The aim of this paper is to identify needs and consumer demands in the cattle feed industry. A recent history of the industry, current and future capacity, the production system covering the processor, feed lots, the studs and the grower are discussed. In Australia exported 795,000 tonnes of beef valued at 2.8 billion; of this $937 million is from Japan. Opportunities for Australian grain-fed beef in Japan identify three categories: 1. top quality Wagyu; 2. Japanese dairy steer and imported grain-fed and grass-fed steers; 3. domestic cull cows and lower grade Australian grass-fed animals.

Important issues are: grading, fat in meat (marbling), odour and flavour. The challenge is for the beef production systems to meet the already identified consumer demands.

WHY LOT FEED?

The answer can be quite simply put - “To satisfy consumer (in importing countries) expectations of beef.”

Consumer Sensory Analysis studies in Japan would indicate that overall liking for beef is a function of liking for the odour and liking for the taste. The studies also illustrated that for a product to be competitive, that is for Australian products to compete with the Japanese Dairy Steer of the B3 grade and US High Choice grade the odours and taste must be familiar. Both the Japanese Dairy Steer and the US High Choice grade product are grain-fed. Therefore, for the Australian product to compete and produce familiar odour and taste sensations it must be grain-fed, the consumers expect familiar odours and taste.

Japan is not unique in its’ requirement for grain-fed beef. An investigation of the current beef cattle-finishing systems world wide would suggest that beef consumers in almost all Australia’s expert market (existing and potential) have become accustomed to grain-finished beef. For example, the North American system is almost entirely grain based. The Japanese system is totally grain based and the Europeans finish their beef on a range of supplements, comprising hay, grain, pulses and silages. Further the developing markets of Asia for example, Indonesia, the Philippines, Taiwan and Malaysia do supplementary feed their cattle on a range of by products, such as palm kernel, tomato pulp, pineapple pulp and grains.

It is significant that the hotel and restaurant trade in those countries that Australia has access to is dominated by the US Choice and Prime grades all of which are grain-fed. To compete in this market segment involves producing a product of similar standard; to achieve these similar standards the product must be grain-fed.

LOT FEEDING IN AUSTRALIA

It wasn’t until the 1960’s that lot feeding commenced in Australia. The first feedlots were developed on the Darling Downs of Queensland from 1964. These were initially farmer opportunity feedlots utilising the vast grain supplies produced from both summer and winter crops on the Downs. The majority of the beef from steers fed for 70-90 days...
was domestically marketed in Brisbane providing a consistent quality product on an all-year-round basis.

The 1965/66 drought heralded the development of the feedlot industry in NSW. The valuable grain resource of the Liverpool Plains was one of the main reasons for the first farmer-opportunity feedlots being established in the Quirindi, Gunnedah and Inverell districts. NSW Department of Agriculture extension officers recommended that farmers with grain surpluses enter into production drought feeding rather than maintenance feeding. Production feeding being the more positive, profitable option, in that it finished steers in a defined time interval for placement onto the domestic market through Woolworths. The production feeding exercise did generate a cash flow that was then able to be used to pay maintenance feeding accounts for the breeding herd.

Commercial feedlots, that is those with a capacity of greater than 1,000 were built during 1971-1974. The commercial feedlots, some of which involved Japanese equity mostly targeted the Japanese market. Approximately 30 commercial feedlots were built during the period 1971-1974. In 1974 the Japanese market closed and the Australian feedlot industry reverted to a farmer opportunity base. The opportunity lots supplied the domestic market only and throughput was seasonal. ‘The numbers peaked in winter months when pasture growth restricted consistent, regular turnoff from grass and reflected the inevitable Australian droughts. This trend continued during the seventies through until the late 1980’s and by 1986 the 28 commercial feedlots recorded 153,000 head on feed. During June 1986 there were approximately 80,000 head on feed in the farmer opportunity feedlots.

![Figure 1](image)

Figure 1 The capacity of Australian feedlots, the numbers of cattle on feed and those predicted for 1993
In June 1988 following the New Beef Access Agreement with Japan, the Australian feedlot industry entered a rapid growth phase. The liberalised market meant beef had to be supplied in accordance with consumer retail needs rather than through government agency tender system. The response by the Australian beef industry to the Japanese consumer preference for grain-fed beef. That is, in 1988 only 5,000 head of grain-fed beef were exported to Japan. This represented 3% of total exports in 262,384 tonnes or 30% of total exports was grain-fed.

In essence the feedlot industry development in Australia has been in response to the sonal adversity (droughts) and the Japanese market. Japanese investment is today, a characteristic trait of the Australian feedlot production capacity.

AUSTRALIAN FEEDLOT CAPACITY

Figure 1 shows the growth in feedlot capacity since 1990. It is worth noting that capacity in 1988 when the New Japanese Access agreement was negotiated, stood at 0,000 head. The Australian Lot Feeders Association (ALFA) estimated that capacity will se to 620,000 by the end of 1993. Licences have been granted to enable the construction of lots to achieve this capacity. However, a downturn in the world economies, particularly in Japan and Australia, will more than likely result in this projected capacity ot being realised.

THE LOT-FED BEEF PRODUCTION SUB-SYSTEM

Integral to the realisation of the projected feedlots capacity is the development of a feedlot oriented beef production sub-system, with the objective of producing feeder steers capable of fulfilling the lot-feeders requirements.

These requirements include:

1. The ability to achieve efficiency of gain in the feedlot during the required feeding period.
2. The ability to produce the specified carcase and meat quality traits, for example carcase weight at reduced seam and subcutaneous fat levels, marbling, meat colour, fat colour, meat texture, fat texture, and fat distribution.

The lot-fed industry sub system could be represented as follows:

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CONSUMER
  /
/ RETAILER
  /
/ PROCESSOR
  /
/ FEEDLOT
   /
  GROWER
/ BREEDER/GROWER / BREEDER
 /       \
SEED STOCK / SUPPLIER   SEED STOCK
            SUPPLIER
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The Lot-Fed Beef Production Sub-System is characterised by the fact that the consumer/retailer requirements for beef quality traits and specific cuts establish the goal for each component within the production chain to aim for.

The Processor

The processor has the task of slaughtering and fabricating the carcase into retailer friendly sub-primals correctly trimmed and vacuum packaged. In addition, the processor must actively seed feedback from the retailers regarding the supply of product in accordance with the specifications. Further, the processor needs to provide carcase feedback to the feedlot to evaluate the performance of cattle slaughtered especially with regard the quality and yield parameters.

The feedlots

The feedlot needs to interact with the processor so as to obtain the processors’ carcase specifications. The feedlot management must then design nutritional and management strategies that will result in the feeder steer obtained from the breeder/grower and/or the grower, fulfilling the processors carcase specification efficiently.

Ideally, feedlot management needs to circulate feeder steer specifications to the beef producing sector. In the case of the long fed cattle they should negotiate supply contracts with the commercial breeder/growers and growers to ensure consistent supply will be forthcoming to meet their (the feedlots’) production schedules all year round.

The feedlot needs to provide feedback to the commercial breeder/grower and grower with respect to:

1. Feedlot growth rate and efficiency
2. Carcase merit performance

The feedlot must also provide the stud industry with their feeder steer specification, for growth rate requirements in the feedlot and for carcase specifications. The studs need to be breeding bulls for sale to the commercial breeders, with the potential to produce feeder steers in the commercial herd with the ability to realise the growth rate and carcase merit attributes specified by the feedlot.

The studs

Feedback regarding the feeder steer produced by the commercial breeders needs to be passed back to the studs so that the studs can monitor their breeding programs and improve the genetic package so that it might then be transformed by the feeding processes (grower phase and feedlot phase) to accurately fulfil the carcase and so the consumer requirements.

The grower

The grower phase is all-important in this production sub-system as it is resulting in the steers being grown from weaning to a specified feedlot entry weight. It is important that the growth rate during this phase is consistent, enabling frame extension and
Figure 2
Australian Beef/Veal Exports in 1991/92
Volume vs Value

Volume
Tonnes Shipped Weight
US 48%

Japan 24%
Korea 12%
Taiwan 4%
Other 5%

Value
$AUS Thousand FOB
US 39%

Canada 5%
Korea 9%
Taiwan 5%
Other 11%

Source: Volume - AMLC
Value - ABS
maturation so that the steers will be entering the feedlot during the optimum age for marbling (18-30 months). As a general rule the longer the feedlot phase planned, the shorter the growing phase.

MARKETS FOR AUSTRALIAN GRAIN-FED BEEF

The amount (%) and value ($A) of Australian beef and veal exported in 1991-92 are given in diagramatic form in Figure 2. In 1992 Australia exported 794,978 tonnes of beef onto the world market worth $2.8 billion. Japan is by far the most important grain-fed market with the grain-fed component representing 62,384 tonnes worth $400 million. The total tonnage of beef exported to Japan in 1992 was 195,733 worth $937 million. On a shipped weight basis the grain-fed component exported to Japan represents 30% which then translates to 41% of the value of exports to Japan.

AEFA estimated that in 1992 some 470,000 steers were fed in Australia for Japan, this represents about 70% of the Australian feedlot industries throughput. Approximately 22% of the cattle fed in 1992 were marketed domestically, a further 6% went through the KI specification for Korea and the balance was not specified although it is likely that most of it would have been destined for the South East Asian hotel trade.

The opportunities for Australian grain-fed beef in Japan

The McKinsey study identified that the Japanese market comprises three market segments:

1. an upper segment supplied by top quality Wagyu
2. a middle segment supplied by Japanese dairy steer, imported grain-fed, imported grass-fed steers
3. a lower segment supplied by domestic cull dairy cows and imported Australian lower grade grass-fed animals.

McKinsey went on to suggest that Australia’s “Window of Opportunity” exists in the middle market where the competitors are the domestic dairy steer of the B2/B3 grades and the US Choice and Prime grades.

A further study commissioned by the MRC and conducted by S.M.A.R.T. (Sensory Market Analysis and Research Technology) amongst housewives that purchase from the ‘middle markets’ indicated that the consumers wanted beef that:

1. Produced a familiar taste and odour when cooked
2. Exhibited a light/bright meat colour (meat colour 2-4)
3. Was tender
4. Exhibited marbling within the middle market requirements of 2-5
5. Lacked fat, (the slice preparations eg. Yakiniku that comprise 70% of product sold at retail are denude of fat)

The most appropriated method of achieving the above mentioned quality traits, is to grain feed. The-Australian product, if it is to produce familiar odours and tastes must be similarly prepared to the competitive products.

There are opportunities for Australia to improve export performance into Japan and gain a higher percentage share of the middle market if a number of issues are addressed.
THE ISSUES

Grading

Currently Australia has a chiller assessment program for describing yield and quality parameters. The system is not of much use to retailers in Japan who have become accustomed to ordering beef through their own and US grading systems.

The retailers wishing to purchase product for their own middle market, order B2, B3 and B4. If they wish to purchase product from the US for their middle market, they order: Low Choice (the B2 equivalent); High Choice (the B3 equivalent) and Prime (the B4 equivalent). If they wish to purchase competitive products from Australia they have to understand chiller assessment and its complex colour range, fat depth and days on feed.

Australia needs a simple retailer friendly grading system so as to translate the chiller assessments made in the abattoirs into a grade that apportions product into a “band of acceptability” against which orders can be written and comparative pricing structured.

Total fat

The consumer studies have clearly shown that the consumers don’t want fat in their meat, yet they do want marbling albeit up to about score 4.5 from Australia.

The challenge is to develop the technology such that carcasses with adequate marbling (score 2-5) can be produced with low levels of inter muscular and subcutaneous at levels. Studies by Rouse and Wilson (Iowa State University) and Baud and Goddard (M112) would indicate that marbling is independent of seam and subcutaneous fat deposition. It may be possible to develop nutritional strategies to enhance marbling at the expense of seam and subcutaneous fat deposition.

Odour and flavour

A research project has been conducted by Rutherglen Research Institute in conjunction with S.M.A.R.T. to investigate the effect of days on grain on strength of smell and acceptability of odour. The findings indicated that the lower the saturated plus monosaturated to polyunsaturated fatty acid ration, the higher is the liking of smell. The results also suggested that to have an acceptable aroma for the Japanese market, fatty acid ratios are the best criterion to be used in defining the specifications. This is because beyond 60 days of grain feeding any meat colour (up to 6) has an acceptable odour. Further work is being carried out to validate this finding. The challenge is to establish similar such relationships for flavour.

CONCLUSION

Japan is Australia’s most significant grain-fed market. The necessary consumer and market place research has been conducted to identify the specific market specifications.

The challenge is for the beef production system to adopt the consumer-driven approach, and supply product according to market place needs. It is up to the research agencies to continue to provide the tools and information for the exporting companies to use in the commercial trading environment to more accurately fulfil grain-fed market place needs.
REFERENCES