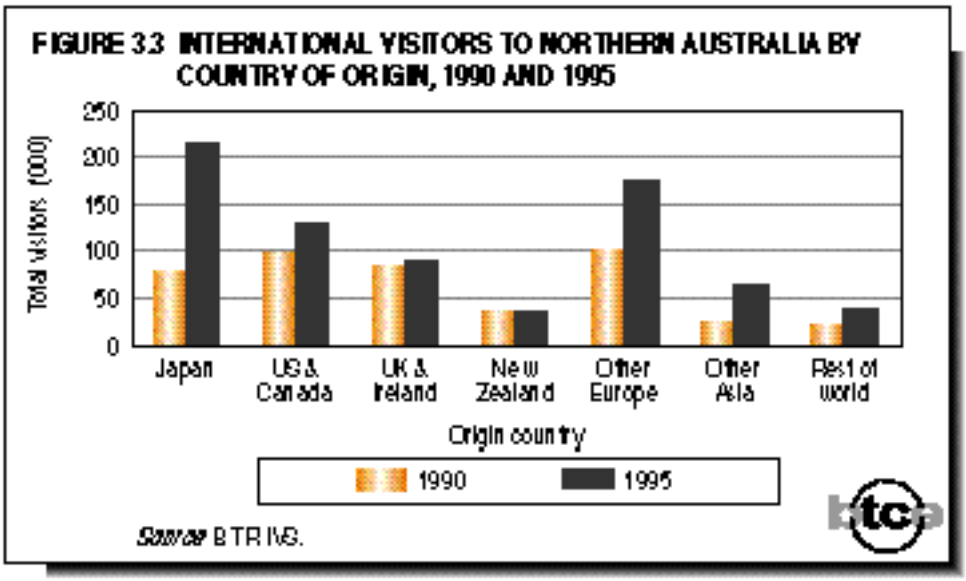
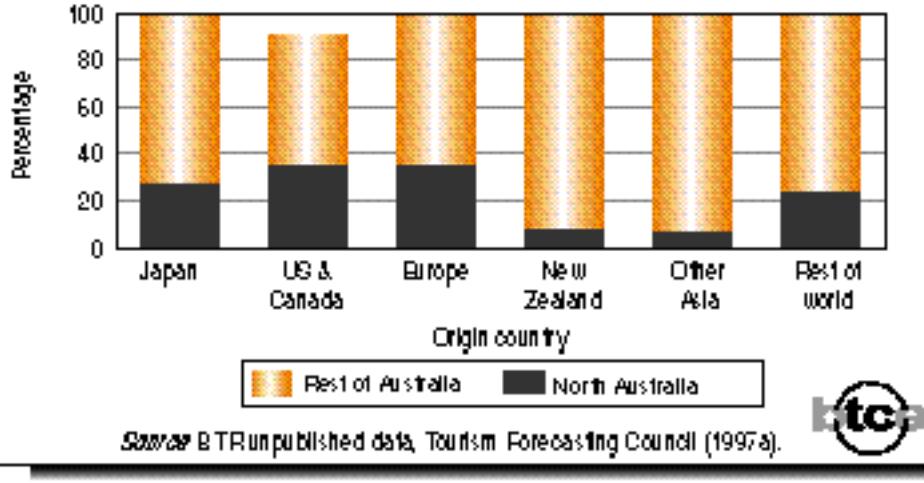
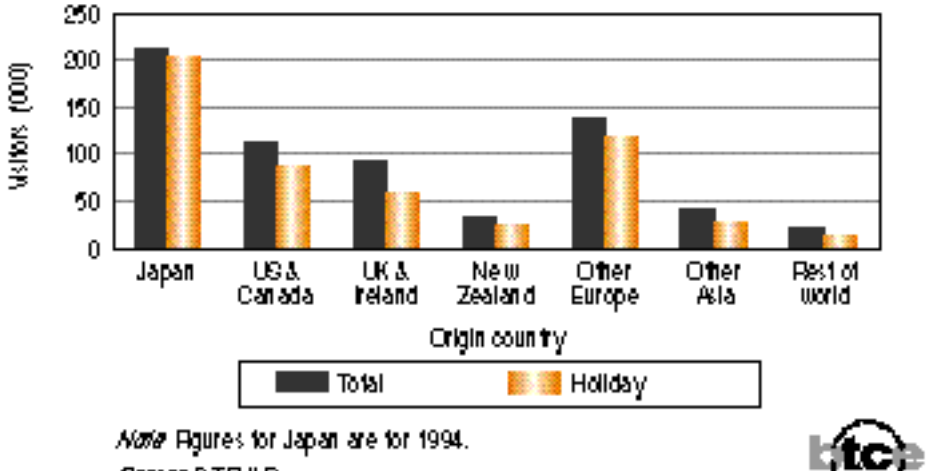


FIGURE 3.4 INTERNATIONAL VISITORS TO NORTHERN AUSTRALIA RELATIVE TO THE REST OF AUSTRALIA BY COUNTRY OF ORIGIN, 1995



Source BTR unpublished data, Tourism Forecasting Council (1997a).

FIGURE 3.5 COMPARISON OF TOTAL VISITORS AND HOLIDAY VISITORS TO NORTHERN AUSTRALIA, 1995



Note Figures for Japan are for 1994.

Source BTR IVS.

and Canada, the United Kingdom and Ireland, Japan, and New Zealand). The remaining regions ('other Europe', 'other Asia' and 'rest of world') each comprise several countries and variables to measure income and the real exchange rates were not readily available. Econometric analysis was not appropriate and time series analysis was used instead.

In the second stage, estimates of numbers of international visitors from all international markets were developed for each of the three sub-regions of northern Australia—that is, demand was estimated on the basis of the destination of the visitors. Econometric models were not appropriate for the second stage. Instead, a time series approach was adopted.

Aggregate international tourism demand in northern Australia

International tourism demand in northern Australia was forecast to the year 2004. Econometric demand models for the four major markets were estimated using annual data from 1981 to 1995. So that factors specific to holiday visitors could be identified, separate demand equations were estimated for holiday and total visitors from the United States and Canada, the United Kingdom and Ireland, and New Zealand. About 96 per cent of visitors from Japan were tourists and so a model for total visitors effectively models demand for tourists.

The econometric models included real GDP as a measure of income for each of the regions. Following Martin and Witt (1987), consumer price index (CPI) and nominal bilateral exchange rates were tested as measures of tourists' living costs in northern Australia. However, the real exchange rate[2] was found to be a better measure.

Visitor numbers were affected by the bicentenary celebrations in 1988 and the pilots' dispute in 1989–90. The effects of these two events were represented by dummy variables. The dummy representing the bicentenary celebrations was also used as a proxy to represent the impact of the 2000 Olympics on international visitor numbers to northern Australia.

Table 3.2 shows results of the short-run relationships between demand and the determinants for all four major markets, and long-run results for total visitors from Japan and the United States and Canada. All the

2. The real exchange rate between the foreign country and Australia is calculated as:
   $Rexrt = Ac \times Exrt/Fc$
   where *Rexrt* is the real exchange rate, *Ac* and *Fc* are the Australian and foreign country consumer price indices, and *Exrt* is the nominal exchange rate.

TABLE 3.2 EMPIRICAL RESULTS OF DEMAND ANALYSIS

Market	Elasticities[a]		R^2
	Income	*Real exchange rate*	*(adjusted)*[b]
UK & Ireland			
Total visitors[c]	2.21	–0.68	0.85
Holiday visitors[c]	2.32	–0.93	0.88
US & Canada			
Total visitors			
short-run	1.99	–0.54	0.98
long-run	3.20	–0.73	
Holiday visitors[c]	2.62	–0.80	0.91
Japan			
Total visitors			
short-run	4.11	–0.72	0.97
long-run	4.48	–0.48	
New Zealand			
Total visitors[c]	1.61	–1.85	0.86
Holiday visitors[c]	1.62	–1.90	0.83

a. Elasticity measures the percentage change in visitor numbers for a 1 per cent change in income or real exchange rate.

b. R^2 is a measure of how well the estimated relationship explains the variation in the data. The closer R^2 is to 1, the greater the explanatory power of the relationship.

c. These elasticities are short-run elasticities.

Notes Income = real GDP of foreign country.

Source BTCE estimates based on ABS 1995a, 1995b, 1995c, BTR IVS and IEDB.

elasticities have the expected sign and, with the exception of Japan, are within a range comparable with other similar studies. The income elasticities for Japan are higher than might be expected. The coefficients are statistically significant at the 5 per cent level.[3]

Generally, the results indicate that leisure travel is sensitive to income levels. Where models were developed for both total visitors and holiday visitors, the results indicate that holiday visitor numbers are more

3. If the estimated coefficient is statistically significant at the 5 per cent level, this implies that there is at least a 95 per cent probability that the actual coefficient is greater than zero.

sensitive to income than total visitor numbers. The short-run income elasticity for holiday visitors ranged from 1.62 for visitors from New Zealand to 4.11 for visitors from Japan. The world median income elasticity for holiday travel is about 2.4 (Witt & Witt 1995). The estimated value for Japan is higher than reported in other studies (Witt & Witt 1995), and could be due to explanatory factors that could not be included in the model.

The elasticity of living costs for holiday visitors varies from –0.54 for visitors from the United States and Canada to –1.90 for visitors from New Zealand. As expected, holiday visitors are more sensitive to living costs in northern Australia than other visitors. Of the countries analysed, holiday visitors from New Zealand were the most sensitive to living costs, probably because living costs in northern Australia represent a higher proportion of total trip costs for visitors from New Zealand than for other visitors.

Figure 3.6 indicates how well the models fit the source data and includes projections of visitor demand up to the year 2005 for total visitor numbers.

Forecasts for other regions were performed using time series analysis. The forecasts of international visitors from all areas to northern Australia are shown in table 3.3. The number of international visitors to northern Australia is projected to grow faster than the total number of visitors to Australia, so that, by the year 2004, 24 per cent of international visitors visiting Australia will include northern Australia in their itinerary compared with about 20 per cent in 1995.

Regional projections

Analysis of the demand on transport infrastructure in northern Australia involved estimation of the number of visitors to each of the three sub-regions. Separate projections using times series analysis were made for the three sub-regions using BTR data and, where appropriate, data collected by regional tourism bodies.

The analysis was complicated by the fact that a significant number of international visitors visit more than one of the three sub-regions in northern Australia. A visitor who visits two of the regions will be counted once for each region (that is, twice), but only once when northern Australia is considered as a single region. As a consequence, the sum of

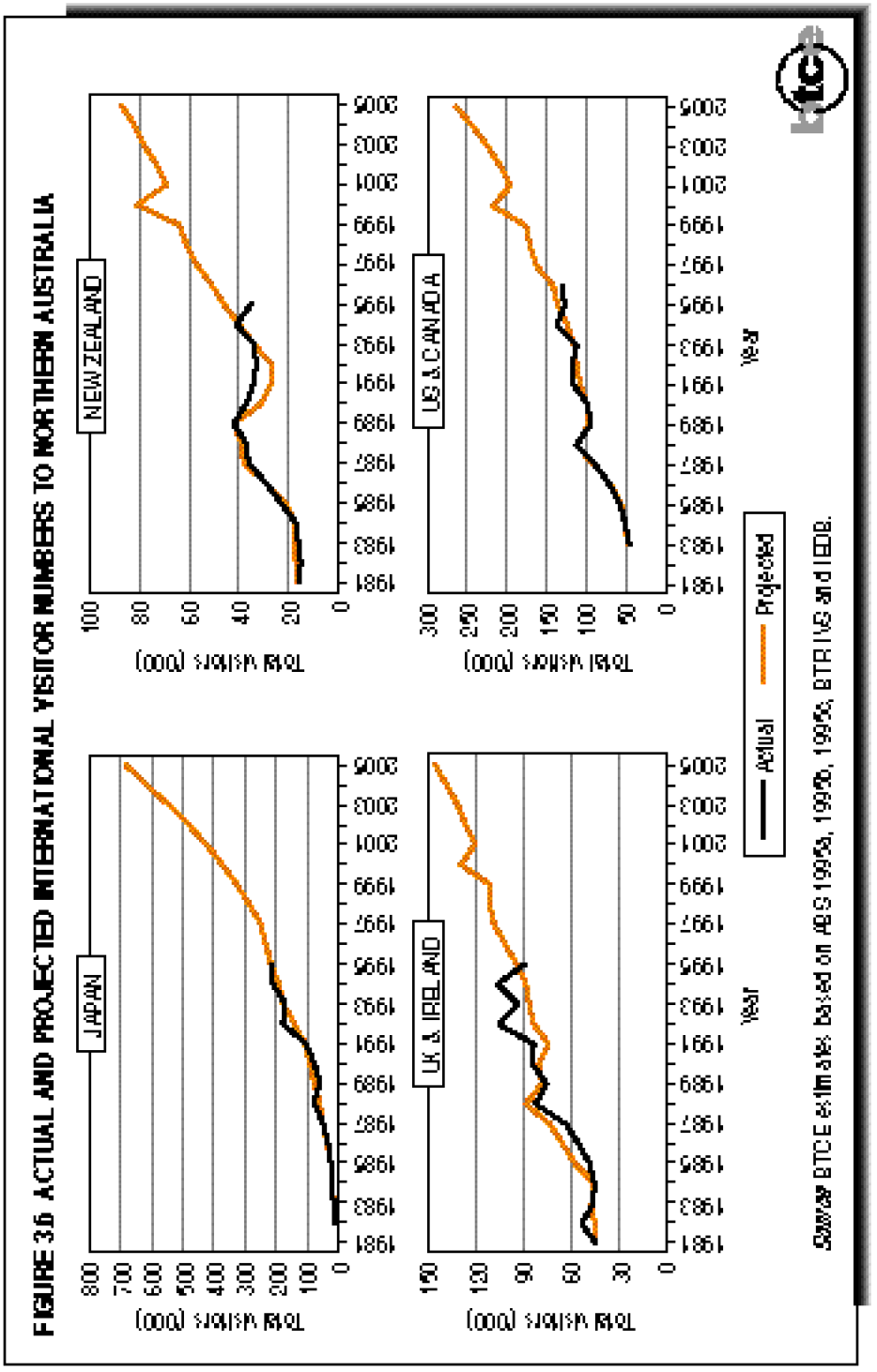


FIGURE 3.6 ACTUAL AND PROJECTED INTERNATIONAL VISITOR NUMBERS TO NORTHERN AUSTRALIA
JAPAN
NEW ZEALAND
UK & IRELAND
US & CANADA
TOTAL VISITORS ('000)
Year
Actual
Projected
Source: BTCE estimates based on ABS 1995a, 1995b, 1995c, BTR IVS and IEDB.

TABLE 3.3 INTERNATIONAL VISITORS TO NORTHERN AUSTRALIA BY COUNTRY OF ORIGIN

('000)

	Japan	US & Canada		UK & Ireland		New Zealand		Other Europe		Other Asia		Rest of World		Total	
Year	*Total*	*Total*	*Hldy*	*Total*	*Hldy*	*Total*	*Hldy*	*Total*	*Hldy*	*Total*	*Hldy*	*Total*	*Hldy*	*Total*	*Hldy*
1989	58	95	na	75	51	42	29	91	73	27	13	23	17	411	240
1990	77	98	79	84	54	37	21	101	81	25	13	21	11	465	336
1991	105	116	81	83	53	34	18	106	87	18	11	17	9	499	364
1992	179	119	81	105	57	33	19	122	101	33	26	16	11	605	473
1993	170	112	86	93	58	34	23	137	118	40	30	20	12	630	496
1994	211	137	98	106	60	41	28	155	133	44	31	26	16	711	576
1995	215	128	100	89	64	35	31	172	144	64	47	39	15	729	615
1996	233	130	107	101	70	51	35	194	164	53	47	52	20	825	677
1997	250	163	114	108	76	57	39	217	184	58	51	65	22	918	737
1998	286	171	115	111	78	61	42	243	208	64	55	78	24	1 014	808
1999	327	176	117	111	77	64	44	272	233	70	59	91	25	1 110	882
2000	373	218	122	129	81	81	57	305	263	77	63	104	26	1 286	983
2001	424	196	174	120	84	69	48	341	296	85	66	117	27	1 351	1 118
2002	481	208	133	126	88	73	51	382	332	93	70	130	27	1 492	1 183
2003	545	224	140	131	93	78	54	427	374	102	74	143	28	1 650	1 309
2004	617	243	149	138	98	82	58	478	421	112	78	156	29	1 826	1 448

Hldy = holiday tourists only. Shaded numbers are forecasts.

Source BTCE estimates based on ABS 1995a, 1995b, 1995c, BTR IVS and IEDB.

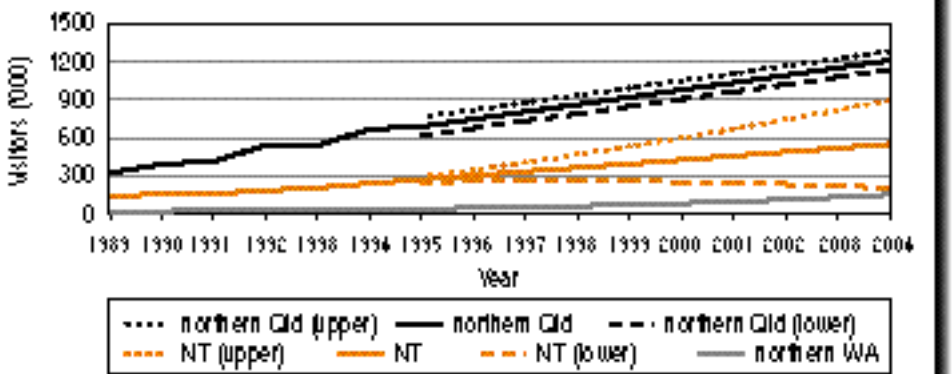
the number of visitors to each region will be larger than the number of visitors to northern Australia in aggregate.

Forecasts for northern Queensland and the Northern Territory were developed using time series analysis. The growth rate produced by the time series analysis for the Northern Territory was used for the estimates for northern Western Australia. The results are shown in figure 3.7 and table 3.4.

The aggregate projections were based on the countries of origin of the visitors, whereas the regional projections were based on the demand for international visitors as recorded for each region. As a consequence, it could be expected that the overall results would differ but that, ideally, they would be consistent. In this case it can be expected that the sum of the regional projections would exceed the aggregate projection because of the effect of some visitors visiting more than one of the three sub-regions.

The middle projections for northern Queensland and the Northern Territory, together with the forecast for northern Western Australia, add up to more than the aggregate forecast illustrated in table 3.3. However, the difference between the two figures decreases as time increases so that, by 2004, the difference is about 5 per cent. This suggests that the upper forecasts for northern Queensland and the Northern Territory may be more accurate and more consistent with the aggregate forecast in table 3.3. Both the middle and upper projections are shown in table 3.4

FIGURE 3.7 INTERNATIONAL VISITORS TO NORTHERN QUEENSLAND, THE NORTHERN TERRITORY AND NORTHERN WESTERN AUSTRALIA



Sources: BTCE estimates based on BTR IVS, NCSTT and TEL data.

TABLE 3.4 PROJECTIONS FOR INTERNATIONAL VISITORS TO EACH OF THE NORTHERN AUSTRALIAN SUB-REGIONS

('000)

	Northern Qld[a]		*Northern Territory*		*Northern WA*	*Northern Australia*	
	Actual & median[b]	*Upper*	*Actual & median*[b]	*Upper*	*Actual & median*[b]	*Actual & median*[b]	*Upper*
1989	325		146		19	490	
1990	394		154		23	571	
1991	417		159		30	606	
1992	541		187		26	754	
1993	541		207		32	780	
1994	668		242		40	950	
1995	690	763	272	296	41	1003	1100
1996	748	821	304	349	48	1099	1218
1997	805	878	335	407	55	1195	1340
1998	863	936	365	468	64	1292	1468
1999	920	993	396	533	74	1391	1600
2000	978	1051	427	600	85	1491	1737
2001	1035	1108	458	671	99	1592	1877
2002	1093	1166	489	743	114	1696	2024
2003	1150	1223	520	819	132	1802	2174
2004	1208	1281	551	896	153	1912	2330

a. Northern Qld comprises the Northern, Far North and North West statistical divisions.

b. Actual to 1994, median forecast thereafter.

Source BTCE estimates based on BTR, NCSTT and TEL data.

to represent the likely range for international visitor numbers. In general, the number of international visitors to northern Australia is likely to be around 2 million by the year 2004, with 55 to 65 per cent visiting northern Queensland, 30 to 40 per cent visiting the Northern Territory and about 7 per cent visiting northern Western Australia.

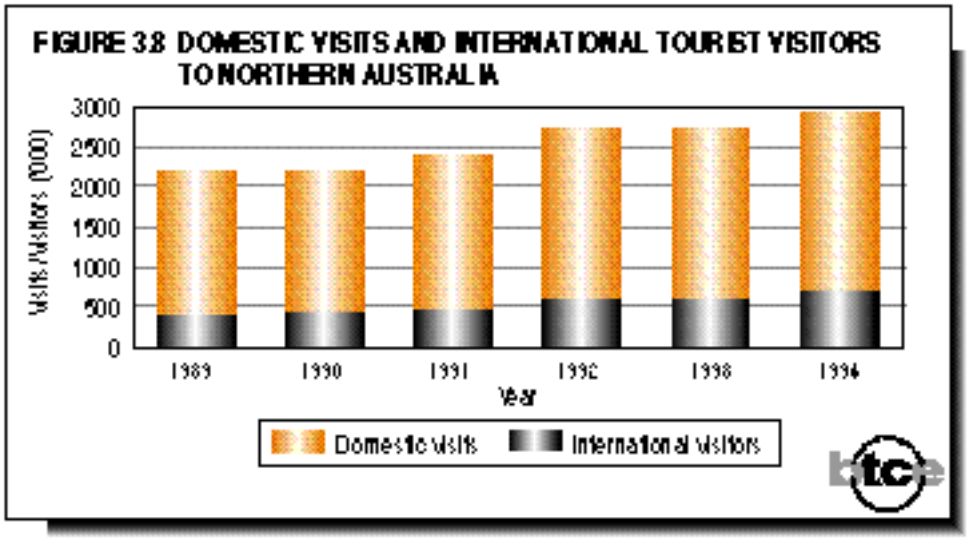
Overall, the projections from the two approaches are reasonably consistent. However, some caution is warranted. Visitors from Asia (other than Japan) are anticipated to be the fastest growing market sector in TFC (1997a) forecasts. BTCE projections suggest that less than 5 per cent of the visitors from 'other Asia' will visit northern Australia. This is consistent with actual numbers up to 1995, but by 2004 the source of 'other Asia' visitors could change significantly so that a larger proportion may include northern Australia in their itinerary.

The projections for northern Western Australia are a further reason for caution. Numbers of visitors to the region have been low and the available data did not permit useful projections using econometric packages. Although the growth rate used by the BTCE is reasonable, the actual growth rate could differ significantly.

DOMESTIC TOURISM DEMAND

Domestic visits are defined in BTR survey data as visits by Australian residents who travel away from home (within Australia) for one or more nights, but for less than three months. In this analysis of the demand for domestic tourism, the focus is on domestic visits made rather than the number of visitors because the data available from the BTR are in this format. However, the number of visits is a more relevant measure of transport infrastructure usage than the number of visitors.

During the period 1989 to 1994, the northern Australian tourism market was dominated by domestic visits made to the region for holiday purposes. This mirrors the national trend that also indicates higher numbers of domestic tourists than international tourists. Although domestic tourism dominates the market, international visits have grown by about 11.7 per cent annually over the 1989 to 1994 period, compared with 7.7 per cent annual growth for domestic visits over the same period (see figure 3.8). It should be noted that the comparison is between visitors (international) and visits (domestic).



Factors influencing domestic tourism demand and choice of travel mode

The factors that influence domestic tourism are similar to the factors that influence international tourism. For example, household disposable income and the price of domestic travel and accommodation take the place of real GDP and the real exchange rate in econometric models of international visitor numbers. The TFC (1996) indicates that Australian domestic tourism is also a function of the price of overseas travel. Other factors include consumer confidence, the unemployment rate, and the availability of accommodation and seats on domestic transport during the peak tourist season.

For the analysis of international visitor numbers, the real exchange rate provided a measure of the competition between visits to northern Australia and domestic holidays in the country of origin of the international visitor. For Australian domestic holidays, competitive overseas travel prices are likely to widen the location choice for holiday travellers. For example, a domestic tourist in the southern States contemplating a holiday in northern Australia could consider New Zealand or Bali as alternative destinations.

In a more general sense, the time available, such as school holidays and other public holidays (Easter and Christmas), is an important factor. Other factors such as the trend towards a shorter working week and the shifting age composition of the population are also thought to influence domestic travel (Duffey 1992). These may significantly accelerate the rate of growth of holiday travel. However, these factors are difficult to model and no attempt was made to include them in this analysis.

The price of domestic travel is largely dependent on the choice of mode of transport. The Australian domestic traveller has all the various transport modes (car, coach/bus, train, plane and boat) to choose from, depending on the destination. Two or more modes could be chosen, such as car and rail or air and car. It is not uncommon for tourists travelling from the southern States to destinations such as Alice Springs or Darwin to 'piggyback' their cars for part of the journey.

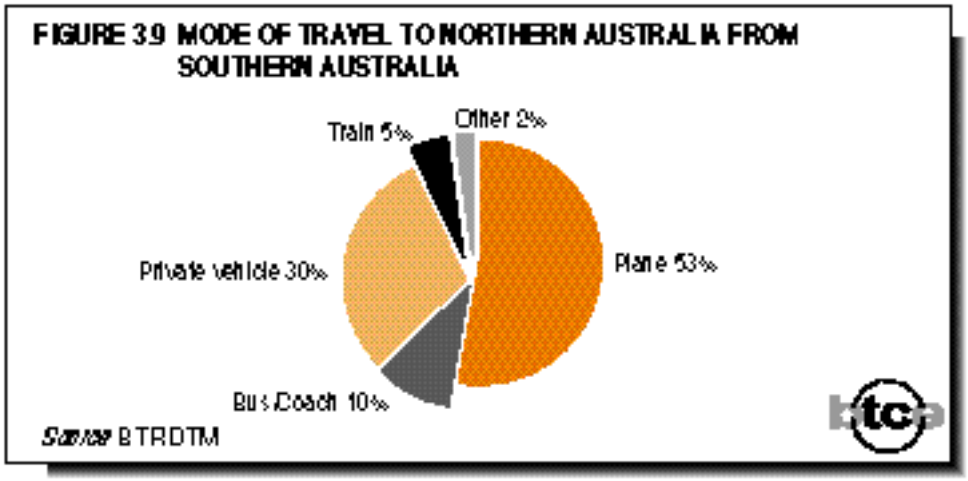
The choice of transport is influenced by the perceived cost. For travel times lasting a day or less, the perceived cost of car travel is no more than the return petrol cost or, for hire cars, the rental rate for the duration of the trip plus petrol cost. For trips lasting several days, the perceived cost could include transit accommodation and, perhaps, food (the cost of food could be perceived as a cost that would be incurred whether the trip is made or not, though the cost is higher when travelling). For coach transport, the perceived cost is the fare charged, which may include

transit accommodation. Based on perceived cost, it is expected that families would opt for car travel in preference to other transport modes for which each member of the family pays a full fare. The perceived cost plus convenience and flexibility account for the dominance of car travel on domestic holidays where the travelling time is not long relative to the holiday time available.

Although travel cost is important, as shown by most studies, statistically it is often not a significant factor. This can be partly explained by the fact that the most common choice of mode of travel is the family car, and perceived costs are generally lower than the true cost of travel. This also helps to explain why some analysts use accommodation costs or combine accommodation costs with travel costs and disposable income to explain domestic visitor nights.[4]

For long-distance trips, such as from the southern States to northern Australia, the inconvenience of the time taken to travel to the destination by car can outweigh the convenience of travelling by car. The effect of travel time is illustrated in figure 3.9, which shows that the dominant mode of transport to northern Australia from southern Australia is plane, followed by car. The difference between the perceived cost of air and car travel narrows for long-distance trips, making air travel more attractive because of the shorter travel time it offers.

FIGURE 3.9 MODE OF TRAVEL TO NORTHERN AUSTRALIA FROM SOUTHERN AUSTRALIA



Source BTRDTM

4. The key reason for the interest in visitor nights is to provide an informed basis for investment in hotel beds. However, the emphasis of this study is on the assessment of the adequacy of transport infrastructure, and hence forecasts of the number of trips or visits is a better measure of transport facility usage.

For domestic tourists travelling to the more remote parts of northern Australia, the reasons for travel may not readily fit into the conventional analysis method. Anecdotal evidence suggests that many Australians travel to northern Australia for the 'experience' and are willing to outlay considerable sums of money on four-wheel drive vehicles. Many families and retired people visit northern Australia during the colder months for trips lasting more than three months and would therefore be excluded from the BTR domestic tourism data. The analysis for northern Western Australia would be especially affected by these factors.

As with the analysis of international visitors, the analysis of domestic tourism first estimates the number of visits to northern Australia on the basis of the State from which they originate, and then in the second stage visits are analysed on the basis of the destination region. This two-pronged approach uses independent sources of data and gives two independent results of tourism demand. To the extent that the two results are consistent, greater confidence can be placed in the projections.

Aggregate demand for domestic tourist visits to northern Australia

In contrast to the analysis of international visitors, the data series available for the analysis of domestic visits were relatively short, so that econometric analysis lacked reliability. Instead, projections based on time series analysis were developed.

The results of the first part of the analysis are illustrated in table 3.5 and figures 3.10 and 3.11. The econometric results are included for comparison and, with the exception of Queensland, produce projections that are within the bounds of the time series analysis, although the slopes are very different for some results. The results of the time series analysis need to be interpreted with caution because most of the results suffer from poor goodness of fit statistics, due to large sampling errors associated with the data.

Regional projections

Separate projections were made for each sub-region using BTR data and data collected by regional tourism bodies. The method used for the projections was time series analysis.

Forecasts for northern Queensland and the Northern Territory were developed using time series analysis. The historic data on domestic visits to north Queensland were extracted from National Centre for Studies in Tourism and Travel (NCSTT) data for the Far North Queensland statistical division and Townsville Enterprise Limited (TEL)

TABLE 3.5 HISTORIC AND PROJECTED DOMESTIC VISITS TO NORTHERN AUSTRALIA

('000)

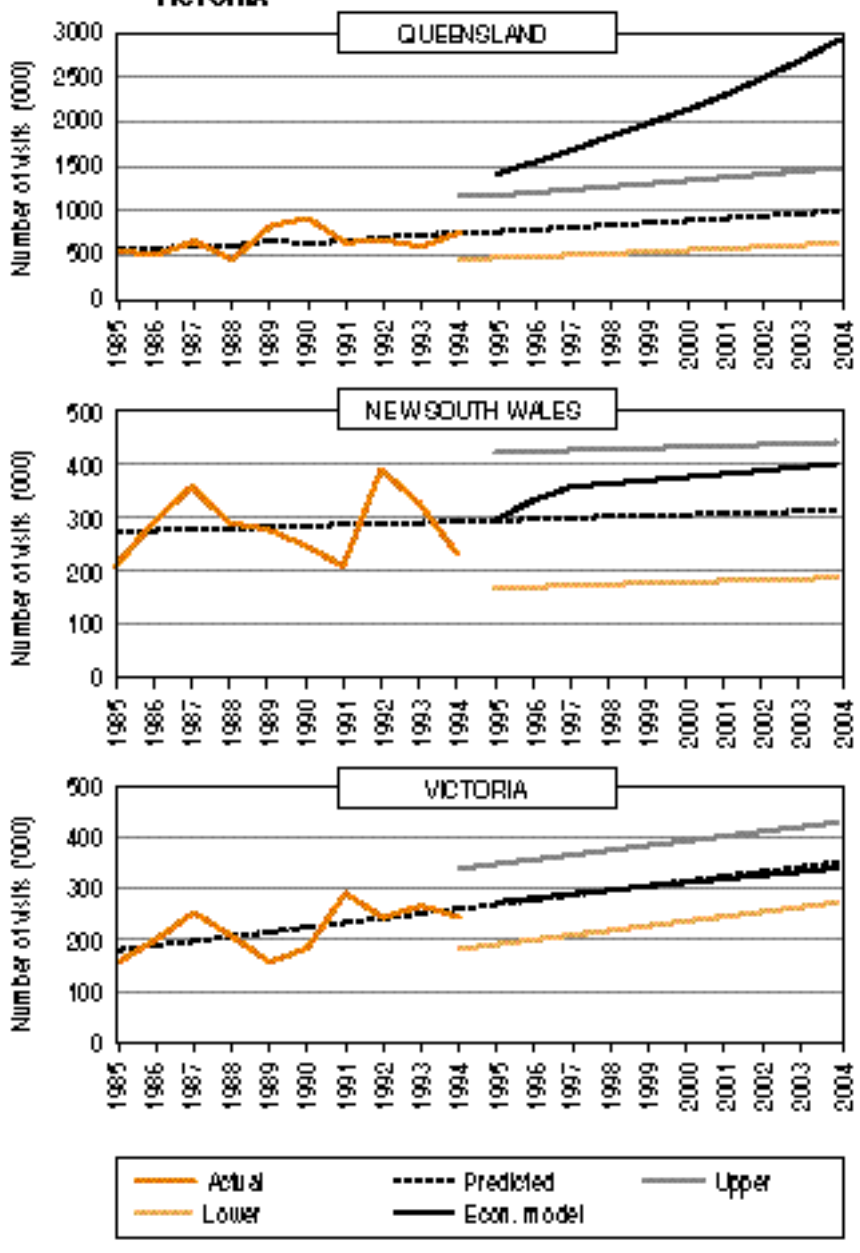
	NSW		Vic/Tas		Qld		NT[a]	WA		SA		Total to Northern Aust
Year	Time ser.	Econ.	Time ser.	Econ.	Time ser.	Econ.	Time ser.	Time ser.	Econ.	Time ser.	Econ.	Time ser.
1985	208		156		545		118	182		63		1 272
1986	291		200		640		45	148		94		1 418
1987	357		253		729		76	188		108		1 711
1988	289		207		792		32	174		119		1 613
1989	277		156		963		96	203		79		1 774
1990	247		184		988		61	166		89		1 735
1991	208		290		1 021		136	150		86		1 891
1992	390		243		1 107		96	167		95		2 098
1993	326		266		1 070		129	214		107		2 112
1994	232		244		1 280		108	197		143		2 204
1995	294	295	269	273	1 321	1 416	134	192	170	123	131	2 334
1996	296	331	278	281	1 395	1 546	144	194	181	128	140	2 436
1997	299	357	287	289	1 469	1 685	154	197	189	134	147	2 539
1998	301	363	296	296	1 543	1 838	166	199	197	139	156	2 644
1999	303	369	305	304	1 617	1 983	178	202	207	145	153	2 749
2000	305	375	314	311	1 692	2 128	191	204	217	151	144	2 857
2001	307	381	323	318	1 766	2 299	205	206	228	158	142	2 965
2002	309	387	332	325	1 840	2 488	220	209	239	164	142	3 074
2003	311	394	341	332	1 914	2 692	236	211	251	171	142	3 184
2004	314	400	350	339	1 988	2 914	253	213	264	178	141	3 296

a. Forecasts based on econometric analysis were inappropriate for the Northern Territory.

Note Time ser. = Time series forecast, Econ. = Econometric forecast. The figures are visits and forecast visits from each State to northern Australia.

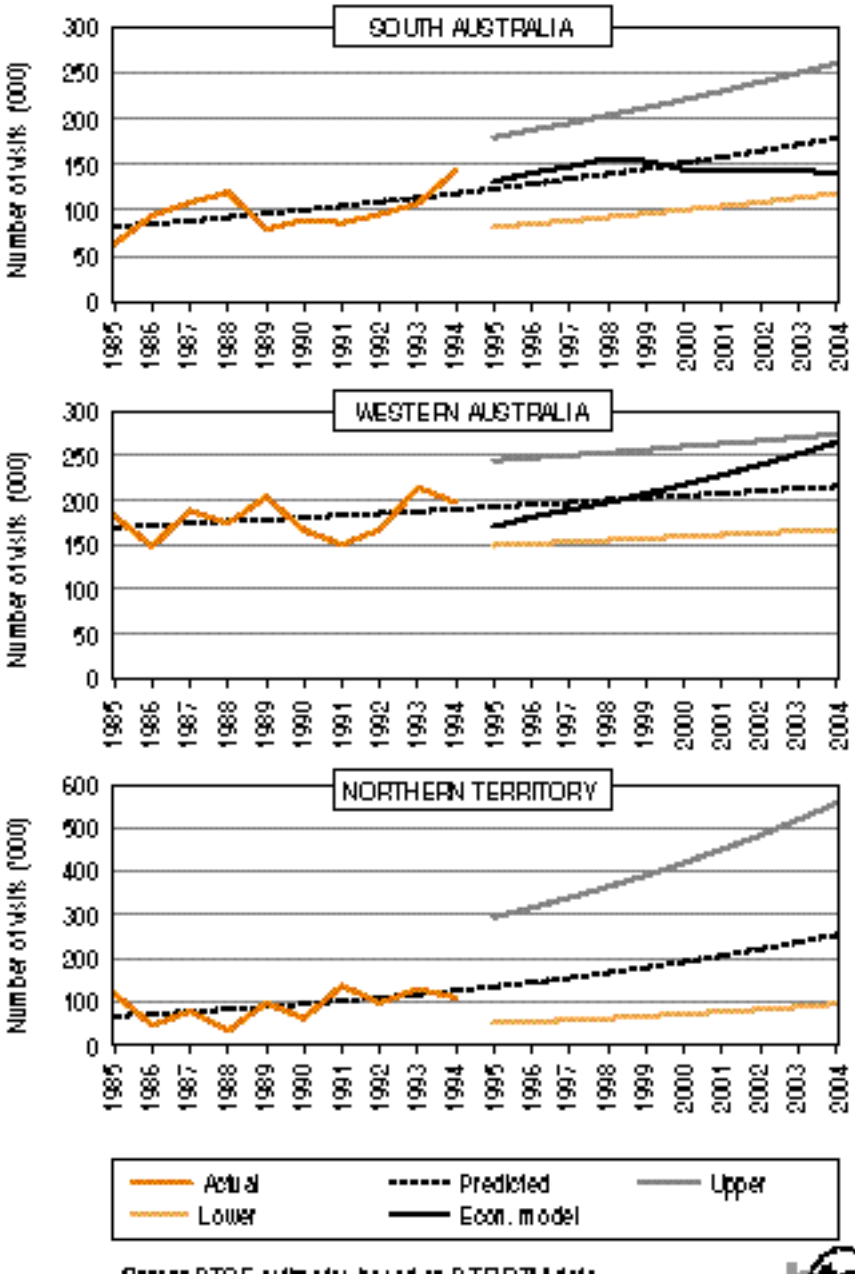
Source NCSTT data; BTR DTM data.

FIGURE 3.10 ACTUAL AND PROJECTED DOMESTIC VISITS TO NORTHERN AUSTRALIA FROM QUEENSLAND, NEW SOUTH WALES AND VICTORIA



Source BTCE estimates based on NCSTT and BTR DTM data.

FIGURE 3.11 ACTUAL AND PROJECTED DOMESTIC VISITS TO NORTHERN AUSTRALIA FROM SOUTH AUSTRALIA, WESTERN AUSTRALIA AND THE NORTHERN TERRITORY



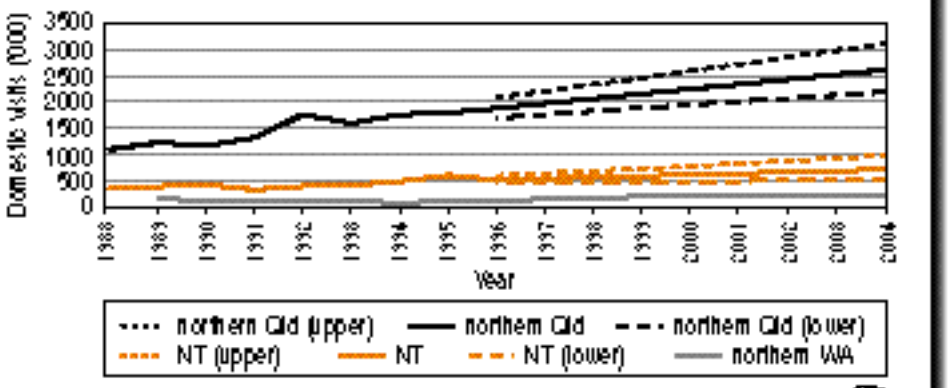
Source BTCE estimates based on BTRDTM data.

data for the Northern Queensland statistical division. Northern Territory data were extracted from the Northern Territory Travel Monitor data.

The historic data for northern Western Australia were not reliable. Projections based on the historic data tend to show declining numbers of visits, which does not appear realistic. As a consequence, domestic visits to northern Western Australia were initially estimated by subtracting the sum of the Northern Territory and northern Queensland projections from the total estimated for northern Australia that is shown in table 3.5. It was necessary to modify this approach because, for some years, the sum of the Northern Territory and northern Queensland projections exceeded the total estimated for northern Australia. The modification involved allowing the sum of the regional projections to exceed the total in table 3.5 by an arbitrary 6 per cent. The projections for northern Western Australia are very sensitive to the total of the regional projections used and, as such, are not reliable.

The results are shown in figure 3.12 and table 3.6. When the upper and lower projections for the Northern Territory and northern Queensland are taken into account, the total number of domestic visits to northern Australia in 2004 is likely to be in the range of 3 million to 4 million. Visits to northern Queensland are estimated to comprise 73 to 77 per cent, compared with 18 to 23 per cent to the Northern Territory and 4 to 7 per cent to northern Western Australia.

FIGURE 3.12 DOMESTIC VISITS TO NORTHERN QUEENSLAND, THE NORTHERN TERRITORY AND NORTHERN WESTERN AUSTRALIA



Source BTCE estimates based on BTRDTM, NCSTT and TEL data.

TABLE 3.6 MEDIAN PROJECTIONS OF DOMESTIC VISITS TO EACH OF THE NORTHERN AUSTRALIAN SUB-REGIONS

('000)

Year	*North Qld*[a]	*Northern Territory*	*Northern WA*	*Total northern Australia*
1989	1222	383	151	1756
1990	1163	416	108	1687
1991	1314	322	120	1757
1992	1758	390	131	2279
1993	1590	409	106	2105
1994	1757	480	68	2306
1995	1790	595	98	2482
1996	1878	508	100	2486
1997	1970	533	143	2645
1998	2061	557	164	2783
1999	2153	582	190	2925
2000	2244	607	188	3039
2001	2335	632	187	3154
2002	2426	657	187	3270
2003	2517	682	188	3387
2004	2608	707	191	3506

a. Northern Qld includes the Northern, Far North and North West statistical divisions.

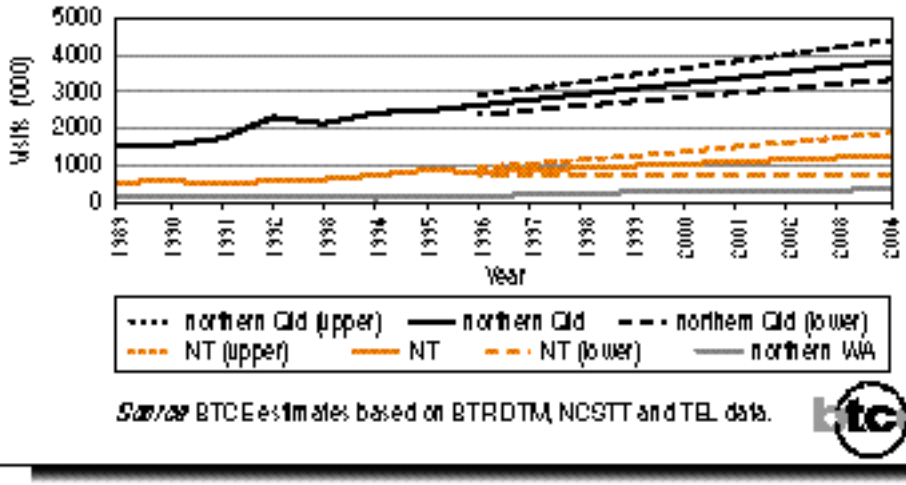
Source BTCE estimates based on BTR DTM, NCSTT and TEL data.

SUMMARY OF RESULTS

Figure 3.13 illustrates the total number of international and domestic visits to each of the three sub-regions in northern Australia. The total number is in the range of 4.4 million to 6.6 million in 2004. The most likely values are in the range of 3 million to 4 million for domestic visits and around 2 million for international visits.

The analysis is based on historic data. The development of tourism in Eastern Indonesia and initiatives such as the Arafura Tourism Zone have the potential to create synergies with the promotion of tourism in northern Australia. To the extent that these synergies exist and are exploited, the results presented in this chapter understate the likely numbers of tourists visiting northern Australia. The information needed to assess the potential of tourism in Eastern Indonesia to influence tourist numbers in northern Australia was not available to the BTCE during this study.

FIGURE 3.13 TOTAL NUMBER OF ESTIMATED VISITS TO NORTHERN AUSTRALIA



Source BTCE estimates based on BTRDTM, NCSTT and TEL data.

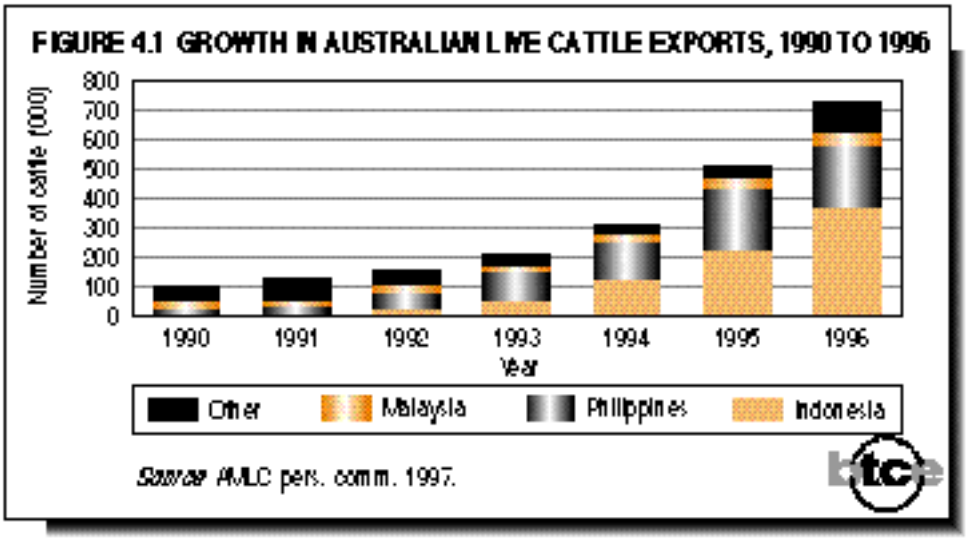
CHAPTER 4 LIVE CATTLE EXPORTS FROM NORTHERN AUSTRALIA

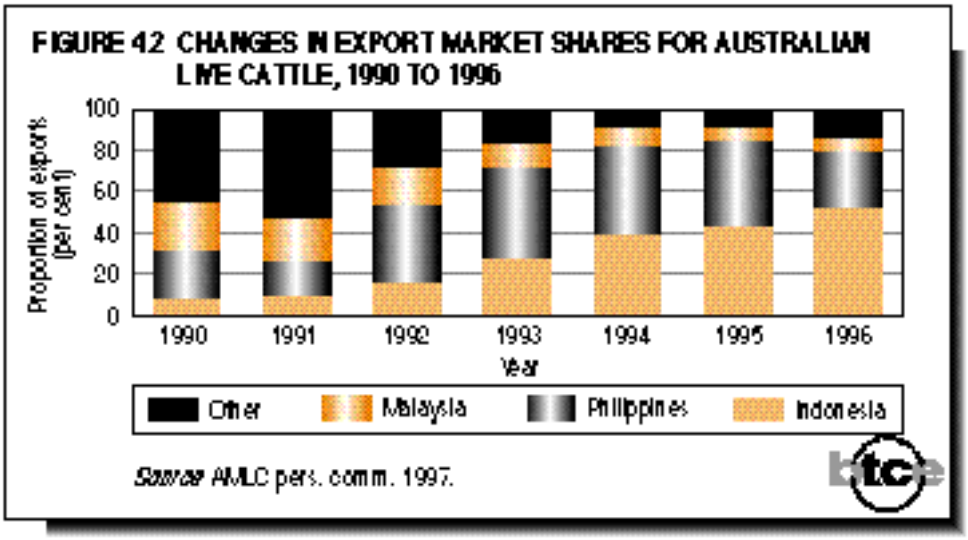
One of the major economic developments in northern Australia in the 1990s has been the unusually rapid growth in live cattle exports. The growth has been led by exports to Indonesia and the Philippines, which together took over 80 per cent of total Australian live cattle exports from 1993 to 1996. The most rapid growth has been in the Indonesian trade, which has increased by an average of 85 per cent per year since 1990. Although the growth of live cattle exports to South-East Asia, and particularly to the Indonesian market, will continue to increase during the next decade or so at least, the current rate of growth may be unsustainable in the long term. The questions of interest are what will be the likely growth pattern of live cattle exports to the region in the medium and long term and what are the transport implications of that growth.

DEVELOPMENT OF THE LIVE CATTLE EXPORT INDUSTRY

The growth in Australia's live cattle exports has been extremely rapid over the period 1990 to 1996 (see figure 4.1). Total exports increased from 97 600 head in 1990 to 723 100 head in 1996¾an average annual compound growth rate of almost 40 per cent. Growth has not only remained strong but has also accelerated consistently and significantly over the period to 1995. Between 1990 and 1991, the growth rate was 28 per cent and it increased to 67 per cent in 1995. Between 1995 and 1996 the growth rate moderated to a still substantial rate of 42 per cent.

The very rapid growth in the Indonesian and Philippines markets since 1990 has meant substantial changes in market shares. In 1990 the two countries accounted for 32 per cent of total live cattle exports and this share increased to 80 per cent in 1996 (see figure 4.2). In 1990 the Philippines was the more important market of the two, but by 1996 Indonesia had increased its market share to 52 per cent of total Australian





live cattle exports. The Philippines market has now shown signs of stabilising, with the number of cattle imported by the Philippines at similar levels in 1995 and 1996. Shares of exports to other countries declined substantially up to 1995, but increased in 1996, mainly due to an increase in exports to Egypt.

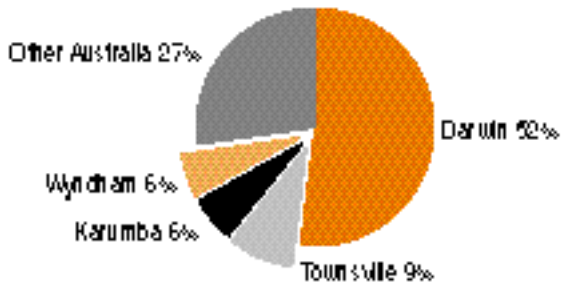
Northern Australia dominates the live cattle export market. In 1996, 73 per cent of all live cattle exports were exported through the four

northern Australian ports of Wyndham, Darwin, Karumba and Townsville. Figure 4.3 illustrates the dominant role of Darwin. Prior to 1996, the three ports of Wyndham, Townsville and Karumba had only a minor role in live cattle exports, but in 1996 the numbers exported through these ports increased significantly.

Although Darwin is by far the major live cattle export port, the cattle exported through it do not all come from the Northern Territory. Table 4.1 indicates that the Northern Territory supplied just under 50 per cent of live cattle exported through Darwin in 1996. Queensland supplied 49 per cent, with the remainder coming from Western Australia and other States. Some Queensland cattle are moved to the Northern Territory for growing out before being sold for export and are included in the live cattle export statistics for the Northern Territory. Table 4.1 indicates that Queensland is the largest supplier of live cattle for exports. It is therefore not surprising that ports in northern Queensland are now emerging as significant export ports for live cattle. The role of these other ports as competitors with Darwin will be examined later.

The developing Indonesian market is becoming the most important overseas market for Australia's live cattle export industry. There are, however, difficulties in predicting the growth of exports to Indonesia. The growth has been extraordinarily high during the 1990s; however, an understanding of the long-term prospects for live cattle exports requires an understanding of the live cattle export industry and the factors affecting demand in Indonesia.

FIGURE 4.3 PORT SHARES FOR LIVE CATTLE EXPORTS, 1996



Source: Personal communications during 1997 with AMLC, NT Dept of Primary Industry WA DoT, Townsville Port Authority and Queensland Ports Corporation.

TABLE 4.1 EXPORT PORT AND STATE OF ORIGIN FOR LIVE CATTLE EXPORTS, 1996

	Export port					
Origin State	*Darwin*	*Wyndham*	*Townsville*	*Karumba*	*Other*	*Total*
WA	5 561	31 522			117 117[a]	154 200
NT	189 918	9 126			527	199 571
Qld	186 936		62 808	42 192	31 154[b]	323 090
Other	1 120				44 594	45 714
Total	*383 535*	*40 648*	*62 808*	*42 192*	*193 392*	*722 575*

a. Includes about 24 700 from Broome and 14 600 from Port Hedland.

b. Includes about 5800 from Cairns and 700 from Weipa.

Source Personal communications during 1997 with AMLC, NT Dept of Primary industry, WA DoT, Townsville Port Authority and Queensland Ports Corporation; ABS ICS data.

OPERATION OF THE LIVE CATTLE INDUSTRY

Cattle supply in northern Australia

Cattle for live exports are usually bought directly from cattle stations. Alternative methods of buying cattle, such as auction or computer aided livestock marketing (CALM), are infrequently used by live cattle exporters. The prices paid by exporters are based on the weight of the cattle at a designated place, usually the export port. Exporters are also paid on the basis of weight, usually at the point of discharge. As a consequence, exporters are keen to ensure that cattle are as heavy as possible by the time of discharge, as long as they meet the specifications for the trade (see box 4.1).

Most cattle exporters are based in Darwin because of its predominance as an export port. However, about half of the cattle exported through Darwin originate from Queensland, with some also sourced from Western Australia. Cattle sourced from Queensland are transported to Darwin in triple road trains that take at least 24 hours for the journey. The stress of the road trip can result in significant weight loss for the cattle. The cattle are usually spelled for around three days in Darwin to regain the lost weight before being loaded on board ship. During this time cattle are fed a mixture of hay and the feed they will receive on board.

BOX 4.1 SPECIFICATIONS FOR LIVE CATTLE EXPORTED TO THE INDONESIAN MARKET

Breed	At least 50 per cent *Bos indicus*
Dehorned	Yes
Weight range	Average shipment < 350 kg / animal
Age	2–4 years
Sex	Prefer steers, but also pregnancy-tested empty heifers, spayed heifers, cows and bulls
Temperament	Quiet, well-handled, adapt and settle on to feed
Coat	Short hair
Colour	No restrictions

Source NT Dept of Primary Industry pers. comm. 1997; Schick 1997.

Cattle normally gain weight at sea and in some respects the ship can be considered as a floating feedlot. The usual feed is a lucerne-based cube manufactured in southern Australia. It costs about $400 per tonne in Darwin and $385 per tonne at Queensland export ports. Work is in progress to develop a cheaper feed with an estimated market price of around $180 per tonne using bagasse, a by-product of the sugar industry. So far the work has had only limited success.

Cattle for export through the northern Queensland ports of Karumba and Townsville are normally purchased within 400 kilometres of the export port. They are transported in triple road trains to Karumba. Road transport is used for most cattle exported through Townsville; however, triple road trains are not permitted in the vicinity of Townsville. Rail transport is also used.

Cattle exported through northern Queensland ports are usually purchased more than one week prior to ship departure. This is to give the Australian Quarantine Inspection Service (AQIS) and the Department of Primary Industry (DPI) sufficient time to access information on the property of origin and the likely disease status of the cattle. This information is obtained through the property number, which is also used to determine whether cattle need dipping for ticks. Foreign buyers or their agents inspect the cattle before they are loaded onto the ship and reject any cattle that are unsuitable (for example, because they are

overweight). When buying cattle, exporters usually allow for a small percentage to be rejected by the buyers or their agents. Quarantine protocol, as required by the importing country, is carried out before departure.

As the number of live cattle exports has grown, the cattle have tended to be drawn from a wider area, especially in Queensland. For example, Koch (1997) commented that 'it is apparent that the live cattle trade is encroaching on areas in Queensland that previously backgrounded cattle for feedlotting'. As increasing numbers of cattle become drawn from a wider area of Queensland, the role of Queensland ports is likely to become more important to the trade.

Queensland Rail has developed rail facilities for transporting export live cattle to Townsville. Rail provides an alternative to road transport for cattle originating in areas with reasonable access to the rail system. Upgrading of the track and the acquisition of new rolling stock has meant that transit times are reasonable. The better condition of cattle transported by rail to Townsville from central Queensland compared with those transported by road to Darwin from central Queensland will improve the competitive position of Townsville as a port for live cattle exports.

Cattle market in Indonesia

Live cattle exported from Australia to Indonesia are usually destined for the 'wet' markets.[1] Live cattle enter feedlots for fattening before slaughter. The Indonesian Government encourages the import of live cattle to allow for fattening within Indonesia before slaughter. Cattle that meet the specifications set out in box 4.1 are imported free of import tariffs. In contrast, slaughter cattle attract a tariff of 15 per cent and beef a tariff of 20 per cent. Importers are required to obtain an import permit. These were previously issued yearly, but now are issued on a ship-by-ship basis. The change is to prevent the importation of 'out of specification' cattle (Schick 1997).

1. 'In the wet market system, cattle are slaughtered during the early hours of the morning and the meat and offal is transferred "hot" to the wet market where it is displayed in meat stalls, usually without protection or refrigeration. Invariably, the cattle are slaughtered, and the meat and offal sold and eaten all within the same day.' (Hughes Export & Marketing 1992, p. 48).

As incomes increase in Indonesia, consumers are also expected to demand higher quality meat and more hygienic methods of presenting and selling it. These expectations are met through supermarkets and the restaurant and hotel segments of the market. Generally, the higher end of the market is met through the import of frozen beef. A small but increasing proportion of beef produced from Australian live cattle imported into Indonesia enters the higher end of the market. Both the wet and cold chain markets are expected to grow as per capita incomes increase, leading to increased demand for live cattle as well as beef from Australia (Schick 1997).

Indonesian fattening enterprises are typically smallholders with one or two cattle. Cattle are held for up to 120 days. The quality of the enterprises varies. Lampung on the tip of Sumatra has the largest concentration of fattening enterprises and these are considered to be well run. Lampung supplies the Jakarta market. In general, there are very few losses of animals in fattening enterprises.

Past attempts at establishing a breeding program in Indonesia have not been very successful. Village headmen often appropriated the bull and charged the villagers for the use of the bull for mating. The issue is complicated by the fact that Brahman cattle usually mate only at night and it is not always possible for villagers to tell when a heifer is ready for mating. In addition, cattle must receive adequate nutrition for successful breeding to take place. Villagers often lack the skills necessary to look after the heifer well enough for successful mating. The breeding program may start again, but in a different form, to overcome some of the problems of the past.

In the long run the live cattle trade may not be able to sustain Indonesia's growing demand for meat. Some believe that the answer is a breeding program based on feedlots. Australia could benefit in the longer term from the establishment of joint ventures between Australian and Indonesian entrepreneurs. Some of the major players are looking at the possibilities, but establishing joint ventures takes time and patience.

Most live cattle imported into Indonesia arrive in Java or Sumatra, with small numbers imported into Kalimantan, Sulawesi and other islands. One possibility raised with the BTCE is to import live cattle into Eastern Indonesia for fattening before transporting them to Java for slaughtering. Unless there is demand for beef in Eastern Indonesia, the procedure would add to costs, and cattle handled in this way would not be competitive with cattle imported directly into Java. Government incentives would be necessary for such a policy to be commercially attractive to live cattle importers.

CONSUMPTION OF BEEF AND OTHER MEAT IN INDONESIA

Indonesia is a developing country. In 1993, the per capita GNP of Indonesia was US$670 (at current prices) and the World Bank classified it as a low-income country. However, the past economic reforms have led to a rapid increase in foreign trade (particularly in the manufacturing sector), a huge influx of foreign investment and, most importantly, a high rate of economic growth. Over the last decade, the economy has grown at an average rate of 6.5 per cent per annum and in 1996 it grew at 7.5 per cent. Until recently, it was expected that the high economic growth rate would most likely be maintained. Currency problems in late 1997 throughout South-East Asia suggest that the Indonesian growth rate is likely to be lower than in the recent past, in the short term at least. However, the process of integration into the regional and world economies will likely continue for at least one more decade (Asia–Pacific Economic Group 1995).

In the meantime, Indonesia is one of the most populous countries in the world and in 1996 its population reached close to 200 million. Between 1965 and 1993, the growth rate of the population was as high as 2.1 per cent per annum on average, although it has reduced significantly since the early 1980s. In the decade between 1980 and 1989, the average growth rate of the population was 1.88 per cent per annum—this reduced to 1.68 per cent per annum between 1990 and 1993.

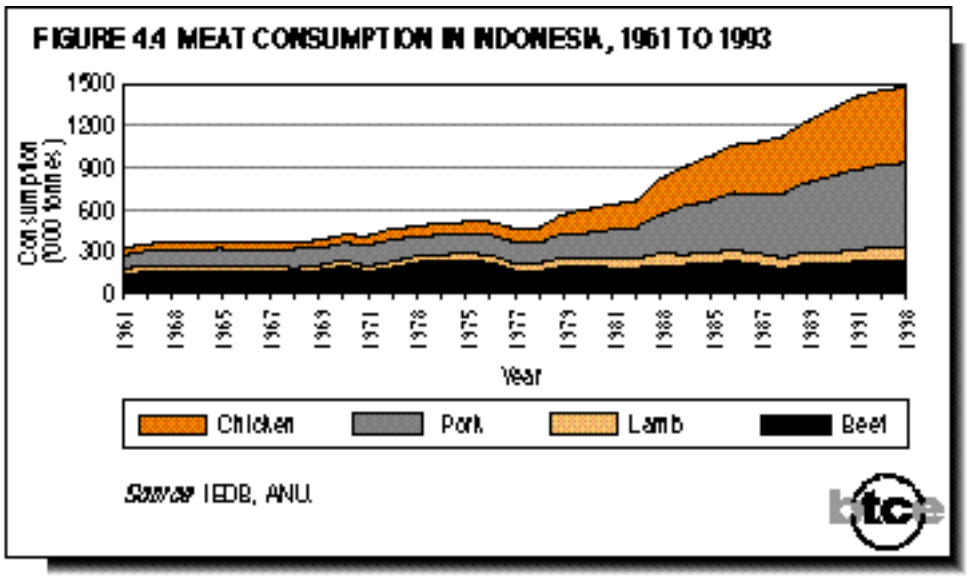
The rapidly growing per capita income associated with a large and expanding population has led to a continued increase in the demand for agricultural products, including beef and other meats. The rapid increase in live cattle exports from Australia in recent years partly reflects this change in demand in Indonesia.

In order to provide a background to the forecast of the demand for beef in Indonesia in the future, it is necessary to look into the relevant economic variables in more detail. Typically, as income rises the proportion of the budget spent on food will fall, the proportions spent on lodging and clothing will remain about the same, and the proportion spent on all other goods will increase. Although higher income will lead to proportionally less spending on food, the total expenditure on food may still increase. Although human beings may eat more when they can afford to, their total intake simply cannot expand indefinitely and it will eventually be constrained by the physical capacity of their stomachs. Food consumption for an individual will stabilise at a certain level and the increased income will be spent elsewhere. However, as income increases, consumers tend to shift expenditure to higher quality food.

Other than individual income, many other variables also have an impact on the aggregate demand for a particular good (such as beef and aggregate meat). For example, the size of the population, relative prices and many other socioeconomic variables are all important determinants.

Figure 4.4 shows meat consumption in Indonesia for the years from 1961 to 1993. In Indonesia, total consumption of meat (including beef, lamb, pork and chicken) increased slowly between 1961 and 1978 and rapidly between 1979 and 1993. In 1993, total meat consumption reached 1.5 million tonnes.

Beef, lamb, chicken and pork together account for at least 96 per cent of total meat consumption in Indonesia.[2] Over the decade between 1970 and 1980, beef was the most important item of Indonesia's meat consumption, accounting for 32 per cent of all meat consumed in 1980. However, since 1980 beef's share of total meat consumption has declined significantly—by 1993 it had declined to 16 per cent of total meat consumption.



2. Fish is also an important source of food in Indonesia. However, data on fish consumption were not readily available, and for this reason fish was excluded from the definition of meat.

The consumption of pork increased rapidly and it overtook that of beef in 1990 and became the most important meat in the 1990s. This change might have been caused by the fact that pork is mainly consumed by the Chinese and Christian communities, who constitute a substantial proportion of the wealthy middle-class population and are in a better position to consume high-quality food.

The consumption of chicken has increased at a faster rate than the consumption of any other meat. In 1970, chicken consumption was only 13.5 per cent of the total meat consumption—far lower than beef and pork consumption. In 1993 it increased to 37 per cent and chicken became the second most important meat. The consumption of lamb increased marginally, but its share of total meat consumption declined from 9.6 per cent in 1970 to 7 per cent in 1993.[3]

Table 4.2 shows some important indicators that are relevant to the consumption of beef in relation to total meat consumption. The population of Indonesia increased by 59.2 per cent between 1970 to 1993 and per capita income in constant US dollars increased far more quickly (by 170.4 per cent) from US$213 in 1970 to US$576 in 1993.

TABLE 4.2 INDONESIAN APPARENT MEAT CONSUMPTION AND OTHER INDICATORS, 1970 TO 1993

Year	*Beef, (incl. veal and offal) ('000t)*	*Lamb, (incl. mutton and goat) ('000t)*	*Chicken ('000t)*	*Pork ('000t)*	*Total meat[a] ('000t)*	*Population (million)*	*Per capita meat consum (kg)*	*Real per capita GNP[b] (US$)*
1970	194	40	56	127	416	117.5	3.5	213
1975	240	51	87	132	510	132.6	3.8	263
1980	192	63	168	176	600	148.3	4.0	338
1985	215	76	318	369	978	163.0	6.0	399
1990	209	83	473	545	1 310	178.2	7.3	498
1993	234	103	545	594	1 476	187.2	7.9	576

a. Apparent meat consumption is defined as the sum of the domestic production and net import (import minus export).

b. GNP is measured at 1987 constant prices.

Source IEDB, ANU.

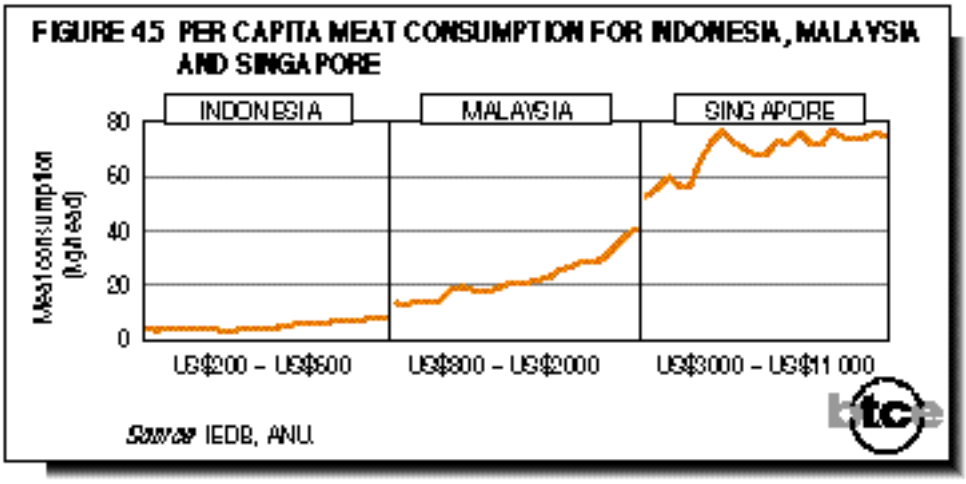
3. In what follows, 'beef' includes beef, veal and offal of cattle, and 'lamb' includes lamb, mutton, and goat meat.

The data reveal some important features of Indonesia's meat consumption. First, average meat consumption is still low, although it has been increasing consistently. In 1993, the per capita meat consumption of 7.9 kilograms in Indonesia was only about one-fourth of the consumption level in Malaysia and one-tenth of meat consumption in Singapore and other economically developed countries.[4]

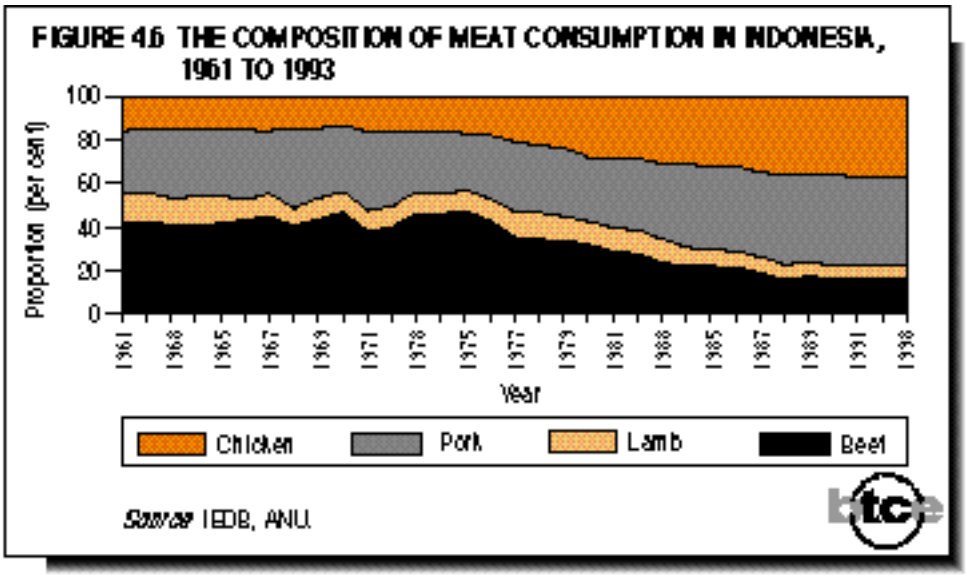
Second, there is an obvious positive relationship between per capita consumption of meat and income. Per capita real income increased from US$213 in 1970 to US$576 in 1993, while per capita consumption of meat increased from 3.5 kilograms to 7.9 kilograms.

The positive relationship between income level and meat consumption seems to be a universal phenomenon. Figure 4.5 shows per capita meat consumption for Indonesia, Malaysia and Singapore and indicates a positive correlation between income and consumption of meat. Meat consumption increases slowly while per capita income lies within the range of US$200 to US$600 (at 1987 constant prices), as in the case of Indonesia over the past two decades.[5] It may accelerate as income reaches the range of US$800 to US$2000, as illustrated by the experience of Malaysia. Growth in meat consumption will eventually level off as per capita income gets close to the level of developed countries, as shown by the experience of Singapore.

FIGURE 4.5 PER CAPITA MEAT CONSUMPTION FOR INDONESIA, MALAYSIA AND SINGAPORE



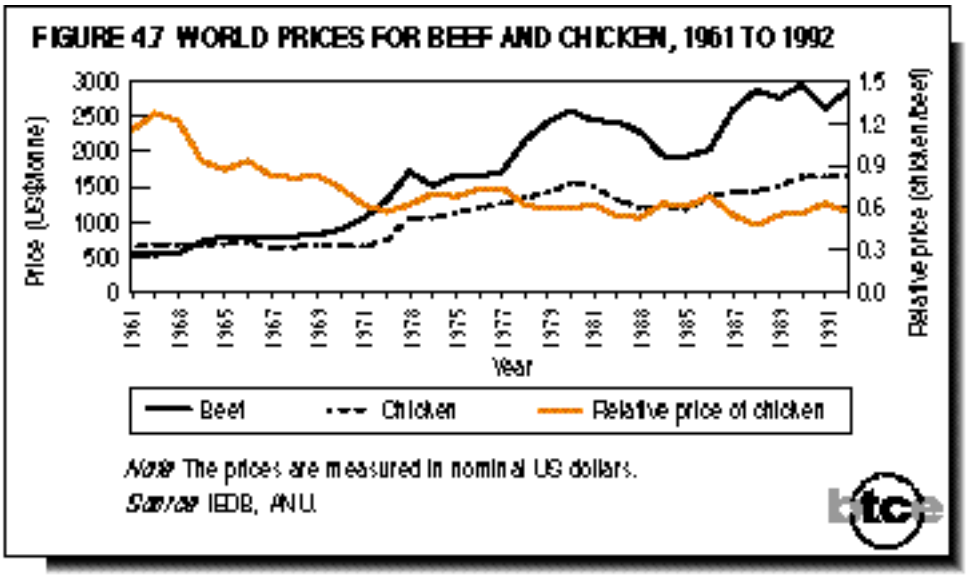
4. Per capita meat consumption in the United States was 98.5 kilograms in 1984; in Singapore in 1993 it was 74 kilograms.
5. Between 1970 and 1993, real per capita income for Indonesia increased by 4.4 per cent per annum (from US$213 to US$576) and per capita meat consumption increased by 3.8 per cent per annum.



The third feature is a marked change in the composition of meat consumption, which is illustrated in figure 4.6. Between 1961 and 1993, the share of lamb in total meat consumption declined marginally while that of pork increased slightly. The most significant changes took place in the consumption of beef and chicken. Beef consumption as a proportion of total meat consumption declined significantly and the loss was almost offset by the increase in chicken's share.

Changes in patterns of meat consumption may be caused by changes in relative prices of meat, shifts in taste and preferences, and changes in socioeconomic variables (such as dieting habit, demography and age of population).

Historical data suggest that changes in relative prices might be an important contributor to changes in patterns of meat comsumption. The 1960s and 1970s were periods when chicken-feeding technology made significant progress and intensive feeding became common throughout the world. As a result, the cost of producing chicken reduced considerably which, combined with market competition, led to a significant reduction in the price of chicken relative to that of beef. This change in the relative price of chicken is reflected in the trend of world import prices for beef and chicken shown in figure 4.7. The price of beef increased from US$558 per tonne in 1961 to US$2870 per tonne in 1992 and, over the same period, the price of chicken increased from US$640



per tonne to US$1636 per tonne. The difference in price was equivalent to a rise by more than 100 per cent in the price of beef relative to that of chicken. The change in shares may reflect a substitution effect resulting from a significant rise in the relative price of beef.

The preceding discussion suggests that it is important to quantify the responses of beef consumers to changes in income and relative prices in order to forecast the future consumption of beef with a reasonable degree of reliability and accuracy. This can be done by measuring the income and price elasticities through appropriate econometric procedures.

FORECASTS OF INDONESIAN BEEF DEMAND

The BTCE developed an econometric model of beef demand in Indonesia (Zhao & Williams 1996). The model is a set of equations that simulates the behaviour of consumers and explicitly allows for the interactions between the consumption of related commodities. In the BTCE model the equations simultaneously model the aggregate consumption of beef, chicken, pork and lamb. This method allows the estimation of price and income elasticities and the effect of changes in relative prices, such as a change in the price of chicken relative to beef.

Table 4.3 shows the expenditure and price elasticities for beef, lamb, chicken and pork. The expenditure elasticities for all four types of meats are positive, implying that none of them is 'inferior' (which is consistent with common sense). However, the magnitudes differ considerably. The average expenditure elasticities for beef and chicken are above unity, while those for lamb and pork are well below unity.

Over the period from 1970 to 1992, the expenditure elasticity of demand for beef remained reasonably stable, although it exhibited a slight upward trend. On average, it was close to unity (1.073). This result implies that consumers in Indonesia did not fundamentally change their taste for beef over a long period of time, and in fact their preference for beef has slightly strengthened over time. It again confirms the view that beef is a highly preferred meat among Indonesian consumers. The result suggests that as total expenditure on meat rises, with other factors held constant, Indonesian consumers will increase their beef consumption by a slightly greater proportion. This is in contrast with the results in figure 4.6, which suggest that the share of beef in total meat consumption declined over the period, implying that the decline in the share was attributable to factors beyond the rise in income.

TABLE 4.3 AVERAGE EXPENDITURE AND PRICE ELASTICITIES FOR BEEF, LAMB, CHICKEN AND PORK

Year	*Beef*	*Lamb*	*Chicken*	*Pork*
Expenditure elasticities				
1970–74	1.037	0.284	1.072	0.816
1975–79	1.050	0.470	1.049	0.856
1980–84	1.069	0.561	1.035	0.866
1985–92	1.112	0.321	1.029	0.901
1970–92	*1.073*	*0.397*	*1.044*	*0.865*
Price elasticities				
1970–74	–0.698	0.170	0.438	0.030
1975–79	–0.580	0.236	0.577	0.084
1980–84	–0.412	0.328	0.757	0.144
1985–92	–0.033	0.522	1.189	0.387
1970–92	*–0.379*	*0.341*	*0.799*	*0.191*

Note To focus on beef and its response to changes in other meats, the table only shows the own- and cross-price elasticities of demand for beef with respect to other meats.

Source Zhao & Williams 1996.

The expenditure elasticity of demand for chicken declined somewhat over the period from 1970 to 1992, although it remained above unity, implying that Indonesian consumers retained a strong preference for chicken over a long period of time and that the consumption of chicken is most likely to increase as the total expenditure on meat increases, with other factors constant. The expenditure elasticities for pork and, in particular, lamb, were inelastic.

The price elasticities shed more interesting light on past trends in beef consumption. The own-price elasticities for beef are negative and cross-price elasticities are positive, which is consistent with economic theory. The average own-price elasticity of demand for beef for the period between 1970 and 1992 turned out to be –0.379, meaning that a 1 per cent increase in the price of beef (relative to all other meats) resulted in a 0.379 per cent decline in the consumption of beef. However, the own-price elasticities gradually changed from –0.698 in 1970–74 to –0.033 in 1985–92, which indicates that the response to such a change in price weakened over time.

The cross-price elasticity of demand for beef with respect to chicken was, unsurprisingly, most significant at 0.799 and, most importantly, it increased over time from 0.438 in 1970–74 to 1.189 in 1985–92. This result combined with a significant decline in the relative price (shown in figure 4.7) offers an unambiguous explanation for the decline in beef's share of total meat consumption. As Indonesian consumers were highly sensitive to changes in the relative price of beef with respect to chicken, a decline in the price of chicken resulted in a fast and significant decline in beef's share of total meat consumption. This implies that beef could continue to lose ground to chicken if the price of chicken (relative to beef) declines further in the future.

Beef consumption was far less sensitive to changes in the prices of lamb and pork.

The estimates for the expenditure and price elasticities in table 4.3 establish a link between the demand for beef and some of its most important determinant variables—the total real expenditure allocated to the consumption of meat, and the price of beef relative to other meats. These estimates, which include assumptions about growth in income and possible changes in the relative price of beef, can be used to forecast future demand for beef.

However, it is still necessary to establish a link between the growth of expenditure on meat and the growth of real income. The evidence from

the developed countries suggests that income elasticity of demand for meat is inelastic (Buse 1986). In Indonesia, the per capita consumption of meat increased by about 3.8 per cent annually while per capita real income increased by 4.4 per cent annually between 1970 and 1993, suggesting that meat may also be income-inelastic in Indonesia.

Zhao and Williams (1996) used a simple econometric model to estimate the income elasticity of expenditure on meat at 0.461, confirming that meat is indeed inelastic in Indonesia. The income elasticity of demand for beef is simply the multiplication of the expenditure elasticity of demand for beef (1.112) and the income elasticity of meat expenditure, giving an income elasticity of demand of 0.513.

The forecast of beef consumption depends on our assumptions about the growth of aggregate income and changes in the prices of competing products. The average annual rate of growth in aggregate income between 1985 and 1993 (6.5 per cent) and the average annual change in the price of beef relative to chicken (0.65 per cent) are used as the base case.[1] A high growth scenario is modelled by assuming no change in the relative price of beef and chicken and a low scenario is modelled by assuming an annual income growth rate of 4 per cent. The results are presented in table 4.4.

TABLE 4.4 FORECASTS OF DEMAND FOR BEEF IN INDONESIA, 1993 TO 2010

(tonnes)

	Scenario		
Year	*Low*	*Base case*	*High*
1992	241 250	241 250	241 250
2000	283 785	295 302	313 581
2005	314 098	335 074	369 425
2010	347 650	380 203	435 214

Note The base case scenario is based on an annual growth in GNP of 6.5 per cent and an annual decline of 0.65 per cent in the price of chicken relative to beef. The high scenario has the same GNP growth assumption as the base case scenario, but no change in the relative prices of chicken and beef. The low scenario also has no price change, but a lower growth in GNP of 4 per cent.

Source Zhao & Williams 1996.

1. The annual growth in income implied by table 4.2 is less than 6.5 per cent. This is because the econometric analysis was based on aggregate income, whereas table 4.2 illustrates per capita income.

Projections of live cattle exports

The projected Indonesian beef demand will be satisfied from a combination of three sources of beef: slaughtering of domestically produced cattle, imports of beef, and imports of live cattle. The projection of live cattle exports therefore requires estimates of future beef imports into Indonesia and the number of cattle expected to be slaughtered from domestic herds. An important parameter in the calculations is the number of cattle required to produce one tonne of beef.

In 1990 there were 1.234 million cattle slaughtered in Indonesia for beef production (Hughes Export & Marketing 1992, p. 55) and 2235 tonnes of beef were imported (IEDB). The total beef consumption in 1990 was 208 929 tonnes. From these figures it is an easy matter to estimate that, on average, there were 6 cattle per tonne—a figure that is close to the estimate of 6.25 used by Hughes Export & Marketing (1992, p. 56). A conversion factor of 6 cattle per tonne of beef was therefore used in estimating the projected number of live cattle exports from Australia.

The BTCE has data on Indonesian beef imports only until 1992, by which time they totalled 10 930 tonnes. The growth rate was around 100 per cent per year for each of the two years from 1990 to 1992. Maintenance of this rate of growth was not consistent with the known live cattle exports to Indonesia and the estimated beef demand derived from the BTCE income and price elasticities. In the absence of any other information, the BTCE assumed that beef imports totalled 15 000 tonnes in 1993. Thereafter, imports were assumed to grow at the rates shown in table 4.5.

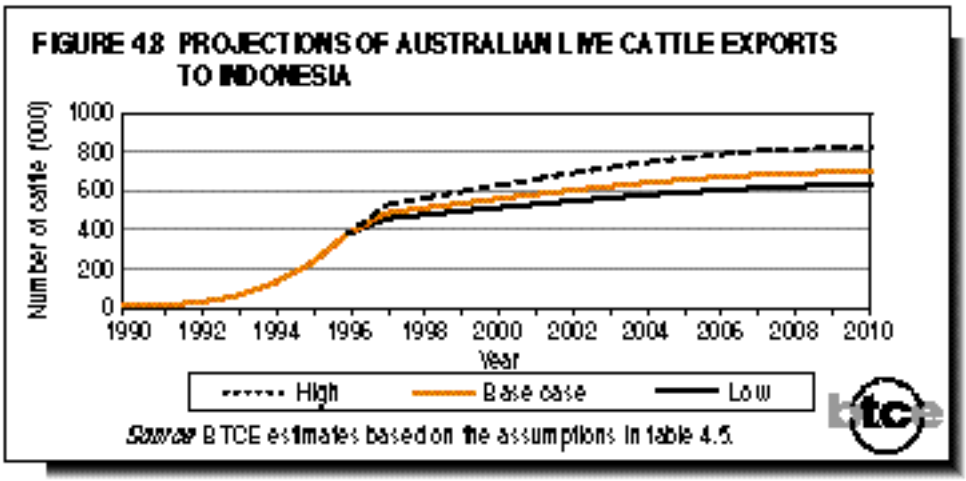
In the base case, the estimated number of Indonesian cattle slaughtered in 1995 under these assumptions was calculated to be around 1.2 million and 1.1 million in 1996. It was assumed that the number of Indonesian cattle slaughtered declined to 1.0 million per annum in 1997, and was maintained at this level for the remainder of the period to 2010. The same number of domestically produced cattle was used for each of the three cases. The assumptions for the projections (including for beef demand) are shown in table 4.5.

The projections of Australian live cattle exports are shown in figure 4.8. By the year 2000, live cattle exports to Indonesia are projected to be in the range of 510 000 to 625 000. By 2010 exports are projected to be in the range of 629 000 to 813 000.

Developing projections of future levels of exports at a time when the market is growing at such a rapid rate is especially difficult. The rapid growth cannot continue indefinitely, but predicting when the market will slow is a difficult task. Past forecasts of growth in the industry have generally underestimated actual exports, and the projections presented here may be similarly inaccurate given the uncertainties in the assumptions.

TABLE 4.5 ASSUMPTIONS USED IN PROJECTED INDONESIAN BEEF DEMAND AND AUSTRALIAN LIVE CATTLE EXPORTS

	Scenario		
Variable	*Low*	*Base*	*High*
GNP (real)	4% per year	6.5% per year	6.5% per year
Relative price of beef	No change	Increase at rate of 0.65% per year relative to chicken	No change
Beef imports	15 000 tonnes in 1993 18% in 1994 & 1995 9% per year thereafter	15 000 tonnes in 1993 21% in 1994 & 1995 10.5% per year thereafter	15 000 tonnes in 1993 24% in 1994 & 1995, 18% in 1996 and 12% per year thereafter
Domestic slaughter rate	1.1 million per year from 1996 to 2010		



Factors not included in the analysis can also impact on the final result. For example, the influence of other markets on live cattle exports has not been included. Producers in northern Australia have been able to take advantage of the live cattle trade to gain relief from low prices in export trades in chilled and frozen beef. Australian producers are expected to be able to re-enter those markets as export prices for beef rise. Live cattle prices will need to increase to compete with chilled and frozen beef markets and this will have a dampening impact on demand for beef in Indonesia and the Philippines.

CHOICE OF KARUMBA OR DARWIN FOR QUEENSLAND LIVE CATTLE EXPORTS

Exporters buying cattle in Queensland for export can choose between the export ports of Darwin, Karumba and those on Queensland's east coast. Townsville is the major port on the east coast for live cattle exports to Indonesia and the Philippines.

The emergence of Karumba as an export port has challenged Darwin's pre-eminent position in the live cattle export market. Karumba is much closer to the source of Queensland cattle than Darwin, but further away from the main export destinations of Indonesia and the Philippines. This section examines the relative costs of exporting through Karumba and Darwin. The data for the analysis are drawn primarily from a similar analysis by Kinhill Economics (1996a) and augmented by data from other sources.

Prior to the dredging of the shipping channel at Karumba, cattle carriers visiting Karumba were smaller on average than ships visiting Darwin or other important cattle exporting ports. There were also difficulties in scheduling vessels because of the demanding tidal patterns at Karumba. The channel has now been dredged and it can be expected that larger ships will increasingly be used for live cattle exports from Karumba. Rather than use past data for the size of ship, the same size ship and number of cattle carried per ship were used for both Karumba and Darwin to better reflect future expectations. The number of cattle used per ship in the analysis was based on actual numbers carried by cattle carriers departing from Darwin in March 1997. Other data and assumptions are listed in appendix I.

Results

The results for live cattle exports to Indonesia and the Philippines are shown in tables 4.6 and 4.7. The costs of exporting live cattle to Indonesia and the Philippines are dominated by the costs of chartering ships. For cattle originating in Cloncurry, ship charter costs account for around half of the total costs associated with exports to Indonesia through Darwin and three-quarters of the costs associated with exports through Karumba. Ship charter costs are less significant for exports to the Philippines, accounting for about one-third of costs through Darwin and one-half of costs through Karumba.

The second largest cost item is road transport costs, especially for cattle exported via Darwin. Road transport costs from Cloncurry account for around 30 per cent of total export costs through Darwin. For exports via Karumba from Cloncurry, road transport costs represent less than 10 per

TABLE 4.6 COSTS OF SHIPPING THROUGH DARWIN AND KARUMBA TO INDONESIA

	Darwin	*Karumba*	*Darwin*	*Karumba*
Cost item	*($/head)*		*(cents/kg)*	
Ship and port costs				
Charter	110.83	165.42	31.67	47.26
Fodder	18.10	25.97	5.17	7.42
Water	0.09	0.37	0.03	0.11
Port costs	3.52	7.66	1.01	2.19
Stevedoring	4.35	0.00	1.24	0.00
Stockman	1.09	1.86	0.31	0.53
Yard costs	12.08	7.03	3.45	2.01
Transit costs	4.06	0.00	1.16	0.00
AQIS costs	0.60	0.92	0.17	0.26
Sub-total	*154.73*	*209.23*	*44.21*	*59.78*
Road transport costs				
Cloncurry	57.16	15.03	16.33	4.29
Longreach	74.65	32.52	21.33	9.29
Total costs				
Cloncurry	211.89	224.26	60.54	64.07
Longreach	229.38	241.75	65.54	69.07

Source BTCE estimates based on assumptions in table I.1.

TABLE 4.7 COSTS OF SHIPPING THROUGH DARWIN AND KARUMBA TO THE PHILIPPINES

	Darwin	*Karumba*	*Darwin*	*Karumba*
Cost item	*($/head)*		*(cents/kg)*	
Ship and port costs				
Charter	71.88	107.29	23.96	35.76
Fodder	12.07	17.42	4.02	5.81
Water	0.07	0.29	0.02	0.10
Port costs	3.45	7.52	1.15	2.51
Stevedoring	4.35	0.00	1.45	0.00
Stockman	1.48	2.30	0.49	0.77
Yard costs	10.55	6.28	3.52	2.09
Transit costs	3.65	0.00	1.22	0.00
AQIS costs	0.50	0.77	0.17	0.26
Sub-total	*108.01*	*141.86*	*36.00*	*47.29*
Road transport costs				
Cloncurry	52.17	13.72	17.39	4.57
Longreach	68.13	29.68	22.71	9.89
Total costs				
Cloncurry	160.17	155.58	53.39	51.86
Longreach	176.14	171.54	58.71	57.18

Source BTCE estimates based on assumptions in table I.1.

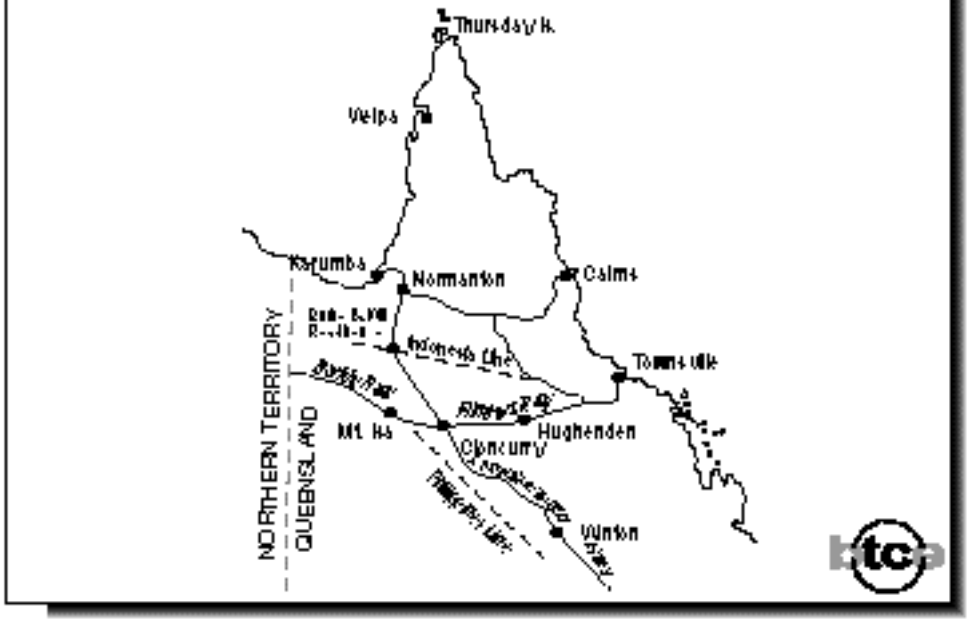
cent of total costs. Essentially, the choice of exporting via Darwin or Karumba is a trade-off between ship charter costs and road transport costs. The results of the analysis therefore depend on the realism of the assumptions for these two cost items.

From Cloncurry, cattle exports to Indonesia have lower costs through Darwin than through Karumba. A 23 per cent reduction in assumed ship charter costs or a 29 per cent increase in assumed road transport costs would reverse the result. Ship charter rates and road transport costs are determined in markets that are reasonably competitive. The actual rates paid can deviate significantly from those assumed in this analysis. However, the extent of the changes required to reverse the result as far as exports from Cloncurry to Indonesia are concerned suggests that the estimates are reasonably robust.

A further analysis was undertaken to estimate at which point closer to Karumba increased road transport costs for exports through Darwin and lower road transport costs through Karumba would completely offset the higher ship charter costs from Karumba. Cattle originating north of a line passing roughly through the Burke and Wills Roadhouse on the Matilda Highway and a point 170 kilometres north of Hughenden could be exported at lower cost to Indonesia through Karumba than through Darwin. Variations in the assumptions used for ship charter rates and road transport costs would move the location of the break-even line (see figure 4.9).

The results show that Karumba is the preferred port for cattle exported to the Philippines from Cloncurry. However, an increase of 13 per cent in the assumed ship charter rate would reverse this result. As a variation of this size could very well be encountered in practice, it must be concluded that, from Cloncurry, the choice of port for exports to the Philippines is lineball between Darwin and Karumba. It is also apparent from the results that Cloncurry is strategically located for live cattle exports. Cattle originating further south along the Landsborough

FIGURE 4.9 ESTIMATED BREAK-EVEN LINES FOR LIVE CATTLE SHIPMENTS TO INDONESIA AND THE PHILIPPINES



Highway must be transported through Cloncurry if they are destined for Darwin and it is also the most practical route for transporting cattle from this region to Karumba. The port that can offer the lowest export costs for cattle passing through Cloncurry can capture a large slice of central Queensland as its hinterland.

Kinhill Economics (1996a) used the difference in costs at Cloncurry as a starting point for calculating how the difference in costs would change if cattle were sourced from different shires in the area. Cattle were allocated to the Indonesian or Philippines trade or to export via Darwin according to the cost differential for each shire. The study estimated that the supply of cattle for export through Karumba potentially totalled 102 000 per year for the Indonesian trade and 182 000 per year for the Philippines trade. Substituting the results of the BTCE analysis has no impact on the potential supply for the Indonesian trade, but approximately doubles the potential supply for the Philippines trade. The major impact on the Philippines trade highlights the major effect of the price differential at Cloncurry.

However, the potential supply for the Philippines trade may be lower than that estimated in the above analysis. The time involved in transporting cattle from the more distant locations south of Cloncurry to Karumba may result in deterioration in the condition of the cattle. It would be necessary to rest the cattle prior to loading them onto the ship and the costs of doing this are not included in the cost estimates for Karumba. In any case, suitable holding facilities are not yet available in Karumba.

On the basis of the potential supply of cattle, Kinhill Economics (1996b) concluded that exports through Karumba could lie within the range of 150 000 to 200 000 per year. To the extent that potential supply determines the throughput at Karumba (Kinhill Economics did not discuss how the throughput estimate was reached), the results of the BTCE analysis suggests that the potential throughput may be higher.

The analysis does not incorporate non-quantifiable factors. For example, the more comprehensive port services available at Darwin, such as ship repair, are likely to give Darwin an advantage.

The BTCE also examined the costs of exporting through Townsville. The results implied that Townsville would have difficulty competing with Karumba or Darwin except for cattle sourced from properties relatively close to Townsville. However, in 1996 almost 63 000 cattle were exported through Townsville, suggesting that there are factors that could not be

included in the costs analysis that are influencing exporters in their decisions as to which port to use. The lack of access to Karumba during much of 1996 before channel dredging was completed may have been one factor. Also, it is easier to access Townsville than Karumba during the wet season. Queensland Rail has developed improved facilities for transporting live cattle and this may have a positive impact on the costs of using Townsville relative to other ports, especially for cattle located in central Queensland.

CHAPTER 5 TRANSPORT INFRASTRUCTURE IN NORTHERN AUSTRALIA

'Efficient freight and personal transport is essential to the nation's economic and social development' (NTPT 1994, p. 1). In its strategy for Australia's transport network, the National Transport Planning Taskforce (NTPT 1994, p. 1) identified the large distances between population centres and the small volumes of freight (by international standards) as a major challenge to the efficient movement of freight within Australia. In northern Australia the challenge is even greater because the distances between population centres are larger and freight volumes (except those associated with major mining projects) are small, even by Australian standards.

The transport infrastructure and services reflect these characteristics. Because of the small population and resultant small-scale manufacture in northern Australia, the population is in some sense more dependent on reliable long-distance transport than the population of southern Australia. Exporters in northern Australia are also dependent on an efficient transport system, especially if inputs into their export production are provided from distant southern suppliers.

Assessment of the adequacy of transport infrastructure is not a simple matter. In its work for the NTPT, the BTCE adopted the concept of technical adequacy as a method of quickly assessing infrastructure adequacy. Infrastructure was said to be technically inadequate 'if it provides a quality of service below some minimum acceptable level defined in terms of a number of parameters appropriate to each mode' (NTPT 1995, p. 3). The BTCE developed demand forecasts for a number of pieces of infrastructure, some of which are located in northern Australia. For this study, the forecasts were updated and the previous assessment reviewed. For infrastructure not included in the earlier study, either forecasts were developed or some judgment made as to its likely adequacy within the time frame of interest.

INFRASTRUCTURE INVENTORY

Northern Australia is served by the usual modes of road, rail, sea and air transport. In addition to these modes, there is a developing system of natural gas pipelines.

Airports

The large area and dispersed population of northern Australia mean that many areas depend on air transport as their major link with larger population centres. Chapter 3 highlighted the important role of aviation in the tourism industry of northern Australia.

Figure 5.1 indicates the location of the major airports in northern Australia. Cairns is the fastest growing airport in northern Australia and has developed over a comparatively short time into a major international gateway for tourists. In terms of passenger movements, Cairns is currently the sixth largest airport in Australia. In an assessment for the NTPT, the BTCE concluded that Cairns would become the fourth largest airport in Australia by 2014 (BTCE 1995b, p. 55).

Other airports with a large proportion of tourists in their passenger throughputs include Darwin and Alice Springs. Townsville airport previously attracted international tourists but has now lost this role because of the development of Cairns airport.

Details of the infrastructure at the most important of the northern Australian airports are shown in table 5.1. In addition, there are many small airports serving mine sites and small communities.

Seaports

Seaports in northern Australia range from some of the largest ports in Australia in terms of throughput to some very small ports serving isolated communities. Figure 5.2 illustrates the location of trading ports in northern Australia.

The largest ports in northern Australia (Port Hedland, Dampier and Port Walcott) are in the Pilbara region of northern Western Australia, which exports large volumes of iron ore. Other essentially single commodity bulk ports with substantial volumes include Gove (bauxite and alumina), Groote Eylandt (manganese ore) and Bing Bong (zinc concentrates) in

FIGURE 5.1 LOCATION OF THE MAJOR NORTHERN AUSTRALIAN AIRPORTS

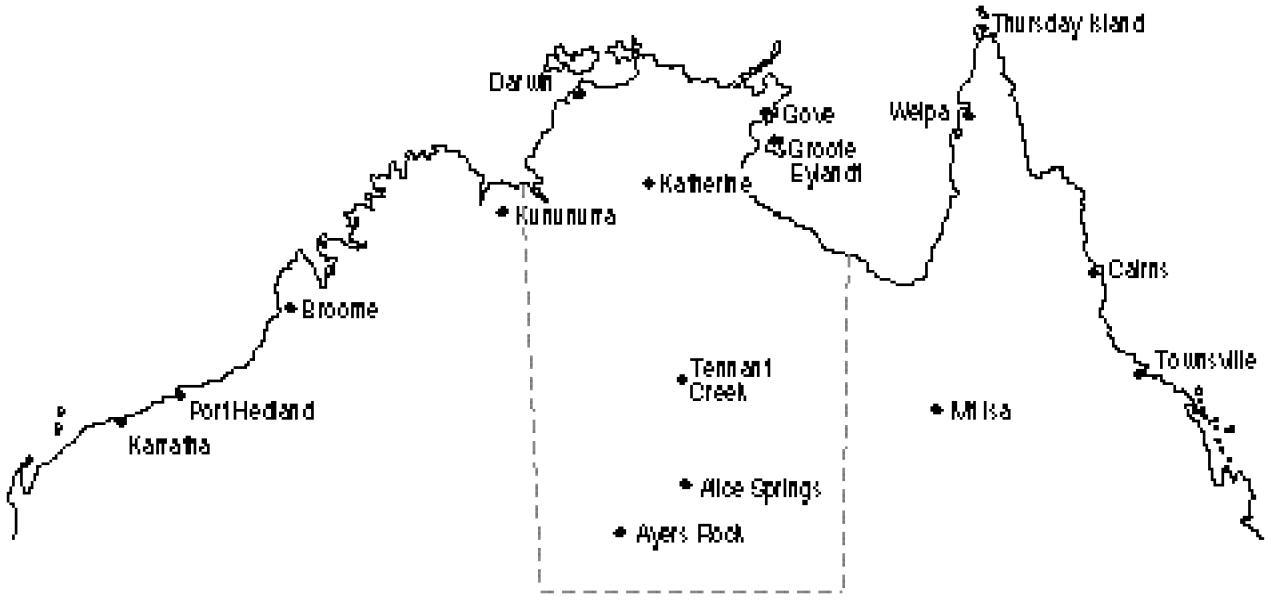


TABLE 5.1 INFRASTRUCTURE AT NORTHERN AUSTRALIAN AIRPORTS

Airport	*Runway length x width (m)*	*Total area of terminals ('000 m^2)[a]*	*Parking positions[b]*	*Aero-bridges*
Port Hedland	2500 x 45; 1000 x 18	na	na	0
Broome	2026 x 45	na	na	0
Darwin	3324 x 60; 1524 x 30	30.5	10	3
Alice Springs	2438 x 45; 1029 x 18; 1133 x 18	4.5	10	0
Ayers Rock	2000 x 30	na	na	0
Kununurra	1829 x 30	na	na	0
Karratha	1800 x	na	5	
Katherine Tindal	2742 x 45	na	na	0
Tennant Creek	1959 x 45; 1349 x 45; 1032 x 18	0.23	1	0
Gove	2058 x 45	na	na	0
Groote Eylandt	1901 x 30	na	na	0
Cairns	3197 x 45; 925 x 18	25.7	24	3
Thursday Island	1389 x 30; 1235 x 30	na	na	0
Townsville	2438 x 45; 1100 x 30	10	7	0
Mount Isa	2560 x 45; 914 x 30	na	4	0
Weipa	1645 x 30	na	na	0

na = data not available

a. Total for both domestic and international.

b. The total number of apron stands for regular public transport (RPT) aircraft (domestic plus international) and excluding General Aviation apron areas.

the Northern Territory, and Weipa (bauxite), Cape Flattery (silica sands), Mourilyan (sugar), Lucinda (sugar) and Abbot Point (coal) in northern Queensland.

In addition to the ports shown in figure 5.2, there are also some specialised facilities for loading tankers at offshore oil fields. These are located in the Timor Sea and in the Carnarvon Basin off the coast of northern Western Australia.

Broome, Wyndham, Darwin, Cairns and Townsville are general-purpose ports, although Townsville also imports and exports significant volumes of bulk minerals.

Most of the northern Australian ports also import significant volumes of petroleum products for local consumption. Table 5.2 summarises the number of berths at northern Australian ports.

FIGURE 52 LOCATION OF TRADING PORTS IN NORTHERN AUSTRALIA

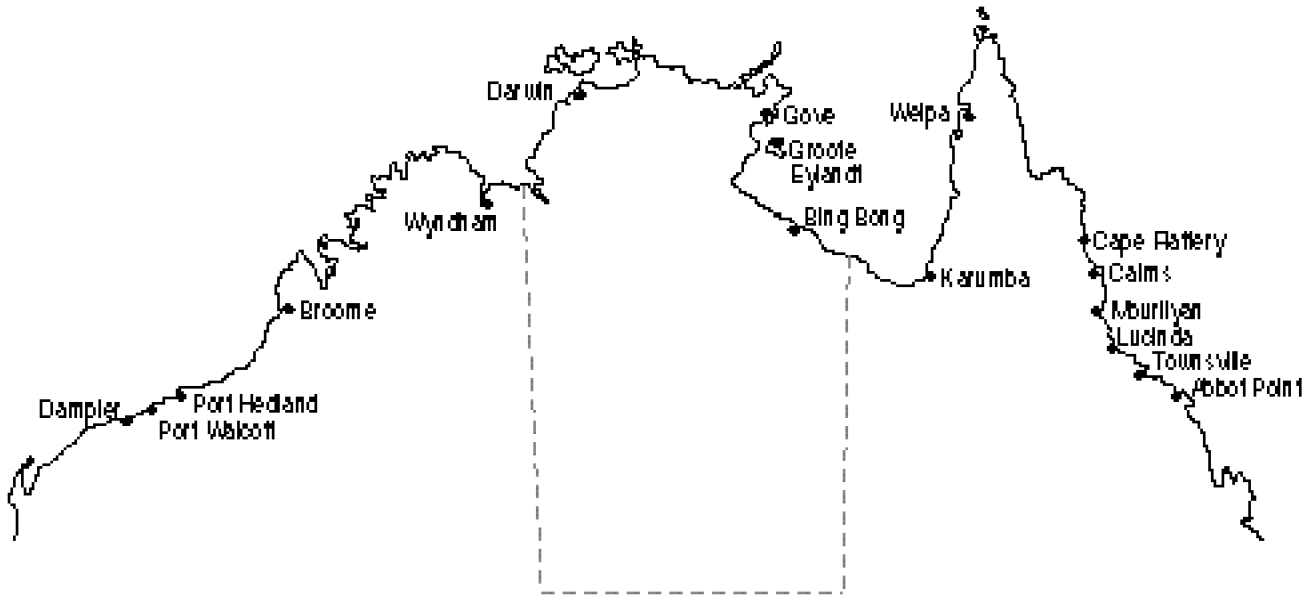


TABLE 5.2 NUMBER OF BERTHS AT NORTHERN AUSTRALIAN PORTS

Seaport	*Non-bulk berths*	*Dry bulk berths*	*Liquid bulk berths*
Dampier	3	2	2
Port Hedland		4	1
Broome			2
Wyndham	1		
Darwin	3	1	1
Gove	1	1	1
Groote Eylandt		1	
Cairns	9	1	1
Townsville	3	4	1
Weipa	1	2	1
Thursday Is	1		1
Cape Flattery		1	
Mourilyan		1	
Lucinda		1	
Abbot Point		1	
Port Walcott		2	1
Karumba	1		

Note Offshore oil production facilities at Jabiru, Challis, Skua, Valranus Island and Barrow Island are not shown.

Source Pielow 1991; Lloyd's of London 1995.

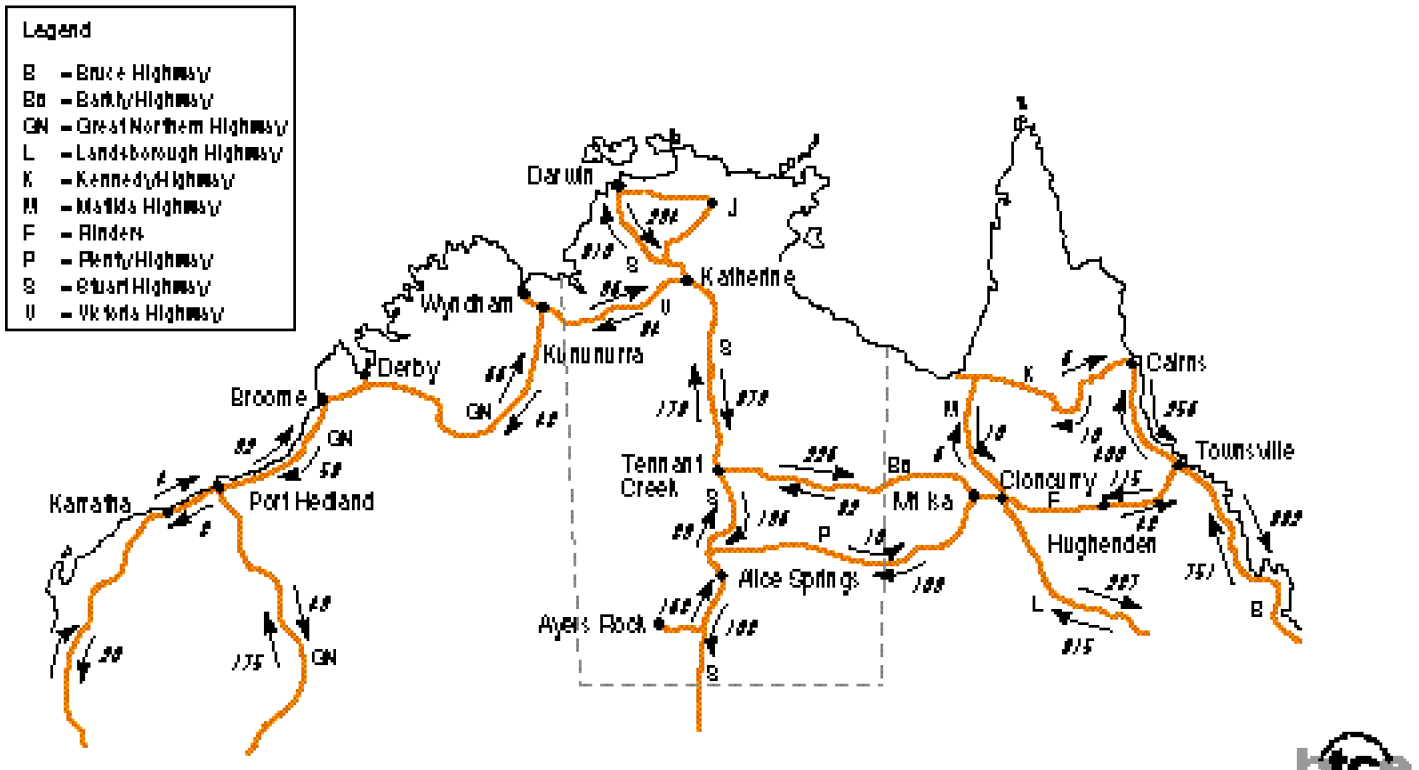
Roads

The road network in northern Australia provides the most important link for the movement of freight. Figure 5.3 illustrates the road network and also shows inter-regional freight movements for 1989–90. The figure indicates the routes that are most important for the supply of freight to the major population centres.

The Bruce, Landsborough, Barkly, Stuart, Victoria and Great Northern Highways form part of the National Highway System and provide a major role in the movement of freight within northern Australia. The Flinders Highway, which links Townsville and Cloncurry, also carries a significant volume of freight.

In addition to the inter-regional freight movements, the road network carries intra-regional freight (not shown in figure 5.3) and passenger vehicles.

FIGURE 5.3 THE NORTHERN AUSTRALIAN ROAD NETWORK AND INTER-REGIONAL FREIGHT MOVEMENTS, 1989–90



The intercity roads in northern Australia, including the National Highway System, are almost entirely two-lane roads, reflecting the generally low traffic volumes throughout much of northern Australia.

Much of northern Australia is subject to heavy rain in the summer months. The road network can be susceptible to the wet conditions and access to some communities can be cut off during the wet season. However, the National Highway System is generally built to be flood-free to ensure that the major centres are not isolated.

Rail

Railways play an important role in the transport of freight within northern Queensland and in the transport of iron ore within the Pilbara area of Western Australia. In addition, Alice Springs is served by rail from South Australia. The iron ore railways in Western Australia are privately owned and all the other railways are publicly owned. The major railway lines are illustrated in figure 5.4.

In 1993–94, the major freight movements within northern Queensland included approximately 1.1 million tonnes from Mount Isa to Townsville (mostly minerals), 800 000 tonnes from Townsville to Mount Isa (mostly coal for power generation in Mount Isa) and about 6 million tonnes of coal on the line from Newlands to Bowen and the coal export port of Abbot Point. Of the coal transported on the Newlands line, about 800 000 tonnes was for domestic purposes, with 500 000 tonnes destined for Mount Isa and 300 000 tonnes for the nickel refinery at Yabulu, north of Townsville. In addition, about 3 million tonnes of nickel ore was moved from the port at Townsville to the nickel refinery at Yabulu.

The volume of iron ore moved on the iron railways is huge by any standard. The lines are operated by three companies: Hamersley Iron, BHP and Robe River Iron Associates. The total freight task of the three companies is around 125 million tonnes carried over an average distance of 300 kilometres, or 36 billion tonne kilometres (WA DoT & Pilbara Development Commission 1997, pp. 8–9).

Gas pipelines

The network of pipelines in Australia has expanded steadily over the past two decades. The delivery of natural gas has been the main function of the expanding pipeline network (see table 5.3). In northern Australia,

FIGURE 5.4 RAILWAY NETWORKS IN NORTHERN AUSTRALIA

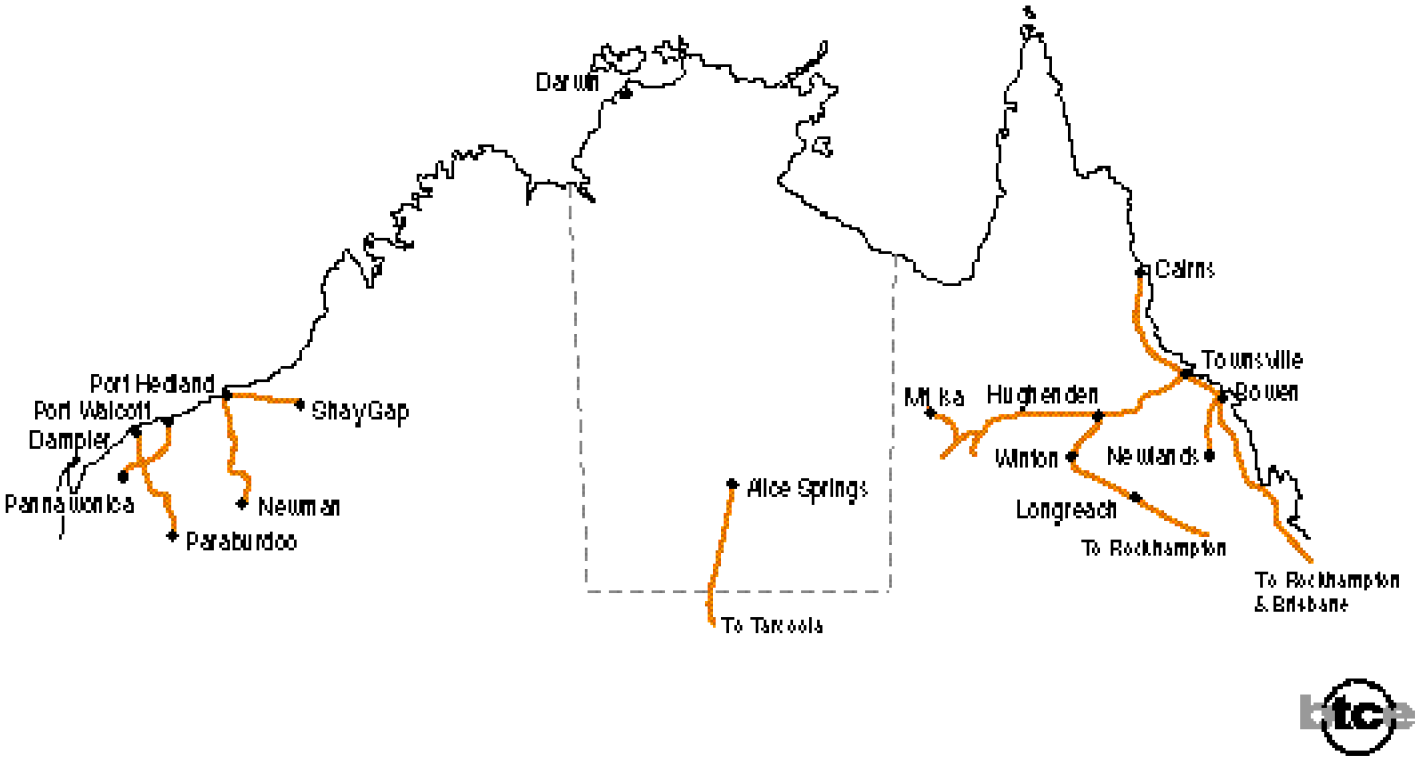


TABLE 5.3 GAS PIPELINES IN NORTHERN AUSTRALIA

Pipeline	*Length (km)*	*Product*	*Operator*
Northern Territory			
Palm Valley–Darwin	1512	gas	NT Gas
Palm Valley–Alice Springs	145	gas	TNT
Mereenie–Alice Springs	270	oil	Oilmin
Daly Waters–McArthur	330	gas	NT Gas
Western Australia[a]			
Burrup–Wagerup	1482	gas	Alinta
Pilbara–Kambalda	1440	gas	AGL
Proposed pipelines			
Ballera (SW Qld)–Mount Isa	840	gas	AGL/Santos
PNG–Gladstone	up to 2500	gas	Chevron

a. In addition to these pipelines, there are several pipelines to connect production facilities to onshore processing facilities.

Source *Petroleum Gazette* 1997; ABARE 1997b, p. 236.

gas has increasingly been used on mineral projects as a fuel for power generation. For example, the newly completed Goldfields pipeline from Pilbara to Kambalda in Western Australia delivers gas from the North West Shelf to generate power at Mount Newman and the goldfields in the Kalgoorlie region. The power generated from gas delivered by the pipeline from Ballera to Mount Isa is expected to reduce mining costs, and this was one of the factors that led to the decision to develop the phosphate mine at Phosphate Hill near Cloncurry.

TRANSPORT SERVICES IN NORTHERN AUSTRALIA

The major freight movements in northern Australia are those associated with the major mining activities. Most of the major mining freight movements—for example, the movement of iron ore—are controlled by the company producing the mineral using facilities owned by the company. It is a fair assumption that the companies concerned will ensure that the facilities and services provided will be sufficient to meet the needs of the companies and their customers. This section of the study therefore focuses on those services that are not provided to satisfy in-house purposes. In addition, the discussion is confined to air and sea transport services to be consistent with the exploration of synergies between northern Australia and Eastern Indonesia. Land transport access

to air and sea transport services is clearly important. The adequacy of the road network to support land transport services is considered later in this chapter.

Air services

Regular public transport services link northern Australia to all of the capital cities in Australia. There are also direct links from Cairns, Port Hedland and Darwin to a number of Asian destinations (see table 5.4). Broome had one weekly international flight to Bali in 1996; however, National Jet Systems, the operator, terminated the service early in 1997 as well as the once-weekly flight from Darwin to Lombok.

Significant opportunities in the provision of transport services between northern Australia and Eastern Indonesia now exist as a result of bilateral transport discussions between Australia and Indonesia. As a result of these discussions, airlines operating international services from Darwin no longer have the Darwin services counted as part of the international capacity allocated to them.

TABLE 5.4 INTERNATIONAL DESTINATIONS OF DIRECT FLIGHTS FROM NORTHERN AUSTRALIAN AIRPORTS, APRIL 1997

Destination	*Frequency (flights per week)*	*Destination*	*Frequency (flights per week)*
From Cairns		**From Port Hedland**	
Auckland	3	Denpasar	1
Denpasar	3 (via Darwin)		
Fukuoka	4	**From Darwin**[a]	
Hong Kong	5 (2 via Brisbane)	Bandar Seri (Brunei)	2
Jakarta	3 (via Darwin & Denpasar)	Denpasar	10
Kuala Lumpur	1 (via Darwin)	Jakarta	3 (via Denpasar)
Nagoya	7	Kuala Lumpur	2
Port Moresby	13	Kupang	2
Sapporo	2	Singapore	7
Seoul	5		
Singapore	9		
Taipei	1		
Tokyo	14		

a. Approval exists for a service between Darwin and Ambon but this had not commenced in August 1997.

Source OAG 1997.

Shipping services

Regular shipping services between northern Australia and Indonesia / Asia are provided by Perkins and Austral Asia Line (AAL). In addition, the live cattle export industry is supported by a significant number of cattle carriers that do not operate to a regular schedule but are more likely to be chartered for a specific time, and operate between nominated ports as required. There is also a specialised shipping service between Cairns and Irian Jaya to supply the Freeport mine on a fortnightly basis. More recently, OzIndo began operating a monthly service with a seven-day transit of the Surabaya–Kupang–Darwin–Benoa (Bali) route.

Cruise shipping is increasingly moving greater numbers of passengers into northern Australia. For example, in 1995–96, 17 different vessels collectively made 21 calls at Cairns seaport, with passengers and crews totalling 18 900. Table 5.5 shows details of cruise ship visits to northern Australian ports. As shown, Cairns has the highest number of visits. It is expected that visits to all ports will increase.

DEMAND FORECASTS

Airports

Until 1988–89, the airports at Alice Springs, Cairns, Darwin and Townsville handled similar numbers of passengers (between 500 000 and 1 million) and the number of aircraft using these airports was between 10 000 and 20 000 (see figures 5.5 and 5.6). The effect of the pilots' strike in 1989–90 is clearly seen in the two figures. During the 1990s, the most notable trend has been the very rapid growth of both passengers and aircraft movements at Cairns.

The growth in air traffic at Cairns has been largely at the expense of Townsville. The annual number of passenger movements at Townsville since 1990–91 has been around half the number in 1985–86, which was the peak year for Townsville. The annual number of aircraft movements has also declined compared with the number in 1985–86 and in 1993–94 the number was 12 per cent less than in 1985–86.

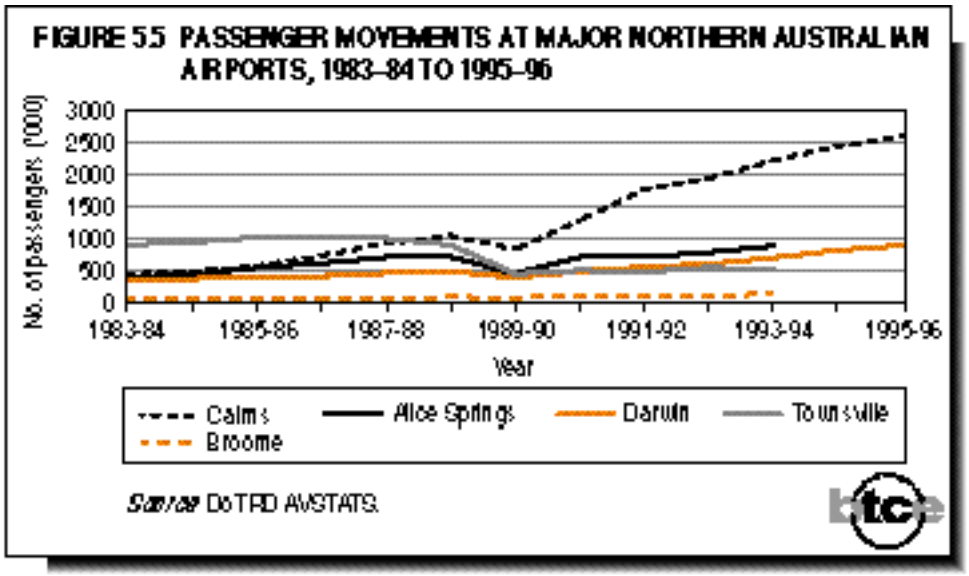
Darwin is the second fastest growing airport of those illustrated in figure 5.5. Darwin had an average growth rate of 8.2 per cent per annum during the period from 1983–84 to 1995–96, compared with the annual growth rate of 15.6 per cent for Cairns during the same period. For the period 1983–84 to 1993–94, Broome and Alice Springs had average annual growth rates of 7.5 per cent and 8.0 per cent respectively.

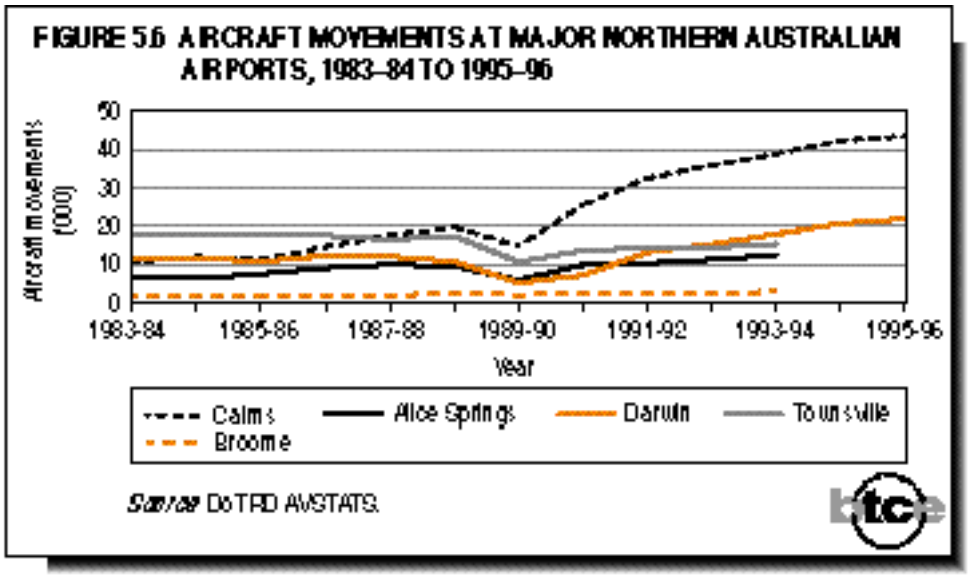
TABLE 5.5 CRUISE SHIP VISITS TO NORTHERN AUSTRALIAN PORTS

Port	*Year*	*No. visits*	*No. ships*	*Passengers on*	*Passengers off*	*In transit*
Cairns	1991–92	21	12	1710	1608	2875
	1992–93	16	9	628	1025	4867
	1993–94	33	18	7240	7077	6549
	1994–95	29	18	1758	2379	6448
	1995–96	21	17	2511	2724	7659
	1996–97	42	na	na	na	na
Townsville	1991–92	9	na	na	na	na
	1992–93	12	na	na	na	na
	1993–94	17	3	na	na	na
	1994–95	5	3	through passengers		2240
	1995–96	6	4	through passengers		3081
	1996–97	1	1	through passengers		769
Darwin	1991–92	15	8	na	na	na
	1992–93	12	8	na	na	na
	1993–94	14	10	na	na	na
	1994–95	17	12	na	na	na
	1995–96	11	8	na	na	na
	1996–97	14	11	na	na	na

na = data not available

Source Darwin, Cairns and Townsville Port Authorities.





The high growth rate experienced at Cairns suggests that a closer look at Cairns airport is warranted.

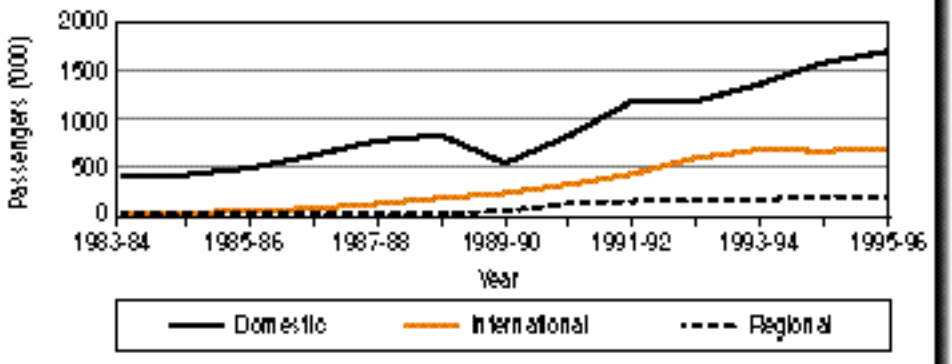
Cairns

The number of international passengers at Cairns airport increased very rapidly between 1983–84 and 1993–94, at an average rate of 38 per cent per annum (see figure 5.7). However, there was virtually no growth in the number of international passenger in the two years from 1993–94 to 1995–96. In contrast, the number of domestic passengers increased at a compound rate of 12.7 per cent per annum over the period 1983–84 to 1995–96, except for 1989–90 and 1990–91, which were affected by the pilots' strike.

Aircraft movements increased at a slower rate than passenger numbers because the number of passengers per aircraft movement increased over time. Over the decade 1983–84 to 1993–94, international aircraft movements increased by 35 per cent per annum and domestic movements by 8.7 per cent per annum (see figure 5.8).

Projections of future passenger numbers and aircraft movements are required to assess the adequacy of the infrastructure at Cairns airport. Clearly, the number of aircraft movements will be determined by the

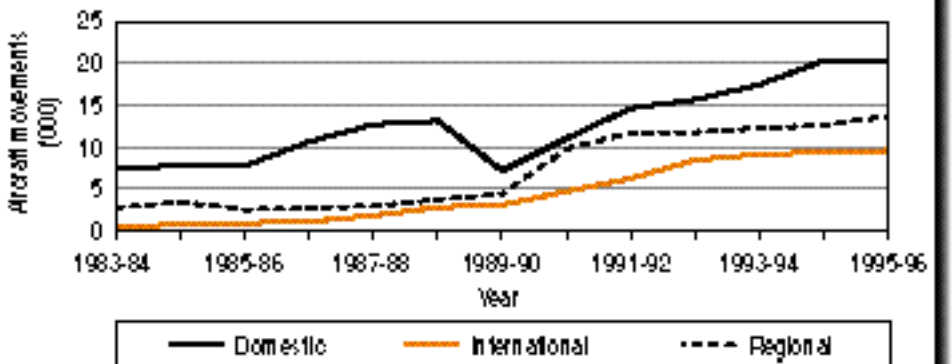
FIGURE 5.7 PASSENGER NUMBERS BY INDUSTRY SECTOR, CAIRNS AIRPORT, 1983–84 TO 1995–96



Note International passenger numbers do not include transit passengers.

Source DoTRD AVSTATS.

FIGURE 5.8 AIRCRAFT MOVEMENTS BY INDUSTRY SECTOR, CAIRNS AIRPORT, 1983–84 TO 1995–96



Source DoTRD AVSTATS.

total number of passengers to be carried as well as the number of passengers per movement. Projections of future aircraft movements must allow for changing passenger numbers per movement.

The AVSTATS (aviation statistics maintained by the Department of Transport and Regional Development) data on which figure 5.7 is based do not include transit passengers. An assessment of the number of future transit passengers must also be included in the projections, since it is expected that new code-sharing arrangements will reduce the number of transit passengers moving through Cairns airport.

The projections in this study included estimations of:

- future passenger numbers, allowing for changes in the number of international transit passengers;
- future passenger numbers per aircraft movement; and
- future aircraft movements.

Passenger numbers

International

The rapid growth in the number of international passengers using Cairns airport between 1983–84 and 1993–94 is unlikely to continue into the future. The lack of growth in recent years indicates that growth may already have levelled off. Industry comments to the BTCE suggest that the main reason for the low growth is a falling off in passenger numbers from Japan. There are Japanese domestic factors that may have influenced the reduced passenger numbers and these factors are likely to be temporary. However, annual growth rates of around 30 per cent are unlikely to be sustained.

Forecasts of international passenger numbers for the Cairns Port Authority (1996b, p. 5b) were based on increases of 7.9 per cent per annum in origin–destination passengers and 4.8 per cent per annum in transit passengers, giving an overall growth rate of 6 per cent. In its work for the NTPT, the BTCE used a growth rate of 8.35 per cent per annum for international passengers (BTCE 1995b, p. 77). In this study, a growth rate of 5 per cent has been used in the projections of international passengers (other than transit passengers). This reflects both the plateauing indicated in figure 5.7 and the number of international tourists forecast for northern Queensland in chapter 3. In addition, there

is evidence to suggest that many international tourists arrive in Cairns on domestic flights rather than on international flights (Maynard 1997).

The Cairns Port Authority (1996b) data for transit passengers were used to obtain a series for the ratio of transit passengers to non-transit passengers. The ratio varied over time; however, based on these data, there was approximately one transit passenger for each non-transit passenger for the years 1994 to 1996. The same ratio was applied to the forecast of non-transit passengers to obtain the total number of international passengers using Cairns airport.

There are some changes occurring in the operations of international airlines using Cairns airport. For example, Qantas and Japan Airlines (JAL) have approval to code-share on flights between Japan and Cairns. JAL has since ceased its service between Tokyo and Cairns and announced its withdrawal from the Osaka–Cairns route. With code-sharing, passengers who previously travelled between Japan and Cairns on JAL can be carried on Qantas flights, and passengers who were previously transit passengers can be carried on direct code-shared flights to Brisbane or Sydney. As a result, the number of transit passengers is expected to decline.

The rate of decline is difficult to predict with any accuracy; however, industry representatives in Cairns have estimated that it will be in the order of 30 per cent. The BTCE projection of international passenger numbers is therefore based on the number of transit passengers decreasing by 30 per cent.

Domestic and regional

From 1983–84 to 1991–92, the average annual growth rate was 14 per cent for domestic passengers and 27 per cent per annum for regional passengers. These growth rates have declined substantially in recent years. For the four years from 1991–92 to 1995–96, the annual domestic passenger growth rate declined to 9.4 per cent and the annual regional passenger growth rate declined to 7.2 per cent.

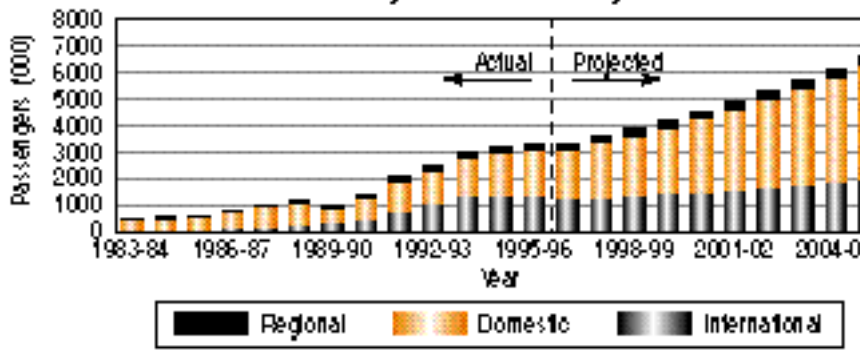
In a study for the NTPT, the BTCE (1995b, p. 77) used an average annual growth rate of 4.34 per cent in its forecasts for domestic passenger numbers and 2.40 per cent for regional passenger numbers. Forecasts undertaken for the Cairns Port Authority (1996b, p. 5b) used an annual growth rate of 5.8 per cent for the number of domestic and regional passengers combined.

The recent growth rates for domestic and regional passenger numbers are well below the growth rates previously experienced, but are still substantially above the growth rates used in previously published forecasts. Time series forecasts produced annual growth rates of 12.8 per cent for domestic passenger numbers and for regional passenger numbers gave a growth rate that declined from the current rate of 7 per cent per annum to 5 per cent per annum by 2003–04.

In the light of the more comprehensive data now available, the earlier projections appear to be based on growth rates that are too low. The growth rates used in this analysis are 10 per cent for domestic passengers and 5 per cent for regional passengers. The results of the passenger forecast are shown in figure 5.9. Note that the international passenger numbers in figure 5.9 include transit passengers while those in figure 5.7 do not.

The forecast of passenger numbers in figure 5.9 is not comparable with the forecasts of tourist numbers in chapter 3. The tourist forecasts are for all of northern Queensland while the forecasts in this section are for Cairns only. A significant proportion of domestic tourists travel by road and, although they would be included in the tourist forecasts in chapter 3, they would not be included in the forecasts for Cairns airport. Although most international tourists arrive in northern Queensland by air, a large proportion arrive or depart on domestic services and would be included in the forecasts of domestic passengers.

FIGURE 5.9 ACTUAL AND PROJECTED PASSENGER NUMBERS BY INDUSTRY SECTOR, CAIRNS AIRPORT, 1983–84 TO 2005–06



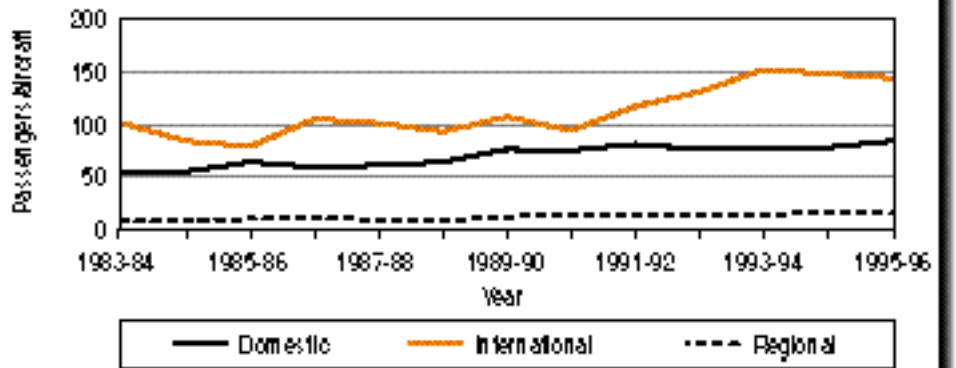
Note International passenger numbers include transit passengers.
Source BTCE estimates based on DoTRD AVSTATS and Cairns Port Authority 1996b.

Passengers per aircraft

The number of passengers per aircraft movement has grown consistently over the period from 1983–84 to 1995–96 (see figure 5.10). The growth was extrapolated until 2005–06 using regression techniques. The average annual increment in passengers per movement was found to be 5.4 for international aircraft, 2.5 for domestic aircraft and 0.66 for regional aircraft.

The number of passengers per domestic and regional aircraft movement is projected to increase by 2.5 and 0.66 per annum, respectively, and the annual increase in the number per international aircraft movement is projected to decline from 5.4 to zero by 2005–06. The number of aircraft movements was estimated using the total number of passengers and the projected number of passengers per aircraft. The number of aircraft movements in 2005–06 at Cairns airport is estimated to be in the order of 66 500 (see figure 5.11). The total number of passengers (including international transit passengers) is estimated to be approximately 6.7 million (see table 5.6). The number of international aircraft movements shows only a small growth compared with domestic movements. The main reason for this is that the number of movements required is influenced downwards by the reduction in transit passengers and the greater estimated growth in passengers per movement for international aircraft (5.4 per annum in the early years of the forecast) compared with domestic aircraft (2.5 per annum). The estimated passengers and movements by sector are shown in table 5.6.

FIGURE 5.10 PASSENGERS PER AIRCRAFT MOVEMENT, CAIRNS AIRPORT, 1983–84 TO 1995–96



Source BTCE estimates based on DoTRD AVSTATS and Cairns Port Authority 1996b.

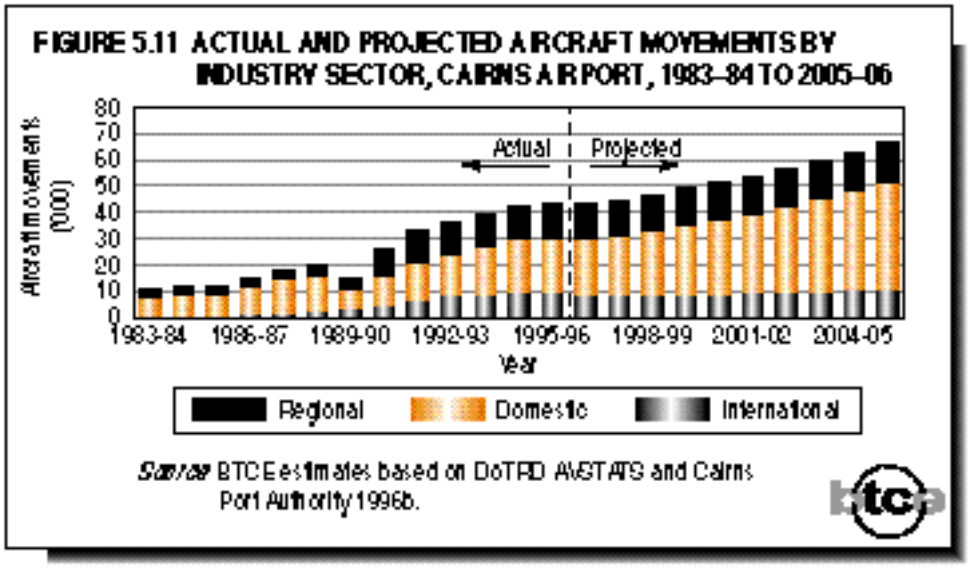


TABLE 5.6 ESTIMATED PASSENGER NUMBERS AND AIRCRAFT MOVEMENTS, CAIRNS AIRPORT, 2005–06

('000)

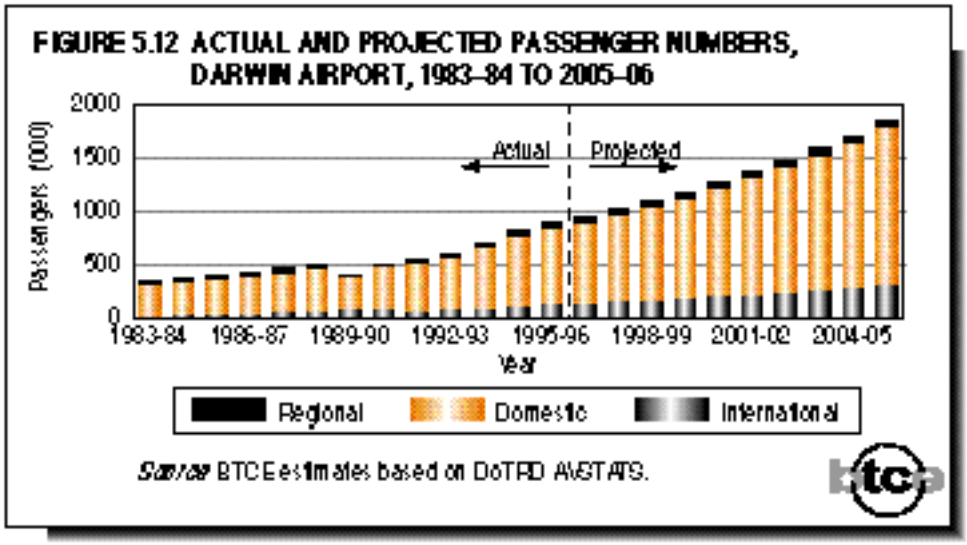
Industry sector	*Passengers*	*Aircraft movements*
International	1923	11.1
Domestic	4395	40.2
Regional	335	15.2
Total	*6653*	*66.5*

Note Figures may not add to totals due to rounding.

Source BTCE estimates based on DoTRD AVSTATS and Cairns Port Authority 1996b.

Darwin

It is simpler to project passenger numbers for Darwin than for Cairns. There is no expectation that the proportion of transit passengers to terminating passengers passing through Darwin is likely to change significantly, so the complication of transit passengers can be ignored. A time series analysis was undertaken, with the results shown in figure 5.12.



The number of domestic passengers was projected to increase by 7.6 per cent per annum, international passenger numbers by 8.9 per cent per annum and regional passenger numbers by close to 2 per cent per annum. The projections are higher than those published by the Northern Territory Government (1996b, p. 48). One possible reason for this is that growth in 1995–96 was greater than that predicted by the Northern Territory Government, so that the BTCE projections start from a higher base. In addition, the growth rate for domestic passengers is much higher than the 4 per cent used by the Northern Territory Government and the 4.34 per cent used by the BTCE (1995b, p. 77). Both of these earlier forecasts were based on data available in 1994. Domestic passenger movements since then have grown substantially beyond 4 per cent per annum, suggesting that a higher rate is more appropriate.

An analysis of passengers per aircraft movement showed that the number of passengers per domestic and regional aircraft movement has remained reasonably constant from 1984–85 to 1995–96 at 73 and 5 respectively. The number per international movement declined from 72 in 1984–85 to an average of 45 during the 1990s. Aircraft movements were projected using averages of 73 per domestic movement, 45 for international movements and 5 for regional movements. The estimated numbers of passengers and aircraft movements for 2005–06 are shown in table 5.7.

TABLE 5.7 ESTIMATED PASSENGER NUMBERS AND AIRCRAFT MOVEMENTS, DARWIN AIRPORT, 2005–06

('000)

Industry sector	*Passengers*	*Aircraft movements*
International	336	7.5
Domestic	1458	20.0
Regional	53	10.7
Total	*1847*	*38.1*

Note Figures may not add to totals due to rounding.

Source BTCE estimates based on DoTRD AVSTATS.

Seaports

Cargo throughput in the northern Australian trading ports is shown in table 5.8. There are seven major bulk ports in the northern region. The largest bulk ports are Dampier, Port Hedland and Port Walcott, with throughputs (predominantly iron ore) of 69 million tonnes, 57 million tonnes and 25 million tonnes respectively in 1995–96. The other major bulk ports are Weipa (bauxite), Abbot Point (coal), Gove (bauxite and alumina) and Groote Eylandt (manganese ore). The cargo throughput for Gove and Groote Eylandt is treated as confidential data by the ABS and is included in 'other NT ports' in table 5.8. There are also three important general cargo ports (Townsville, Cairns and Darwin), of which Townsville has the most significant cargo throughput.

Table 5.8 also indicates the volume of trade between northern Australian ports and Indonesia. Overall, 1 per cent of cargo exported from northern Australian ports is destined for Indonesia. Ports involved in the live cattle trade tend to have the highest proportion of their cargo going to Indonesia. Forty per cent of the crude oil exported from Barrow Island goes to Indonesia.

The proportion of the total value of northern Australian exports that is sent to Indonesia is 5.6 per cent, which is significantly higher than the volume proportion. This is mainly because of the high value cargoes from live cattle exporting ports and Barrow Island. From Cairns, only 1 per cent of the cargo volume goes to Indonesia, but this 1 per cent represents 23 per cent of total export cargo value. The generally high value of cargo exported to Indonesia through Cairns indicates the importance to Cairns of its role as a support base for the Freeport mine.

TABLE 5.8 CARGO THROUGHPUT AT NORTHERN AUSTRALIAN TRADING PORTS, 1995–96

('000 tonnes)

	Exports		*Imports*	
Port	*Total*	*Indonesia*	*Total*	*Indonesia*
Abbot Point	4 365	0	0	0
Townsville	3 339	50	3 348	1 126
Lucinda	524	0	0	0
Mourilyan	97	0	0	0
Cairns	3 232	38	139	3
Weipa	2 219	4	39	0
Karumba	13	4	0	0
Darwin	879	190	504	21
Other NT ports	4 819	123	755	0
Wyndham	162	11	84	0
Broome	92	6	28	0
Yampi Sound	38	0	0	0
Port Walcott	25 137	0	25	0
Dampier	69 114	1 165	250	0
Barrow Island	112	45	0	0
Port Hedland	57 316	27	236	0
Total	*171 459*	*1 662*	*5 406*	*1 151*

Notes 1. Figures do not include coastal cargo.

2. Figures may not add to totals due to rounding.

Source ABS ICS data.

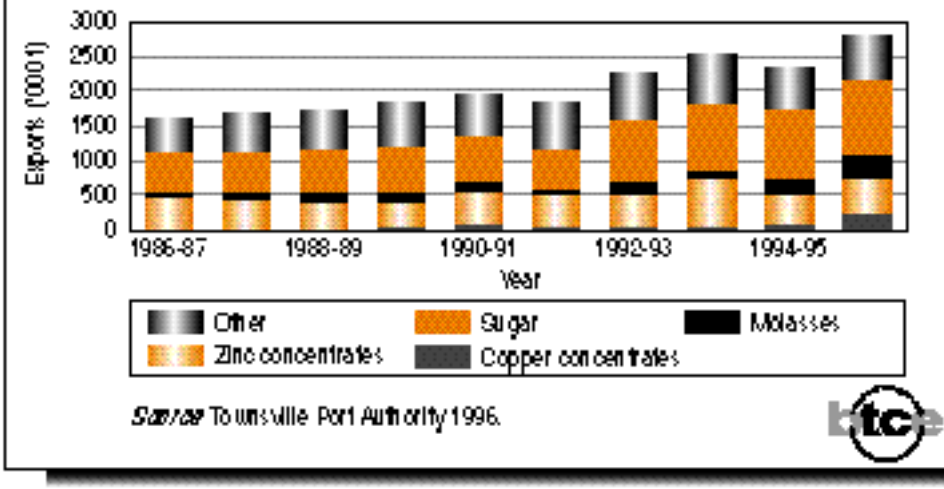
Overall, 21 per cent of the volume of overseas imports into northern Australian ports originates in Indonesia. The value of imports from Indonesia is only 2 per cent of the total value of imports into northern Australian ports. Townsville is by far the largest import port, importing around 1 million tonnes of nickel ore representing 4.5 per cent of the total value of Townsville's imports. Both Cairns and Darwin import significant volumes of petroleum products from Indonesia.

The ports with the greatest interaction with Indonesia—and potentially Eastern Indonesia—are therefore Townsville, Cairns and Darwin.

Townsville

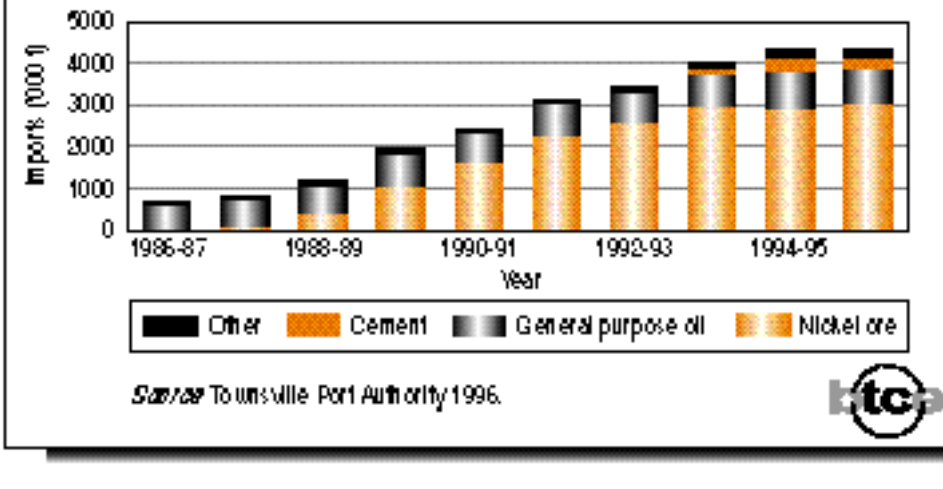
Although Townsville is a general cargo port, it also imports and exports large volumes of bulk cargo. The categories of cargo handled at Townsville are illustrated in figures 5.13 and 5.14. Sugar is Townsville's major export commodity in terms of volume, but the export of zinc concentrates is expected to increase with the development of the BHP Cannington mine. Imports are dominated by the import of nickel ore

FIGURE 5.13 COMPOSITION OF TOWNSVILLE'S EXPORTS, 1986–87 TO 1995–96



Source Townsville Port Authority 1996.

FIGURE 5.14 COMPOSITION OF TOWNSVILLE'S IMPORTS, 1986–87 TO 1995–96



Source Townsville Port Authority 1996.

from New Caledonia and Indonesia for the Yabulu refinery. In 1995–96, Townsville's throughput (including coastal cargo) totalled 7.1 million tonnes.

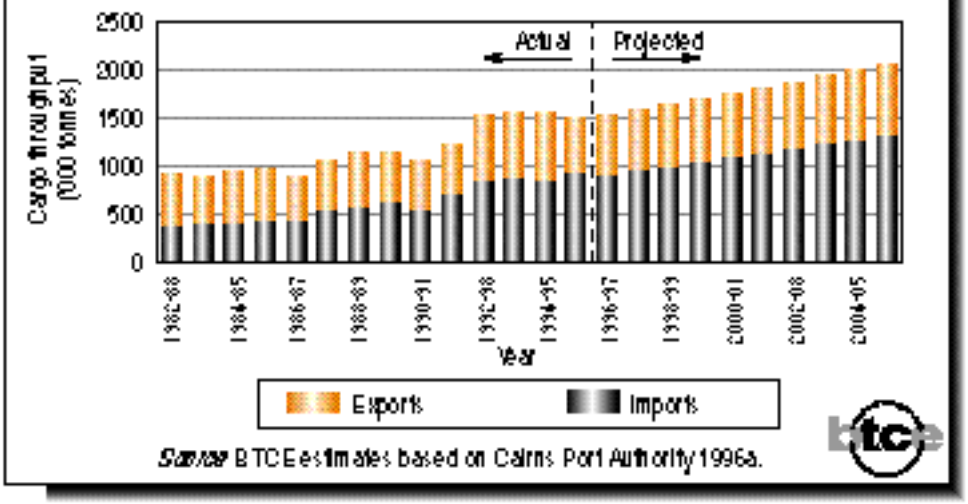
The Townsville Port Authority expects that nickel ore imports will increase to around 4 million tonnes per annum from the present level of 3 million tonnes following the expansion of the nickel unloading facilities. Port throughput is expected to increase to 10 million tonnes per annum by the year 2000, due to increases in volumes of minerals, petroleum and sugar being handled by the port (Townsville Port Authority 1996, p. 6).

Cairns

In 1995–96, Cairns had an overseas cargo throughput of 3.4 million tonnes (see table 5.8). This throughput mainly comprised exports of sugar and molasses and imports of petroleum products and fertilisers. Exports to Indonesia also included a wide range of products such as lubricating oils and steel products. Overall exports from Cairns to Indonesia were worth about $122 million in 1995–96 (ABS ICS data).

Projections of future cargo throughput at Cairns were undertaken using time series analysis (see figure 5.15). Exports are projected to grow at

FIGURE 5.15 ACTUAL AND PROJECTED CARGO THROUGH THE PORT OF CAIRNS



Source BTCE estimates based on Cairns Port Authority 1996a.

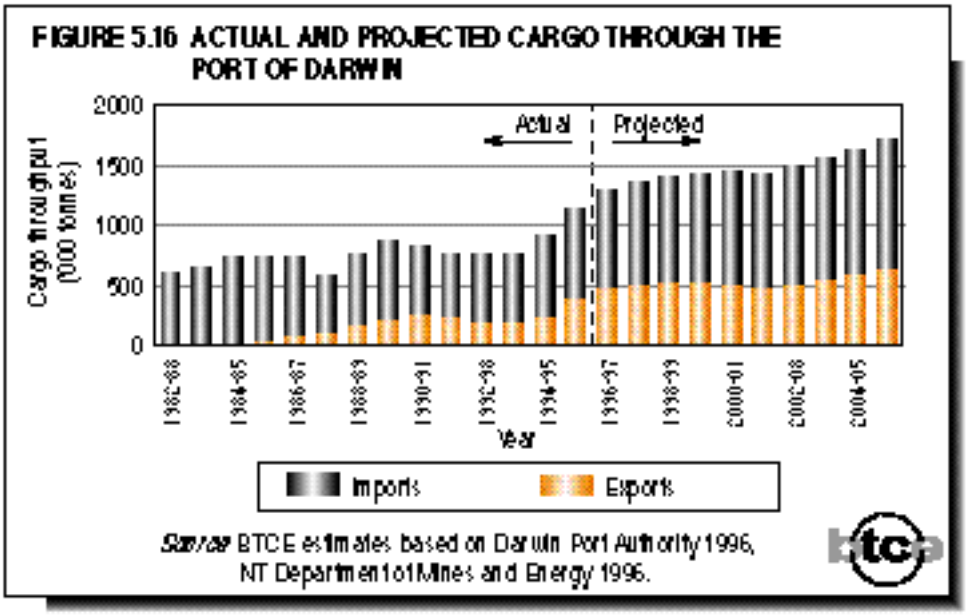
just under 2 per cent per annum and imports to grow initially at 4.9 per cent, declining to 3.8 per cent by 2005–06. Increases in the import of petroleum products as a result of population growth and increased numbers of tourists are the major source of import growth (Cairns Port Authority 1996a, p. 20).

Darwin

In 1995–96, Darwin had an overseas cargo throughput of 1.4 million tonnes (see table 5.8). Darwin's overseas exports are mainly live cattle, zinc ores and concentrates. Darwin's imports are mostly petroleum products.

Projections of Darwin's exports were based on separate examinations of live cattle exports and zinc and lead concentrates. The Darwin Port Authority (1996, p. 63) predicted that the export of zinc concentrates would increase by 40 per cent in 1996–97 compared with exports in 1995–96 following the expansion of the Woodcutters mine. Production at Woodcutters is anticipated to cease around 2001 (NT Department of Mines and Energy 1996). The projections of live cattle exports are from chapter 4. A time series projection was adopted for imports. The results for both exports and imports are shown in figure 5.16.

FIGURE 5.16 ACTUAL AND PROJECTED CARGO THROUGH THE PORT OF DARWIN



Source BTCE estimates based on Darwin Port Authority 1996, NT Department of Mines and Energy 1996.

The results show a plateauing of throughput in 2000–01 due to the anticipated cessation of production at the Woodcutters mine. The projections do not take account of the possible effect of the proposed Darwin to Alice Springs railway, which the Northern Territory Government expects will have a significant impact on trade through the port of Darwin. BTCE projections also do not take account of the effect of the new port at Darwin on throughput or the increased promotional activity of the Northern Territory Government as these two factors cannot be incorporated into time series analysis. It is expected that the new port and promotional activities will increase throughput and therefore the projections in figure 5.16 tend to understate the likely outcome.

INFRASTRUCTURE ADEQUACY

In principle, consideration of transport links between northern Australia and Eastern Indonesia should not exclude consideration of domestic transport links that support international freight and passenger transport. However, at this stage there is insufficient information to allow an adequate assessment of the likely impacts on transport demand resulting from the development of Eastern Indonesia. The second stage of the project will consider in some detail the development of tourism in Eastern Indonesia and its impact on transport demand and infrastructure in both Eastern Indonesia and northern Australia. For this reason, the assessment of the adequacy of transport infrastructure in northern Australia is somewhat superficial. From the information that was available to the BTCE, it seems that the current and anticipated traffic between northern Australia and Eastern Indonesia is unlikely to place heavy burdens on domestic transport links in northern Australia.

In BTCE (1995a), the roads in northern Australia that form part of the National Highway System were identified as having low upgrade requirements. The major expenditure requirement identified by the BTCE was $257.5 million for the link between Townsville and Cairns. Other expenditure included $38.8 million for the link between Darwin and Katherine and $9.8 million for the link between Cloncurry and the Northern Territory border (BTCE 1995a, appendix III).

Although the National Highway System is the backbone of the national road system, the States and Territories manage large networks of roads that connect communities to major population centres and to service industries dependent on road transport. For example, the Northern Territory Department of Transport and Works (1996) has developed a strategy for setting priorities for road investment over a ten-year period.

The investment plan was based on public consultations and identifies the industry or access issue affected by each investment. Similar plans were developed by the Western Australian Department of Transport and the Kimberley and Pilbara Development Commissions. The analysis in this report has little effect on the conclusions regarding roads that have been reached by these agencies.

Future interaction between northern Australia and Eastern Indonesia is likely to have major impacts on sea and air transport.

In sea transport, the major impact is likely to be on cruise shipping. If the Arafura Tourism Zone develops, the number of cruise ships visiting northern Australian ports could increase significantly. At this stage it is not possible to project the number with any confidence; however, the Northern Territory Government plans to construct a new cruise ship terminal at Darwin as part of its promotion of tourism. The Cairns Port Authority is developing the area adjacent to the port to become an attractive area for tourists, but there are no plans at this stage to construct a new cruise ship terminal (Cairns Port Authority 1996a).

Although Australian live cattle are not exported to Eastern Indonesia in large numbers, live cattle are the fastest growing export from northern Australia. The port of Karumba is emerging as a potential competitor for Darwin, but is currently limited by the absence of cattle-holding facilities. At present, Karumba is more of a challenge to Darwin for live cattle exports to the Philippines than a competitor for exports to Indonesia. Construction of cattle-holding facilities is unlikely to be financially viable unless live cattle throughput exceeds around 80 000 head per annum (Kinhill Economics 1996b, p. 5).

Port facilities are being expanded in both Darwin and Townsville. In Darwin, the development of the new port at East Arm will provide sufficient capacity for many years. In Townsville, considerable development is already underway and more is planned to expand nickel ore unloading facilities and to develop loading facilities for concentrates from the Cannington mine and other mineral products. A major issue for the Townsville Port Authority is the development of the Eastern Transport Corridor as a new access route for rail and road. The new route would link the port to the Korea Zinc refinery and the Copper Refineries Limited plant. The corridor would divert heavy vehicular traffic from the city centre (Townsville Port Authority 1996).

In general, planned port developments up to 2005–06 appear to be consistent with anticipated demand.

The previous assessment of airport infrastructure adequacy by the BTCE (1995b) indicated that investment would be required at both Darwin and Cairns. The number of passengers through Cairns since then has been higher than the BTCE projections and the number of aircraft movements has been somewhat lower. Investment in terminal facilities, apron and taxiways has progressed in accordance with expectations at that time, and future planned investment appears to be sufficient to meet anticipated demand.

Darwin airport handled significantly more domestic passengers in 1995–96 than were projected by the BTCE (1995b). Projections in this study indicate that demand will grow more rapidly than projected in the earlier work; however, it is not expected that any additional investment will be required prior to 2005–06.

Although transport infrastructure is of fundamental importance to northern Australia, the BTCE demand projections in this and earlier studies do not indicate any major deficiencies over the next decade. Existing development plans appear sufficient to accommodate infrastructure expansion when required.

CHAPTER 6 CONCLUSION

Northern Australia and Eastern Indonesia are geographically close and both are relatively remote from the major centres of population in their respective countries. Population densities in Eastern Indonesia are low compared to densities in Western Indonesia, but are much higher than in northern Australia. The remoteness and low population densities of northern Australia and Eastern Indonesia make transport links both vital and a challenge to the development of both regions.

Northern Australia is rich in mineral resources and many of these are being exploited by efficient resource companies. As a consequence, the economy of northern Australia, compared with the national economy, derives much of its activity from mining and much less from manufacturing and services (apart from those associated with tourism). The economy of Eastern Indonesia is predominantly based on agriculture and forestry, with mining being important in some provinces.

The differences between northern Australia and Eastern Indonesia in terms of natural resources, human capital and stages of economic development suggest that there could be possible economic complementarities between the two regions. However, the existence of economic complementarities has not yet generated significant trade between the regions.

After examining the available data, the BTCE concluded that, from the Australian perspective, there are potential synergies in the following areas:

- support from northern Australia for mining operations in Eastern Indonesia
- human resources development
- live cattle exports
- tourism

MINING SUPPORT

Australia has developed considerable expertise in the support of mining operations in locations remote from major population centres. The infrastructure developed in support of Australian mining operations can also be used to support operations in Eastern Indonesia. Activity in this area is already occurring. For example, the support from Cairns of the Freeport mine in Irian Jaya has operated successfully for many years and has contributed significantly to the Cairns economy. Other cities in northern Australia could also be developed as mining support centres for mining operations in Eastern Indonesia.

The infrastructure of some Eastern Indonesian mining ventures could also be used as a base for the development of tourism. For example, transport links to mining sites could also be used to bring tourists to nearby attractions.

HUMAN RESOURCES DEVELOPMENT

As Eastern Indonesia develops, there will be an increasing need for skilled people to plan, manage and operate the transport system. Facilities for developing the necessary skills in Eastern Indonesia are not well developed, but high-quality facilities exist in northern Australia. The opportunity exists to use these facilities to provide suitable training to Eastern Indonesia as its economy develops.

LIVE CATTLE EXPORTS

Live cattle exports from northern Australia have grown at very high rates during the 1990s. In recent years, exports to Indonesia have grown at higher rates than exports to other destinations. Most cattle for export are sourced from northern Queensland but live cattle are predominantly exported through Darwin.

By 2010, the number of cattle exported to Indonesia is projected to be within the range of 600 000 to 800 000. The Queensland port of Karumba is expected to play a larger role in the live cattle export trade, especially with the development of the port to meet the needs of the Century zinc mine. However, Karumba is more favourably placed for exporting to the Philippines than it is for exporting to Indonesia.

Live cattle are mostly exported to Java and Sumatra rather than to Eastern Indonesia because the market for beef is strongest in the wealthier areas of Western Indonesia. Demand for beef in Eastern Indonesia is not expected to develop significantly until income levels increase. The BTCE does not expect that the destinations in Indonesia

of live cattle exports from northern Australia will change substantially in the medium term.

Although there have been proposals to fatten cattle in Eastern Indonesia for later sale in Western Indonesia, such a move would not be financially attractive unless some incentive were given to cattle importers. The BTCE was given some anecdotal evidence of cattle being fattened in Kalimantan, but these cattle were fattened for the Brunei market, where labour costs are higher than in Eastern Indonesia.

TOURISM

Because of low population densities in northern Australia and low incomes in Eastern Indonesia, tourism in both areas depends on visitors from outside the region for its development. International visitors to northern Australia are projected to total 1.9 million in 2004–05, 1.65 million of whom are expected to be visiting for holidays. Domestic visitors to northern Australia are projected to reach 3.3 million in 2004–05.

At present, a large number of international tourists visit Indonesia but do not include Eastern Indonesia or Australia in their itineraries. In addition, the large number of tourists that visit northern Australia rarely include Indonesia in their travel plans. The development of tourist facilities in Eastern Indonesia opens up the possibility of jointly promoting northern Australia and encouraging tourists that are visiting Western Indonesia (including Bali) to extend their trip to Eastern Indonesia and northern Australia. In addition, Indonesians see a benefit in encouraging international visitors to northern Australia to extend their trip to include Eastern Indonesia. The development of the Arafura Tourism Zone is an example of joint promotion that can encourage regional tourism development.

Of the activities examined in this project, the possibility of jointly promoting tourism in northern Australia and Eastern Indonesia has the largest potential for generating synergies between northern Australia and Eastern Indonesia. However, BTCE projections of the number of international visitors to northern Australia could not take into account the possible development of tourism in Eastern Indonesia due to lack of information on the timing and likely impact of tourist developments in Eastern Indonesia. Therefore, the projections for international tourist demand in northern Australia in this study will understate future demand to some extent.

INFRASTRUCTURE

Northern Australia is very dependent on the adequacy of its transport infrastructure. The demand forecasts in the report, although somewhat different from earlier BTCE forecasts, do not materially alter the conclusions of the earlier analysis. In general, the transport infrastructure analysed is adequate for the expected demands, or plans are in place to expand the infrastructure when increased capacity is required.

CONCLUSION

Although there are potential synergies in the areas of mining support and human resources development, the major potential development that would impact on the transport system is the development of tourism in Eastern Indonesia. Live cattle exports are booming in northern Australia and these will have some impact on port infrastructure in northern Australia. However, at this stage, live cattle are not exported to Eastern Indonesia in large numbers, and it is not expected that they will be until income levels in Eastern Indonesia increase significantly.

This study confirms the view that neither northern Australia nor Eastern Indonesia has sufficient internal resources to promote rapid development independently. Northern Australia is limited by its small population and Eastern Indonesia is limited by its low income. Tourism provides one of the best means of facilitating development in both regions. Tourism infrastructure is reasonably well developed in most of northern Australia, but is limited in Eastern Indonesia. Developments that would facilitate the movement of tourists through Eastern Indonesia would be of benefit to both regions. The potential economies of scale available in jointly promoting both regions are one way in which tourism development can be assisted. The availability of transport links is an important part of the development process.

Because of shortcomings in the information available, the analysis in this report could only go part of the way in exploring the potential synergies resulting from the development of tourism in Eastern Indonesia. Further work is required to complete the analysis. To this end, a second stage of the project is planned to be undertaken by the BTCE and the Research and Development Agency of the Ministry of Communications to address the development of tourism in Eastern Indonesia and the impact that this will have on tourism demand in northern Australia and the associated transport infrastructure.

APPENDIX I ASSUMPTIONS FOR ESTIMATING LIVE CATTLE EXPORT COSTS

TABLE I.1 CATTLE EXPORT PORT COST ASSUMPTIONS

	Darwin	*Karumba*
Ship		
Gross registered tons	2 300	2 300
No. of cattle		
Indonesia	1 200	1 200
Philippines	1 440	1 440
Charter rate (A$/day)	23 000	23 000
Sailing time (days)		
Jakarta	5.8	8.6
General Santos	4.5	6.7
Cattle details		
Average weight (kg)		
Indonesia	350	350
Philippines	300	300
Feed (% of body weight per day)	2.25	2.25
Fresh water (kilolitres/head/day)	0.03	0.03
Port charges		
Wharfage: livestock ($/tonne)	1.52	2.80
Wharfage: fodder ($/tonne)	4.31	na
Loading fee ($/head)	1.70	4.00
Fodder loading ($/ship)		1 035
Fresh water ($/tonne)	0.54	1.42
Stevedoring ($/head)	4.35	0.00
Fodder ($/tonne)	395	380
AQIS ($/ship)	723	1 109

continued on next page

TABLE I.1 CATTLE EXPORT PORT COST ASSUMPTIONS (continued)

	Darwin	*Karumba*
Stockman		
Accommodation ($/voyage)	200	200
Wage rate ($/day)	100	100
Air fares ($/voyage)[a]		
Indonesia	403	1 026
Philippines	1 337	2 316
Road transport costs		
Cattle per deck		
Indonesia	28	28
Philippines	31	31
No. of decks[b]		
Indonesia	42	42
Philippines	46	46
Line haul costs (cents/deck/km)	95	95
Road distance (km)		
Cloncurry	1 719	452
Longreach	2 245	978
Yard costs		
Yard fee		
$/head	0.75	
$/head/day		0.75
Contractor fee ($/head/day)	0.12	
Unload/load fee ($/deck)	18	17
Feeding fee ($/tonne)	42.86[c]	38.00
Time in yard (days)	3	1.5
Transit costs		
Unload/load ($/deck)	12.50	na
Fodder (cents/kg)	0.75	na
Dipping ($/head)	1.00	na

na = not applicable

a. Individual fares used in the calculations are:

	Destination		
Origin	Jakarta	Manila	Karumba
Darwin	403	1 087	na
Cairns	731	1 771	295
General Santos	na	250	na

b. Number of decks estimated as the total number of cattle divided by the number of cattle per deck and the result rounded to the nearest multiple of 2.

c. Fee of $1.50 per 35-kg bag converted to $/tonne.

Source Kinhill Economics 1996a; NT Dept of Transport and Works 1996; Queensland Ports Corporation 1997 pers. comm.; Austral Livex pers. comm. 1997.

APPENDIX II PRESENTATION TO THE TRANSPORT WORKING GROUP OF THE AUSTRALIA–INDONESIA DEVELOPMENT AREA BY THE RESEARCH AND DEVELOPMENT AGENCY OF THE INDONESIAN MINISTRY OF COMMUNICATIONS

(LOMBOK, 25 AUGUST 1997)

Eastern Indonesia and northern Australia are geographically close and share common economic interests such as tourism. Each has its own economic strengths and limitations for rapid development. The transport synergy study attempts to find common economic characteristics between the two regions that could lead to future cooperative activities which will foster the development of both regions as one regional entity.

The synergy study is of significance in the context of the Australia Indonesia Development Area (AIDA) initiative and the Indonesian Government's current emphasis on the promotion of private sector investment in Eastern Indonesia. These two growth factors provide the catalyst for future cooperation between the two regions. Supporting infrastructure in terms of the transport network and economic inputs already exists in both regions and some of the existing economic activities are complementary.

Eastern Indonesia and northern Australia are relatively remote from the major centres of population in their respective countries. Population densities in Eastern Indonesia are low compared to densities in Western Indonesia but are still much higher than those in northern Australia. Because of the remoteness and low population densities, especially in

northern Australia, transport links are important as well as a challenge to the development of both regions.

We apply the same criteria as the Bureau of Transport and Communications Economics (BTCE) for defining Eastern Indonesia; that is, we defined a region where complementarities with northern Australia are likely to exist and a region that is compatible with likely sources of data.

Eastern Indonesia was formed under Presidential Decision No. 120/1993 as a result of the Government's prime determination to achieve a more equitable distribution of economic growth and regional development. The region consists of the islands of Kalimantan, Sulawesi, Maluku, Irian Jaya, Timor Timur, Nusa Tenggara Timur, and Nusa Tenggara Barat. The main economic activities in Eastern Indonesia are predominantly agriculture, forestry, mining and tourism. The region is rich in nickel, oil, copper and coal.

The differences in economic base and stage of economic development between Eastern Indonesia and northern Australia lend themselves to potential economic cooperation and transport synergies between the two regions. There are also complementarities in the two regions. Northern Australia is a major importer of nickel, ammonia, copper, cement and processed wood from Eastern Indonesia. Eastern Indonesia, on the other hand, has the potential to support the cattle export industry of northern Australia. Northern Australia presently exports most of its live cattle to Western Indonesia. Northern Australia and Eastern Indonesia could develop further cooperation in this trade. The vast lands of Eastern Indonesia are good grazing land for cattle fattening before the cattle are distributed to Western Indonesia and other destinations. This is a win–win situation whereby such cooperation will promote northern Australia's cattle exports and at the same time provide employment to the people of Eastern Indonesia.

While tourism on the surface would appear to be a competitive trade for the two regions, it could benefit both sides.

Trade between the two regions has existed since the 1980s. Although trade between Indonesia and Australia has grown very rapidly during the 1990s and there are important factors supporting synergy between the two regions, trade between northern Australia and Eastern Indonesia has not increased significantly.

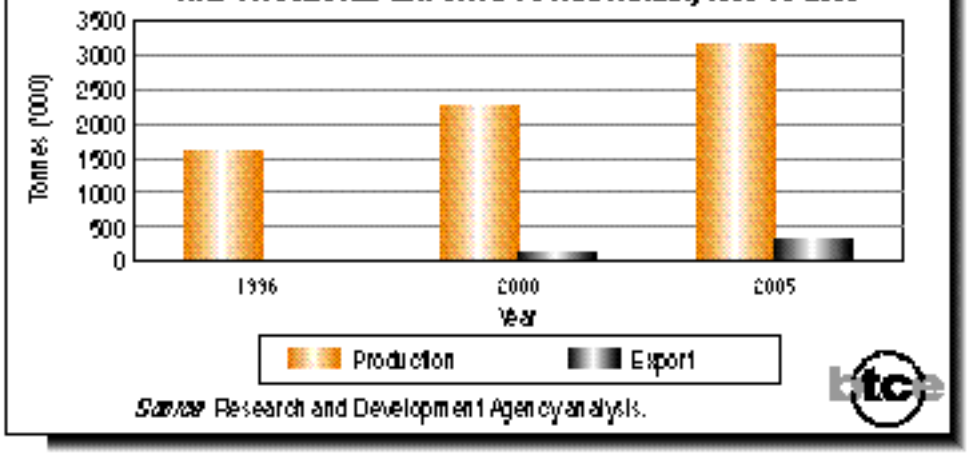
As a result of close regional and bilateral cooperation between Indonesia and Australia, cargo flow between the two countries is expected to increase. Export volume to Australia in the year 2000 is estimated to reach 226 153 tonnes and import volume from Australia, 248 909 tonnes. In the year 2005, the export volume is expected to increase to 513 286 tonnes and import volume to 365 749 tons. These increases will, to some extent, increase the existing trade between Eastern Indonesia and northern Australia. The main commodity exports from Eastern Indonesia to northern Australia are nickel, ammonia, copper, processed wood, crude palm oil and cement.

Our study focused on commodity exports—particularly cement and processed wood—and tourism because they are major trade sectors and have potential impacts on transport links between the two regions. Data on cargo flow and demand indicate that cement and processed woods have the best prospects as export commodities.

CEMENT

Cement export projections for the period 1996 to 2005 from Eastern Indonesia to Australia are illustrated in table II.1 and figure II.1.

FIGURE II.1 CEMENT PRODUCTION IN EASTERN INDONESIA AND ACTUAL AND PROJECTED EXPORTS TO AUSTRALIA, 1996 TO 2005



Source Research and Development Agency analysis.

TABLE II.1 ACTUAL AND PROJECTED EXPORTS OF CEMENT FROM EASTERN INDONESIA TO AUSTRALIA, 1996 TO 2005

(tonnes)

Description	*1996*	*2000*	*2005*
Production (South Sulawesi and East Nusa Tenggara) (tonnes)	1 600 051	2 280 982	3 137 433
Export to Australia (tonnes)	136	114 048	313 743
Export proportion (per cent)		5	10

Source Research and Development Agency analysis.

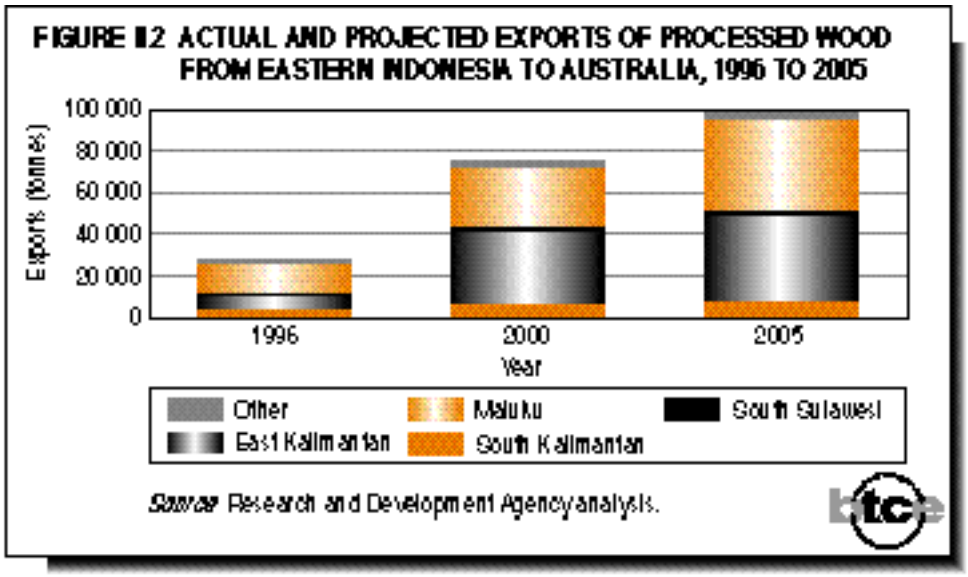
PROCESSED WOOD

Exports of processed wood from Eastern Indonesia to Australia—particularly from Maluku, East Kalimantan and South Kalimantan—are predicted to increase. This is mainly because of a 4 per cent per annum increase in the production and export of processed wood products. This estimate is based on available capacity and wood production growth (see table II.2 and figure II.2).

TABLE II.2 ACTUAL AND PROJECTED EXPORTS OF PROCESSED WOOD FROM EASTERN INDONESIA TO AUSTRALIA

Province	*1995* (tonnes)	*2000* (tonnes)	*1995–2000 Changes (per cent)*	*2005 (tonnes)*	*1995–2005 Changes (per cent)*
Bali	706	1 002	42	1 397	98
South Kalimantan	4 336	6 415	48	7 965	84
East Kalimantan	6 318	35 132	456	41 919	563
North Sulawesi	359	967	169	1 035	189
South Sulawesi	1 845	2 263	23	2 233	21
Maluku	14 283	28 553	100	43 546	205
Irian Jaya	299	328	10	361	21
Total	*27 966*	*74 660*	*165*	*98 456*	*250*

Source Research and Development Agency analysis.



TOURISM

Northern Australia and Eastern Indonesia both depend on the tourism dollar to boost their economic base. Both have similar tourism attractions (coral reefs and scuba diving) and depend on domestic and foreign tourists from outside the region.

Factors influencing tourism numbers include income and relative costs of living in destinations for international visitors and the price of domestic travel for domestic visitors. Other factors include consumer confidence, government policies, the unemployment rate, marketing expenditure and the availability of accommodation. As might be expected, holiday visitors are more sensitive to income and prices than other travellers.

At present, a large number of international tourists who visit Indonesia do not include Eastern Indonesia or northern Australia in their itineraries. Similarly, the large numbers of tourists that visit northern Australia rarely include Eastern Indonesia in their travel plans. The development of tourist facilities in Eastern Indonesia provides opportunities for joint promotion of northern Australia and Eastern Indonesia to encourage tourists visiting Western Indonesia (including Bali) to extend their trip to Eastern Indonesia, and northern Australia. Conversely, Indonesia sees benefit in encouraging international visitors

to northern Australia to extend their trips to include Eastern Indonesia. The development of the Arafura Tourism Zone is a good example of a joint promotion that can encourage regional tourism development.

The success of joint promotion of tourism between northern Australia and Eastern Indonesia will depend on Eastern Indonesia's capacity to provide the following:

- unique and interesting tourist attractions
- promotion of, and access to, tourist sites
- improved accommodation, transport and communication facilities
- innovative and creative souvenirs

SUPPORTING INFRASTRUCTURE

The existing transport network in Eastern Indonesia supports the main economic activities in the region. The total length of national and provincial roads in the region is approximately 20 000 kilometres. The major ports in Eastern Indonesia are Ujung Pandang and Bitung and the major airports are Denpasar, Ujung Pandang, Balikpapan, Manado and Biak.

Transport development in Eastern Indonesia is a priority in the context of the national development plan. In its efforts to promote private sector investment in Eastern Indonesia, the Government issued Presidential Decree No. 120/1993, which provides tax benefits and fiscal incentives for potential investors. In addition, under Presidential Decree Nos 89/1996 and 90/1996, the Government introduced the Integrated Economic Development Area concept, where specific provincial areas are selected for prioritised development. Presently 13 such areas have been indicated in Eastern Indonesia.

CONCLUSION

The transport synergy study is significant in the context of the bilateral transport relationship and future cooperation between the two regions. Complementarities and supporting infrastructure already exist in both regions, which would facilitate the development of both regions as one regional entity.

The study identified cement and processed wood as the major commodities with export potential for Eastern Indonesia.

Tourism has also been identified as having future potential for transport synergies between the two regions. Because of shortcomings in our data collection, we are not able to demonstrate this potential. However, we will pursue this for the next stage of the study. The draft terms of reference for Phase II have been agreed to by the BTCE and both sides hope to commence the study soon.

We agree with the analysis carried out by the BTCE that transport links are important for tourism development to take off in the Eastern Indonesia – northern Australia region. In this regard, the commitment of both governments to the AIDA process and of the Indonesian Government to its transport development plan for Eastern Indonesia will provide the policy impetus for analysing and addressing the development of tourism demand in Eastern Indonesia and the associated transport infrastructure.

Jakarta, August 1997

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Abbreviations

ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
AGPS	Australian Government Publishing Service
AIP	Australian Institute of Petroleum
AMLC	Australian Meat and Livestock Corporation
BTCE	Bureau of Transport and Communications Economics
EAAU	East Asia Analytical Unit (Department of Foreign Affairs and Trade)
MIM	Mount Isa Mines
NT	Northern Territory
NTPT	National Transport Planning Taskforce
TFC	Tourism Forecasting Council
WA DoT	Western Australian Department of Transport

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