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Potential economic implications for regional tourism of a Foot and Mouth Disease outbreak in North Queensland

D.B. SMORFITT

School of Business, James Cook University, PO Box 6811, Cairns, Queensland 4870, Australia. Tel: +61 7 4042 1442. E-mail: david.smorfitt@jcu.edu.au.

S.R. HARRISON

School of Economics, The University of Queensland, Queensland 4072, Australia.

J.L. HERBOHN

School of Natural and Rural Systems Management, University of Queensland, Gatton 4343, Australia.

International and domestic tourism are sensitive to disastrous events which make areas inaccessible to visitors, less attractive or more dangerous. One form of tourism disaster is the outbreak of an exotic disease, of which Foot and Mouth Disease (FMD) is a prime case. It is now well documented that the 2001 FMD outbreak in the UK had a greater impact on tourism than on agriculture. It has been estimated than an FMD outbreak in Australia would impose a cost of about $13 million. The impact on tourism would be highly dependent on the extent and duration of an FMD outbreak, as well as on any management and containment restrictions imposed by the authorities in their attempt to control and eventually eradicate the disease. Public perception and thus the provision of accurate information and the way in which the media report disasters will also play an important role in determining the impact on the tourism industry. The economy of Tropical North Queensland relies heavily on international visitors, and an FMD outbreak in the region would impose a large cost to the regional economy, conservatively estimated here to be of the order of $200 million per year.

Keywords: Foot and Mouth Disease; tourism impact; feral pigs; feral animals; North Queensland; Australia

International tourism is highly sensitive to adverse events, including outbreaks of exotic diseases for which the disease vector can be transported by humans – resulting in restrictions on visitors' movements. Of major importance in this

context is Foot and Mouth Disease (FMD), a highly contagious viral disease of cloven-hoofed animals (ungulates). The primary infection mechanism is through direct contact by inhalation of virus aerosols. Under particular conditions – such as a potent source of aerosols from an infected piggery, high humidity, mild temperatures and exposed livestock downwind – long-distance spread of FMD (measured in kilometres) by wind-borne virus can occur (EUFMD, 2001). Other sources of spread include contaminated vehicles, equipment, people and products. The FMD virus is hardy and can survive for several weeks in meat if the pH does not fall below 6.2, in frozen lymph nodes, bone marrow and viscera, and in salted and cured meats and non-pasteurized diary products (EUFMD, 2001). The globalization of trade has increased the risk of FMD spread (Elliot, 2001; Hirsch, 2001), as has the increased risk of bio-terrorism.

The outbreak of FMD in the UK in February 2001 had far-reaching effects on the UK economy, extending well beyond the immediate impact on the agricultural sector. Of particular note was the severe effect on tourism. The UK outbreak highlighted the risk that Australia faces and the potential economic impact that such an outbreak could have on the Australian economy. There are various important differences between the UK and Australia in terms of the risk factors, some of which, such as climatic conditions, may work in Australia's favour while others, such as sparse population, may be detrimental to Australia's efforts in identifying the outbreak and implementing control measures.

This paper briefly reviews various types of 'tourism disasters' and examines the impact of FMD on the tourism sector of the UK economy. Various issues associated with an FMD outbreak in Australia are then addressed, including the contribution of tourism to the Australian economy, its importance to the national and North Queensland regional economies and the potential economic impact that an FMD outbreak could have on tourism in North Queensland.

Tourism disasters

Tourism is a global industry, and various disaster events may be identified – such as natural disasters, terrorist attacks and disease outbreaks – which have had major adverse impacts on international tourism activity. These events may threaten the safety of visitors in transit or at a destination, or lead to imposition of restrictions on travel movements at visitor destinations.

Disaster events in relation to tourism are common around the world, and require appropriate management to reduce impacts, but, according to Faulkner (2001), evidence suggests that few destinations have appropriate management plans in place to cope with these events. Faulkner (2001, p 136) further states that 'relatively little systematic research has been carried out on disaster phenomena in tourism, the impacts of such events on the tourism industry and the response of industry and relevant agencies to cope with these impacts'. The suggested reason for this lack of research is that a theoretical and conceptual framework to underpin the analysis has not been developed. Faulkner differentiates between 'crises' and 'disasters': crises have their roots in planning and management deficiencies, and are thus 'self-inflicted', while disasters cause catastrophic change over which a country has little control. However, some events may not fit this classification precisely. For instance, a terrorist attack

would normally be regarded as an unavoidable disaster, although in some situations it might be argued that various factors, such as political, economic and social pressures on communities, have provoked a terrorism crisis. Fink (1986) and Keown-McMullan (1997), cited in Faulkner (2001), point to the role of the media in disaster management strategies and the important role they can play (possibly even determining whether or not a difficult situation develops into a disaster). Conversely, the media can play a negative role by sensationalizing the situation and spreading incorrect information.

Hall (2002) identified 27 terrorist attacks, bomb threats and attempted hijackings in international aircraft in 2001 up to the time of the 11 September 2001 attacks, noting that terrorist attacks on tourists and tourist infrastructure had a large negative impact on travel behaviour. Hall states that the media have an important role to play in both the presentation of the image of the destination and its re-establishment as a popular destination after a disaster event, and that they also have a substantial impact on the policy measures governments take with respect to travel safety and security.

The role of government in crisis management has been highlighted by Blake and Sinclair (2003) in their paper covering the US response to the 11 September terrorist attacks. They identify three issues confronting policy makers:

- whether the downturn is sufficiently large to merit offsetting measures;
- the duration of the downturn – long-term or permanent impacts require measures that minimize adjustment costs while the market returns to equilibrium, while temporary impacts require the economy to be insulated from the impact; and
- choice of policies for implementation – an evaluation of the available alternatives is required before making the choice.

Australia is generally regarded as a safe tourist destination. However, events that have discouraged air travel – including aircraft hijacking and the SARS outbreak – have reduced visitation to Australia. The SARS outbreak posed a disease risk that had a major effect on international air travel, peaking in April–June 2003. SARS had a severe impact on Australian tourism, albeit for a relatively short period. The impact appears to have peaked in May 2003, when there was a 22% decrease in overseas visitor arrivals, with the greatest reductions in arrivals from Asian countries including Taiwan (73%), China (71%) and Singapore (59%). There were in fact additional arrivals relative to the previous year from Germany (16%), New Zealand (6%) and the USA (9%) (Department of Industry, Tourism and Resources, 2003), perhaps associated with reduced attractiveness elsewhere due to the 11 September 2001 attacks and the ensuing Iraq war and international terrorism.

Some disaster events, such as the floods in Katherine in Australia in January 1998, were of limited duration and spatial extent and the economic impact was not severe on a national scale. The floods had both positive and negative impacts on tourism, as reflected in Table 1.

Many of these positives and negatives would also be present in an FMD outbreak, although the infrastructure issue would probably not be present. However, as indicated by Faulkner and Vikulov (2001), the regional counter-disaster plans developed by emergency agencies deal with many issues, such as ensuring visitor safety and – in the case of FMD outbreaks – containment and

Table 1. Longer-term positive and negative tourism impacts of the Katherine flood.

Impact area	Positive impacts	Negative impacts
Marketing	Media profile due to floods. Flood history a potential in its own right.	Focus on flood impacts delays response beyond restoration of services. Focus on recovery diverts attention/ resources from strategic issues.
Infrastructure and investment	Refurbishment of infra-structure	Curtailment of investment in expansion of infrastructure.
Improvement in disaster management	Development of tourism disaster management plan. Upgrading of insurance policies to allow for flood damage.	Losses incurred as a consequence of the flood represent a high price for a 'wake-up call'.
Cohesion	Team spirit and cooperativeness galvanized in the tourism sector. Improved community awareness of tourism benefit.	Tensions between tourism sector and business community over allocation of resources.
Human resources	'Acid test' for staff.	High staff turnover and loss of experienced staff.

Sources: Faulkner (2001); Faulkner and Vikulov (2001).

livestock management. However, the local regional tourism authority is likely to be the agency responsible for the implementation of the plan in the tourism sector.

There has been an uncomfortably large number of outbreaks of exotic pests and diseases in North Queensland in recent years. For example, Zlotkowski (2002) highlights outbreaks of: the Asian green mussel and Caribbean tube worm in 2001; the papaya fruit fly in 1995 (eradicated by 1998, at a cost of $35 million); and black sigatoka in bananas at Tully in 2001, costing $20 million to contain. These outbreaks were within a two-hour drive of Cairns, the international visitor entry point to North Queensland. The events had little effect on tourism, although they quite clearly reflected the potential for the entry of exotic diseases into Australia.

Impact of FMD on UK tourism activities and earnings

Various estimates have been made of the impact of the FMD outbreak on the UK economy. The National Institute of Economic and Social Research suggested, on the basis of a 20% fall in livestock and dairy output in 2001, the direct impact of a 0.06% reduction in GDP (£480 million). Oxford Economic Forecasting placed the figure between 0.05% and 0.15% of GDP (£400 million to £1.2 billion) (Countryside Agency, 2001). The Countryside Agency (2001) estimated the total FMD compensation for slaughtered animals

Table 2. Reductions in total tourism expenditure and GDP, 2001–04.

Year	Reduction in tourism expenditure (£ billion)	Fall in GDP due to tourism expenditure reductions (£ billion)	Total fall in GDP due to the FMD crisis (£ billion)
2001	7.7	2.0	3.6
2002	5.2	1.3	1.6
2003	1.3	0.4	0.6
2004	0.6	0.3	0.5

Source: Blake *et al* (2003).

at over £1.1 billion. Presumably this figure, while a transfer payment and hence not relevant for cost–benefit calculus, does approximate the market value of the animals destroyed. Figures from the Department of Environment, Food and Rural Affairs (DEFRA) cited by Butler and Airey (2003) show that the direct cost to the taxpayer was £2.06 billion. This included £1.05 billion compensation for slaughtered animals (8.6 million animals, including 4 million with FMD or on contiguous properties and 2.5 million slaughtered under welfare or movement restriction regulations), £254 million for cleaning and disinfecting properties and £170 million for disposal and transportation of carcasses. Slee (2003, p 2), citing the Anderson Committee report on FMD impacts in the UK, commented, 'Of the estimated loss of earnings in the economy of about £5.6 billion, about £5 billion related to the tourism sector and only £0.6 billion to the farm sector.'

An indication of the time pattern of FMD costs to the UK economy is provided by Blake *et al* (2003) in Table 2. The impacts continued for four years, although they tailed off in 2003 and 2004.

The impact on tourism was particularly widespread, with the greatest impact in Cumbria, Scotland and Wales (Christel De Hann Tourism and Travel Research Institute, cited in Butler and Airey, 2003). Cumbria Country Council, for instance, estimated that as at March 2001 visitor numbers were down by 60–70% from those of the previous year. The Lake District bookings were down by 75%, and Norfolk experienced a 30% reduction in rural visitor numbers despite no recorded cases of FMD (Countryside Agency, 2001).

In the early stages of the FMD outbreak it was realized that the control measures instituted were having a major impact on activities other than livestock farming, notably on countryside recreation and inbound tourism (DEFRA, 2001a). The role of agriculture in the UK economy has progressively decreased in importance, as highlighted by the Council for the Protection of Rural England (CPRE, 2001) in its position statement *The Strategic Lessons of the FMD Outbreak*. CPRE commented that the 'special significance given to agriculture in economic and development policies needs to be fundamentally re-evaluated', noting that farming now accounted for only 2% of GDP and employed only 1.5% of the workforce. Table 3 provides a comparison of the relative importance of the UK agriculture and tourism sectors. Tourism is not only a greater contributor to the economy than agriculture, but its revenue grew by 26% between 1996 and 1999, while agricultural revenue declined by 21% over the same period. Tourism accounts for about four times as much as agriculture in

Table 3. Comparison of agriculture with tourism in the UK.

Characteristic	Agriculture (all forms)	Tourism
Employment[a]	253,000 full-time 304,000 part-time/seasonal 1.5% of workforce	1.9m FTE 7% of workforce
Revenue generated	£15.3 billion per year (total) £7.3 billion (livestock and products)[a]	£64 billion per year (total)
Foreign exchange	£8.4 billion (all forms) £1.0 billion (meat and dairy)[b]	£12.5 billion (foreign exchange)
Gross Domestic Product	1% of GDP	4% of GDP
Growth rate, 1996–99	–21% decline in revenue generated	+26% growth in revenue generated

[a] Employment is expressed in slightly different ways, a single 'full-time equivalent' estimate being available for tourism. [b] Excludes poultry and associated products.
Source: Adapted from English Tourism Council (2001), as cited by the Countryside Agency (2001a).

employment, revenue generation and contribution to GDP, and it earns 50% more in foreign exchange.

Many non-agricultural activities were affected by the FMD outbreak. For instance, the third Foot and Mouth Impact Survey of its 300 member companies by the Outdoor Industries Association (OIA) identified losses of over £40 million by retailers and suppliers of outdoor clothing and equipment. The cancellation of two events, the Cheltenham Festival and the Badminton Horse Trials, cost £11 million and £18 million respectively (Countryside Agency, 2001).

National Trust research indicates that the special environmental qualities of the countryside are the bedrock of UK recreation and tourism, with 40% of employment in tourism depending directly on a high-quality environment; in a rural context this rises to between 60% and 70% (CPRE, 2001). According to Lowe *et al* (cited in CPRE, 2001), the value of tourism greatly exceeds that of agriculture and thus the 'public good' benefits of pastoral farming systems – such as distinctive landscapes and wildlife habitats – in large areas of the countryside far outweigh the market value of tradeable products.

The importance of tourism is further highlighted in that four of the eight key findings of the Rural Task Force (DEFRA, 2001a, pp 5–6) referred to tourism. The task force noted that: (a) farming and tourism were interdependent and intertwined with the wider rural economy, and so future policies for farming would have to take those links into account in a way that had not been done in the past; (b) countryside tourism, dependent on access to a landscape heavily influenced by farming, was a powerful economic force in many rural areas, frequently worth more to local communities in GDP terms than the farming that supported it; (c) many rural areas had a narrow economic base, dominated by farming and tourism, and many rural businesses depended mainly on passing trade; (d) the long-term impact of FMD on farming and tourism was uncertain and depended on the progress of the disease, factors such as farmers' decisions on restocking, and how quickly the countryside could attract visitors back.

Table 4. Number and proportion of tourism trips by UK residents to destinations in England in 1999 (millions, with percentage in parentheses).

Socio- economic group	Total	Seaside	Large city/ town	Small town	Countryside including villages	Not stated
AB (High)	33.7	4.6	13.2	7.5	7.8	0.6
	(26.7)	(3.6)	(10.5)	(5.9)	(6.2)	(0.5)
C1	43.3	9.1	15.6	10.0	8.2	0.4
	(34.3)	(7.2)	(12.4)	(7.9)	(6.5)	(0.3)
C2	23.2	6.6	6.6	5.0	4.9	0.1
	(18.4)	(5.2)	(5.2)	(4.0)	(3.9)	(0.1)
DE2 (Low)	26.0	7.2	9.6	5.3	3.8	0.1
	(20.6)	(5.7)	(7.6)	(4.2)	(3.0)	(0.1)
Total	*123.3*	*27.5*	*45.1*	*27.7*	*24.7*	*1.2*
	(100.00)	*(21.79)*	*(35.74)*	*(21.95)*	*(19.57)*	*(0.95)*

Source: English Tourism Council (2000), cited by Countryside Agency (2001a).

Table 4 reports the number and proportion of tourism trips by UK residents to destinations in England in 1999. The importance of the countryside to tourism activities is evident in that there were 24.7 million visitors to the countryside and villages, accounting for 19.57% of total tourism trips by UK residents to destinations in England in 1999. Trips to the countryside increased by 50% between 1993 and 1999 and are playing an increasingly important role in the tourism industry (Countryside Agency, 2001b). Tourism spending in the English countryside accounts for approximately £12 billion annually (England overall spending £53 billion), of which day-visitors to the UK, domestic staying visitors and overseas tourists account for 77%, 17% and 6% respectively (Countryside Agency, 2001b, p 13).

Table 5 reveals the nature of activities undertaken by tourists when visiting the English countryside. Around 44% (excluding 'other') of tourist activities locate tourists in close proximity to agricultural and rural areas. This accounts for the important potential role that tourism can play in the spread of FMD, and the need for control over tourist movements in the countryside.

Role of information and public perception in the impact of FMD control measures and redevelopment of the UK tourism industry

Public perception and an inability to ensure that appropriate accurate information was made available to the public compounded the effects of the FMD outbreak. In particular, perception about restrictions over entry into rural areas, use of public walkways and whether scheduled rural events would take place exacerbated the duration and extent of the depression in tourism. The lack of information, or at least the failure to disseminate up-to-date and accurate information, has been identified as the cause of some of the financial loss. The Countryside Agency (2001b) notes that, in addition to the duration and extent of the FMD outbreak, the key factors determining financial impacts are the speed at which access to the countryside is restored, how quickly visitors perceive that access conditions have returned to normal and the extent to which

Table 5. Proportion of people taking part in various activities when visiting the countryside, England 1999.

Activity	Fraction of visitors (%)	Comments
Hiking, walking and rambling	19	
Swimming	16	11% indoor swimming
Visiting heritage attractions	13	
Visiting a theme park	6	
Cycling	6	
Sailing – yachting and motor boat (cruising)	5	
Fishing	5	1% sea angling
Field/nature	4	
Pony trekking/riding	2	
Shooting/stalking/hunting	2	
Mountaineering/rock climbing	2	
Other sports and leisure	20	
Total	*100*	

Source: English Tourism Council (2000), cited by Countryside Agency (2001a).

their perception of the countryside as a destination for holidays or day-visits has been affected.

Public misconceptions have been highlighted as a factor that led to financial loss. In many instances the reduced visitation may well have been the result of genuine and socially responsible attempts by the public to stay away from outbreak areas. However, the failure to disseminate up-to-date and accurate information exacerbated the problem, extending the duration of the impact and the losses suffered by the tourism industry. The perception that countryside areas were closed could also have caused visitors to cancel their holidays or to change them to other areas, such as coastal resorts, with a consequent regional redistribution of tourism income.

The media coverage of the attempts to control and eradicate FMD in the UK was dramatic, especially in highlighting the more sensational aspects, such as the culling and disposal of slaughtered livestock. This, when combined with the closure of most footpaths at the beginning of the control process, resulted in many tourists deciding to change their holiday and day-visit plans. The Rural Task Force Report (DEFRA, 2001b) cited an English Tourism Council survey of late August 2001 which indicated that, even though animal carcass burning had ceased well before August and over 90% of footpaths were then open, 24% of respondents agreed that 'most places in the countryside are closed', 54% agreed that 'people should keep out of the countryside to avoid spreading FMD', and 35% agreed that 'you could not enjoy going to the countryside because you would see the destruction and disposal of animals'. Similarly, the Rural Task Force (DEFRA 2001a, p 23) stated that for 'international tourists, the downturn may be partially due to economic slowdown in the Japanese and USA economies, but primarily due to the images of disposal of carcasses, the mega-pyres in particular, presented in foreign media'.

Costs and delays in re-establishment of the tourism markets

The Rural Task Force (DEFRA, 2001a, p 32) stated in their report that 'tourism needs to attract visitors back into the countryside and revive images of a "green and pleasant land" which have been dented by scenes of slaughtered animals and burning pyres'. The sensationalized photos of animal slaughter and burning pyres came free of charge courtesy of the media, but the advertising and promotion needed to counteract these negative images required substantial resources. On the broader front, on 11 April 2001 the Department for Culture, Media and Sport (DCMS) set out a strategy focusing on national and international tourism. The DCMS gave the English Tourism Council £3.8 million for immediate recovery work including research, information and promotion. The British Tourist Authority was given £14.2 million for a publicity campaign to attract foreign visitors back (DEFRA, 2001a). At the local level, various areas launched initiatives to restore visitor confidence – Yorkshire's tourism campaign, for an example, cost £2 million and was designed to revive Yorkshire tourism which was missing out on an estimated £75 million per week due to the FMD outbreak (BBC, 2001).

The Rural Task Force (DEFRA, 2001a) reported that a number of revival measures were undertaken. These included a visit by the Tourism Minister together with industry representatives to the USA to counteract negative media coverage, a number of ministers making countryside visits to publicize the openings of rights of ways, radio promotion setting out guidelines for a safe visit to the countryside, a series of public information advertisements in national and regional media, and a widely distributed public information leaflet and poster. A Website was established by the Central Office of Information providing information on, for example, visitor attractions and was linked to the Countryside Agency's Website. The English Tourism Council also undertook extensive public relations activities, including 900 radio and television interviews and 2,000 press articles. The British Tourist Authority invited 60 of the world's tourist and travel leaders from the UK's nine most important tourist originating countries to a special VIP programme in Britain.

The FMD outbreak risk in Australia

It may be argued that the outbreak of FMD in Australia is highly unlikely, considering that the last Australian outbreak was in 1872. Notably, however, Korea and Japan experienced outbreaks of FMD in 2000–01, with previous outbreaks many decades earlier (in 1934 and 1908 respectively). The spread of FMD (type O or Pan Asia) throughout the world is illustrated in Table 6.[1] Some of the countries listed are important trading partners with Australia (AFFA, 2002b).

The highest risk of FMD entering Australia is in imports of live ungulates and contaminated meat or dairy products. The virus, which can survive for long periods in a range of fresh, partially cooked, cured and smoked meats and in inadequately pasteurized dairy products, could be brought in by passengers on aircraft and ships, through the mail or on fishing vessels or yachts (EUFMD, 2001a). There is also the potential for unintentional virus release by illegal

Table 6. Evolution of pandemic strain of Foot and Mouth Disease virus serotype (FMDV-O).

Country/region	Year identified (previous outbreak in parentheses where available)
Northern India	1990
Nepal	1993
Saudi Arabia	1994
Near East & into Europe	1996
Bangladesh	1996
Bhutan	1998
China	1999
Taiwan	1999
Most of South East Asia	1999–2000
Korea	2000–01 (1934)
Japan	2000–01 (1908)
Primorsky Territory of the Russian Federation	2000–01 (1964)
Mongolia	2000–01 (1973)
Kwazulu Natal, South Africa	2001 (1956)
UK	2001 (1967)
France	2001

Source: adapted from EMPRES (2001).

fishermen, who frequently operate off the North Queensland and Northern Territory coast – about 100 are apprehended each year (Anon, 2002; McDonald, 2002). Illegal immigrants (boat people) and drug smugglers could also introduce FMD. Tropical North Queensland (TNQ)[2] has a coastline of approximately 2,500 km and so imposes a major challenge for surveillance. The FMD virus is most likely to be introduced in contaminated meat products (Geering, cited in Productivity Commission, 2002, p 9) eaten by pigs, which are highly susceptible to infection by ingestion. If the infected pigs were wild or belonged to a swill feeder (albeit illegal) unconcerned about or reluctant to report sick animals, the initial outbreak could well go unnoticed and uncontrolled (AUSVETPLAN, 2001, p 13, cited in Productivity Commission 2002, p 9).

As a result of the UK's FMD outbreak, the Australian government has taken the risk of the entry of exotic diseases more seriously, and the level of quarantine funding, inspection and vigilance has increased substantially. In 1999, funding was approved for 10 new feral animal control programmes targeting rabbits, starlings, feral goats, feral pigs, foxes and plague mice (Anon, 1999). In a press release dated 31 May 2002, the Federal Minister for Agriculture, Fisheries and Forestry reported the recruitment of about 1,200 extra staff, 35 more detector dogs and 48 new X-ray machines at airports (AFFA, 2002a). The 2001–02 AFFA budget included a record $596 million funding package for quarantine to safeguard Australian agriculture from FMD and other diseases (AFFA, 2002b).

In October 2001, a real life operational exercise – Exercise Wild Thing – was undertaken with the objective of testing and improving the *Wild Animal Management Manual* (WAMM) of AUSVETPLAN (NR&M, 2002). The multi-agency exercise tested the wild animal component of a response to an exotic disease. A scenario was developed in which an outbreak of an exotic disease,

referred to as 'Droopy mouth fever' (DMF) (read FMD) was assumed to have occurred. The source was a yacht landing at Princess Charlotte Bay, where feral pigs spread the disease to neighbouring cattle stations. The *Exercise Wild Thing Report* (NR&M, 2002 p 2) noted that 'this scenario was believed likely to occur. The Princess Charlotte Bay area, as an entry point, had previously been identified as high risk by AQIS [Australian Quarantine Inspection Service].' The project was designed to improve Australia's preparedness for responding to an animal health emergency by enhancing the long-term capability for wildlife management of several agencies (NR&M, 2002, p 3). The issues addressed included: knowledge of feral pig ecology and management, including disease surveillance; skills, knowledge and attitude in individual agencies; public awareness of exotic diseases and wild animal management; multi-agency co-operation; organizational responsiveness in agencies including staffing, training, equipment and processes; and validation of whole-of-government commitment to, and preparedness for, emergency responses to exotic disease incursions.

A further preparedness exercise, known as Exercise Minotaur, was conducted in September 2002 as a desk-top national simulation to test high-level decision making and communication for disease outbreak response.

These two exercises and the lessons learned from the UK FMD experience have led to improved knowledge of how to control an FMD outbreak originating in northern Australia.

Potential economic impacts of an FMD outbreak on agriculture and tourism in Australia

A number of studies, reports and articles have attempted to evaluate the effects of an FMD outbreak in Australia on the national economy. Zlotkowski (2002) suggested that a major outbreak could close export markets for beef and lamb for up to 15 months and could cost as much as $13 billion in lost GDP. The Productivity Commission (2002) estimated losses for three alternative outbreak duration scenarios. It predicted losses in net present value terms of $2–3 billion for a three-month outbreak, $3–5 billion for a six-month outbreak and $8–13 billion for a twelve-month outbreak.

Most assessments of potential FMD costs for Australia have concentrated on the agricultural sector, with little or no reference to tourism. The Productivity Commission (2002), for example, devoted approximately two pages to tourism in a 174-page report, stating (p 74),

> In relation to domestic tourism, areas in and around the infection would suffer substantially. The affected areas and the magnitude of the effects would be highly dependent on the location of the outbreak. For this reason, The Commission has not attempted to estimate the impact on domestic tourism from the outbreak scenarios used in this study. . . .

If there were an outbreak of FMD in North Queensland, to what extent would it affect the regional tourism industry? For a clearer understanding of the potential impact, it is useful to examine the economic importance of tourism at national and regional levels. There are many potential scenarios based on a variety of factors, such as the duration of the outbreak, geographical spread and the authorities' reaction.

Table 7. Income shares of tourism and other 'base' industries in Tropical North Queensland.

Base industry	Value of income ($ million)	Percentage of total (%)
Tourism	1,450	39.94
Agriculture	670	18.46
Mining	390	10.74
Manufacturing	650	17.91
Fishing	200	5.51
Other	270	7.44
Total	*3,630*	*100.00*

Note: 'Base' industries are defined as those that tend to be orientated towards earning income outside the region.
Source: Tourism Tropical North Queensland (2001).

On the national level tourism plays a crucial role in the Australian economy, accounting for around $31.8 billion or 4.7% of GDP in 2000–01 (ABS, 2002). The Australian National Accounts define 'Tourism GDP' as the total market value of Australian-produced goods and services consumed by visitors after deducting the cost of goods and services used in the process of production (ABS, 2002).

At the regional level, the two most important drivers of the North Queensland economy, as shown in Table 7, are agriculture and tourism, both of which would be affected by an FMD outbreak. Tourism alone accounts for almost 40% of the income of base industries and thus plays an extremely important role in the regional economy. Butler and Airey (2003) indicate that the landscape and rural areas are an important attraction for many domestic and international tourists, and so anything that detracts from them damages the tourism image as a whole. Buckley and Klemm (1993), cited in Butler and Airey (2003), noted that a favourable image was an essential requirement for any destination. The image promoted by Australia is one of sunny skies, outback experiences and outdoor activities, and any negative impact on this vision could have a severely negative impact on Australian tourism, especially if the media, public relations and communication of knowledge were not well managed.

As in the UK, agriculture and tourism are inextricably entwined, so an FMD outbreak in Australia could have a severe affect on tourism. Is the interrelationship between the two industries as close as that in the UK? International visits to TNQ have a greater focus on nature-based recreation, as shown by O'Halloran *et al*'s (2000) analysis of inbound visitors.

There is little livestock farming close to Cairns, the international tourist entry point in TNQ. However, survey evidence indicates that tourists typically visit both the World Heritage Areas surrounding the city – the Wet Tropics and the Great Barrier Reef. Findings from a 1999 survey of 1,372 tourists in the Far North Queensland statistical division are presented in Table 8. The survey – conducted at Mission Beach, Cairns, Kuranda, Port Douglas and other locations – identified the top ten attractions, activities and sites visited by respondents (Pearce *et al*, *c*2001). At least five in the first two categories and nine in the third category would involve tourists coming into close contact with

Table 8. Top ten attractions, activities and places visited in Far North Queensland, 1999.

Attraction	%[a]	Activity	%[a]	Place or site	%[a]
Cairns Central Shopping	64	Visit beaches	69	Port Douglas	63
Kuranda Scenic Train	62	Shopping in general	62	Kuranda Village	61
Skyrail	60	Rainforest short walk	58	Cape Tribulation	48
The Pier Marketplace	57	Snorkelling	56	Atherton Tablelands	45
Kuranda markets	56	Scenic coastal drive	51	Daintree Village	44
Rainforest habitat	44	Shopping, local crafts	51	Barron Falls	43
Rainforestation, Kuranda	38	Scenic rainforest drive	47	Mossman Gorge	42
Cairns Casino	32	Visit small towns and villages	45	Barron Gorge	37
Undersea World, the Pier	26	Glass bottom boat viewing	44	Mission Beach	37
Birdworld, Kuranda	24	Night life	38	Atherton	34

[a] Proportion of respondents visiting attraction, activity and place. *Source:* Pearce *et al* (*c*2001).

animals and the environment. These results suggest that the proportion of activities undertaken in TNQ that bring tourists into close proximity with animals and the environment is similar to that in the UK. It is also notable that there is a large feral pig population in the region's rainforests and mangrove areas, with pig movements through cropland, and so control measures in the event of an FMD outbreak would involve widespread controls on visitor movements. These considerations suggest that the impact on tourism in FNQ, should an FMD outbreak occur, would probably be similar to that in the UK.

DEFRA and the DCMS (2002) (cited by Productivity Commission, 2002) estimated that international tourism receipts in the UK fell by 5.9% over the period of the 2001 outbreak. The Productivity Commission (2002, p, 72) stated that 'the restrictions on movement to control the disease could have some impact on tourism in Australia but the effect is likely to be significantly less than in the UK'. The report justified this statement on the basis of two arguments. First, Australia should have learnt how to manage an outbreak of FMD in a way that would minimize the collateral industry damage. Second, in Australia, agriculture and tourism are not integrated to the same extent as in the UK. These arguments are not entirely convincing. In North Queensland there is a strong emphasis on ecotourism in rural areas. Also, the region presents particular difficulties for the eradication of exotic diseases, and the federal government would undoubtedly respond to an FMD outbreak with a vigorous stamping out programme which would include control over human movements in quarantined areas.

There is potential for the various feral animal species – including feral pigs, cattle, goats and water buffalo – to act as vectors of the disease in North Queensland. Large and sparsely populated areas in the north, including Cape York, would make control of these vectors difficult. The TNQ and Northern regions as defined by the Bureau of Tourism Research (Figure 1) contain the Wet Tropics of the Queensland World Heritage Area. The rainforests and mangroves provide a large and inaccessible feral pig habitat. Vernes *et al* (1999) estimate that there are approximately 2–3 feral pigs per square kilometre in Queensland Wet Tropics rainforests, or about 27,000 in the 9,000 km^2 protected area. The dense rainforest and in many instances rough terrain create

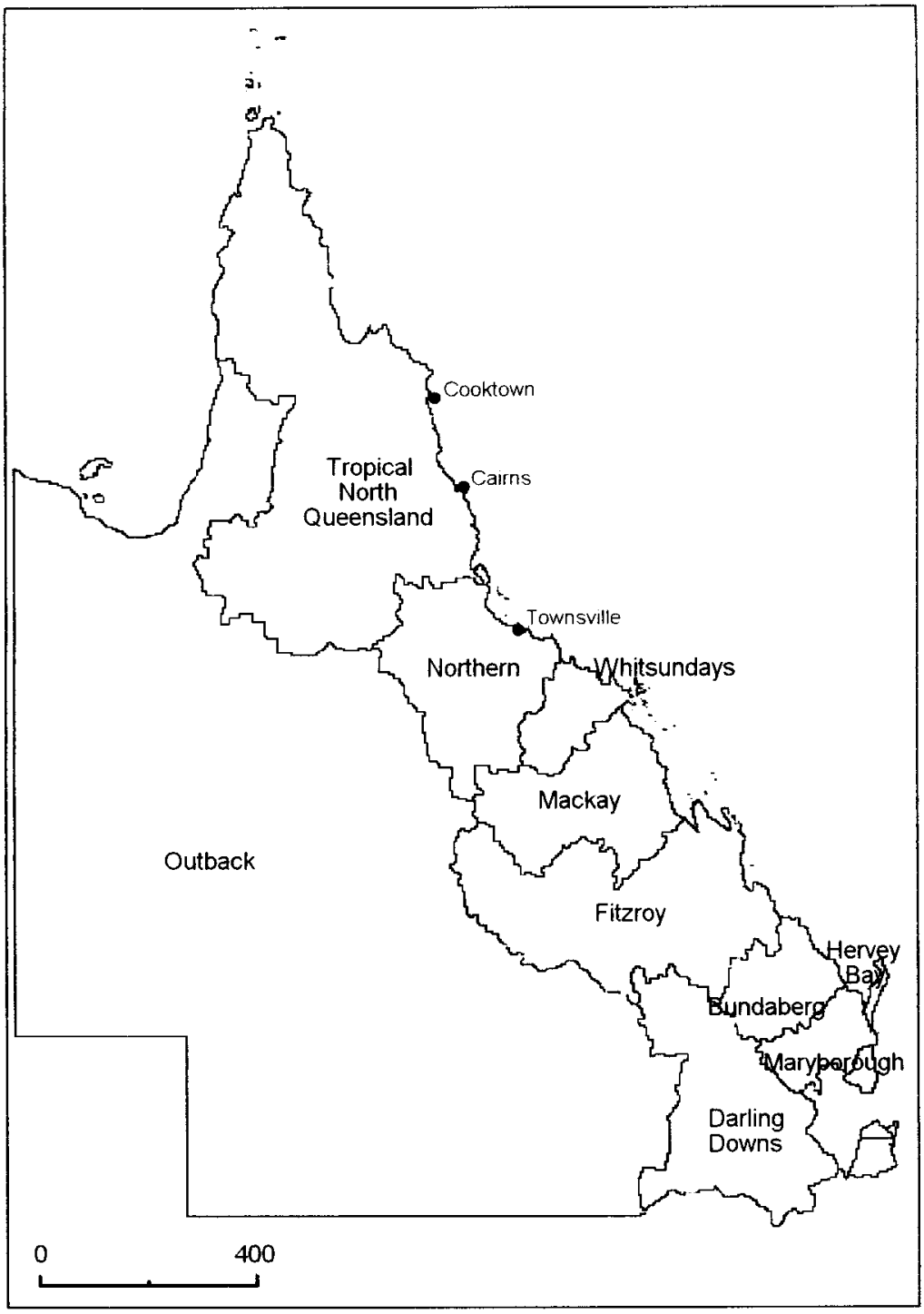

Figure 1. Designated tourism regions, Queensland, 2001.
Source: Bureau of Tourism Research (2001).

difficulties in human access; the trapping of feral animals is impossible and currently no hunting is allowed in protected forest areas.

Estimating the economic impact on tourism of an FMD outbreak in TNQ

The cost to Australia from reduced visitor numbers may be estimated in terms of the economic surplus to producers and consumers and costs to government. Of particular interest in relation to an FMD outbreak in North Queensland would be:

Table 9. Visitor expenditure levels in Tropical North Queensland by source of visitor, 1998–99.

Visitors to the region	Domestic day-visits ($ million)	Domestic overnight ($ million)	Inter-national ($ million)	Total ($ million)	Share of total (%)
Residents visiting within the region	119	97	–	217	10.5
Visitors from other Queensland regions	13	263	–	277	13.4
Visitors from interstate	3	591	–	594	28.8
International visitors	–	–	835	835	40.5
Subtotal: visitors to the region	135	952	835	1,922	93.1
Before/after expenditure of residents travelling interstate, overseas and to other Queensland regions	0	52	89	141	6.9
Total	*136*	*1,004*	*924*	*2,064*	*100.0*
Share (%)	*6.6*	*48.6*	*44.8*	*100.0*	

Source: OESR (2002).

- foregone producer surplus associated with reduced demand for tourism goods and services by domestic and foreign visitors;
- foregone consumer surplus as a result of the lower consumption by domestic tourists of recreation services (the consumer surplus from international visitors is not an economic loss from an Australian perspective); and
- losses in government revenue from tourism such as taxes and permit fees.

Estimates could also be made of the indirect or flow-on effects of changes in tourist expenditure (see, for example, Salma, 2002), though this has not been attempted here.

While it is not possible to estimate direct losses in economic surplus precisely, some indicative estimates may be derived if a number of simplifying assumptions are made. In the event of an FMD outbreak in TNQ, it would be expected that travel within the region would be severely restricted and in consequence that visitor numbers would be reduced. It is difficult to predict what this reduction in visitor numbers would be. DEFRA and the DCMS (2002), cited by the Productivity Commission (2002), estimate that international tourism receipts in the UK fell by 5.9% over the period of the 2001 outbreak, while Blake *et al* (2003) estimate a 14.5% decrease. Bringing the issue of the economic impact of disasters a little closer to home, the SARS virus resulted in a decrease in Australian international visitors of 22% in May 2003.

Suppose that there were an FMD outbreak in Tropical North Queensland and that tourism receipts fell by 6.0%. As indicated in Table 9, total visitors' expenditure in TNQ in 1998–99 was $2.064 billion, of which international, interstate and within-region visitors accounted for 40.5% ($835 million), 28.8% and 13.4% respectively (OESR, 2002, pp 14, 25).

Table 10. Cost structures in the tourism industry.

Business type	Fixed costs	Variable costs	Profit [a]	Total
Taxi	39	29	32	100
Bus and coach operators	41	40	19	100
Caravan parks	42	37	21	100
Motels	38	37	26	100
Restaurants	24	61	15	100
Average	*37*	*41*	*23*	*100*
Median	*39*	*37*	*21*	

[a] Profit before owner salaries and assuming all employee salaries are variable.
Source: Adapted from CCH Benchmarking (2004).

Estimation of annual loss in producer surplus

Assuming that international and domestic visitors have the same expenditure, a 6% fall in expenditure by international tourists would result in an annual expenditure reduction of about $120 million (6% of $2.06 billion). Only part of this amount would be lost producer surplus. If providers of goods and services for international visitors continued to operate, but at lower levels, they would still incur fixed costs but would avoid marginal costs with respect to the reduction in visitor numbers. In particular, there might be savings in labour costs (from staff shedding) and in the costs of operating equipment such as tour vehicles.

In order to undertake a simplistic analysis, we need to break down fixed and variable costs and profit. The tourism sector includes many different types of businesses (such as accommodation, transport and restaurants) with differing relative costs of providing visitor services. The size of the organizations in each of these areas also varies greatly: for example, in accommodation there are small bed-and-breakfast operators and small family-owned motels, but also large international resorts with high fixed costs. White (2004) suggests that fixed costs could vary between 20% and 80% of the overall business costs of firms in the tourism industry. Analysis of CCH national benchmarking data on taxi, bus, motels, caravan parks and restaurants (Table 10) provides greater insight into the cost and profit breakdown. It appears that fixed and variable costs each account for about 40% of total revenue and profit about 20%. Taking this breakdown, a loss of $1,000 in visitor expenditure would mean a $400 loss rather than a $200 profit – that is, the producer is $600 worse off. Applying a 60% loss to $120 million expenditure yields a foregone annual producers' surplus of $72 million.

Estimation of loss in consumer surplus from domestic tourists

Domestic residents who are discouraged from visiting TNQ may stay at home, travel overseas or visit second-best alternative sites. In the case of visits to substitute destinations, the reduction in domestic economic surplus could be small. The consumer surplus foregone is the difference between consumer surplus arising from a visit to the preferred destination (TNQ) and that of the best (and chosen) alternative use of their time.

Table 11. Sensitivity analysis of reduction of tourist receipts due to FMD outbreak.

Decrease in tourism receipts (%)	International tourism foregone in producers' surplus ($ million)	Domestic tourism ($ million)	Total ($ million)
5	61.8	3.06	64.86
10	123.6	6.12	129.72
15	185.4	9.18	194.58

A 6% reduction in domestic visitors (59.5% of all visitors) from an annual expenditure of $2.06 billion would result in reduced expenditure of 6% × 59.5% × $2.06 billion or about $72 million. Suppose the consumer surplus after allowing for travel, accommodation and other costs incurred by domestic visitors is 50% of their expenditure, and the reduction relative to the best alternative use of time is 10%, then the annual foregone consumer surplus is $72 million x 50% × 10%, or $3.6 million.

Government revenue foregone

No doubt there would be some loss in government revenue associated with reduced foreign tourism – for example, with respect to airport taxes, permit fees to visit rainforest and reef locations and fees and taxes levied on tourism service providers. (Government charges associated with domestic tourism are transfer payments which do not represent any net gain or loss to the economy, and are not relevant in this context.) The government revenue foregone would probably be small relative to losses in producer and consumer losses, and no estimate is made here.

Estimated annual economic loss to tourism

Aggregating the above estimates, the total annual economic surplus foregone is estimated to be about $72 million + $3.6 million, or $75.6 milllion. Because of the uncertainty of the impact of FMD on tourism expenditure, a sensitivity analysis has been undertaken in which the percentage reduction has been varied between 5% and 15% (Table 11). The estimated economic loss ranges between about $65 million and $200 million. If a similar pattern over time were observed, as in the UK (Table 2), the total economic loss in relation to tourism from an FMD outbreak would be of the order of twice this amount. The above cost estimates are deliberately conservative, with no allowance for revenue loss to government or for indirect effects.

The impact is greater on producers than on consumers, because the latter can more readily switch their activities to other locations. This may well be greater than the cost to livestock industries in TNQ (though small relative to the Australia-wide loss by livestock industries), and would have a severe impact on the regional economy. Furthermore, the impact could be particularly severe on individual firms providing services to tourism (operators of four-wheel-drive tours to rainforest areas, for example).

Discussion

The outbreak of an exotic disease which leads to severe controls on countryside visitation can result in a severe cost to tourism. The experience in the UK was that the FMD outbreak imposed high costs on livestock industries but an even higher cost on tourism. The task of re-establishing the tourism industry was expensive and time-consuming and loss of income continued during the 're-establishment' period.

Tentative estimates can be made of the economic impact of reduced tourism in the event of an FMD outbreak in Tropical North Queensland. The economic analysis presented here indicates that an FMD outbreak in North Queensland would have a major regional impact. Movement controls arising from the outbreak would relate in particular to farming and forest areas. It might be concluded that marine tourism, including visits to the Great Barrier Reef, would not be affected. However, coastal areas are habitats for animals which can transport the FMD virus, including feral pigs in mangrove areas. Furthermore, the international perception of movement controls, and uncertainty about whether they apply to marine areas, might discourage reef tourism. Besides, a high proportion of international visitors come to see both the reef and the rainforest, and restrictions on one would reduce visitation to the other.

Movement restrictions in TNQ would presumably increase domestic visitation to other Australian sites. The degree of site substitution by international visitation numbers is less clear. One possibility is that international visitors would go to other sites in Australia, so that numbers would be a little lower. Another possibility is that, through lack of information or fear of movement control in other areas of Australia, the visitor numbers to other Australian sites could actually decline. The assumption of a reduction of about 6% in international visitors to TNQ and no change for other regions is probably optimistic. The various other parameters of the analysis are also subjective estimates, and further research is needed to improve their reliability. The duration of restrictions on human movement in the event of an FMD outbreak is highly uncertain. There could be a permanent fall in visitation trends (both domestic and international), or alternatively there could be compensatory visitation, with visitors simply delaying their trips.

It is clear that exotic livestock diseases, including Foot and Mouth Disease, must be taken as a real threat to the Australian economy. The probability of an outbreak of FMD, its effect on various sectors of the economy and its duration are subject to speculation. The probability of an outbreak depends on the preventative measures instituted by various levels of government, while outbreak costs would depend on the control and eradication processes, as reflected in the AUSVET plan. It is critical that economic analysis takes into account not only the cost to livestock industries but also the cost to tourism.

Endnotes

1. Tropical North Queensland is the marketing name adopted by Tourism Tropical North Queensland and the Bureau of Tourism Research. It includes areas in the North Queensland and Far North Queensland statistical divisions.
2. As pointed out by a reviewer of this paper, there have also been FMD outbreaks in Greece, Belgium and the Republic of Ireland. Table 6 does not represent an exhaustive list of countries that have experienced problems with FMD outbreaks.

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