INTRODUCTION

Change in the Australian prime lamb industry was advocated by Thatcher (1982) and others because many consumers required lamb products from larger and leaner carcasses than were readily available. Further integration of contemporary information on production and marketing through a national workshop resulted in recommendations for research and development to meet this demand (Thatcher and Harris 1983). Consumers required more innovative products, and thought lamb was no longer reliably tender (Ashton-Jones 1986).

Subsequent production research aimed at supplying the larger and leaner carcasses needed for specialty lamb products; market research aimed at creating consumer awareness of the new products. Marketing activities included encouraging producers to trade over the hooks, introduction of a uniform language of carcass description, a better knowledge among producers and buyers of carcass characteristics on live lambs, and development of specialty meat products for export.

Success was limited. This may have been because development was not simultaneous throughout the whole industry. Marketing initiatives lacked adequate supplies of carcasses, whilst markets were not available when large lamb production was stimulated. Actual specifications were confusing, i.e. larger and leaner than what?

This led to the development of a coordinated national program of research, production and product development, marketing and promotion. This program is called the Elite Lamb Program. This contract describes the activities involved, the extensive industry involvement and the national nature of the program. Some changes required in attitudes and management systems in all industry sectors are discussed.

THE PRIME LAMB PROGRAM

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BACKGROUND

The past 2 decades have seen a decline in consumption and market share of lamb in Australia (Table 1). This has been associated with declining profitability in all industry sectors and a view of lamb meat as over-fat, uninteresting and irrelevant to modern health conscious consumers.

Over the past decade a range of new, boneless lamb products from larger lambs was developed to fill consumer needs for lean products which are attractive and easy to prepare. Impact on the industry was limited due to inconsistency of supply and insufficient targeted marketing.

The Meat Research Corporation’s commissioned Prime Lamb Program seeks to redress this situation. Its goal is to increase the volume of lamb production consumed in high value domestic and export markets to 8% of 1990-91 production levels by 1994. The MRC program specifies products from lambs of 18-26 kg carcass weight and fat score 2-3. However, the research and development effort is aimed at the production of Elite lambs of carcass weight 22 kg and above and GR 6-15 mm (fat score 2-3) to realise the market demand and increased processing efficiency associated with larger, leaner lamb carcasses.

Statistics show that only about 1% of lambs produced would meet Elite lamb specifications (Table 2). Appropriate lean lambs 22 kg carcass weight and above are in low supply; for lambs of carcass weight 18 kg and above, over 80% of lambs are overfat for the production of lean cuts.
Table 1. Apparent consumption [average of decade (kg/head/year)] of different types of meat

<table>
<thead>
<tr>
<th>Decade</th>
<th>Beef</th>
<th>Pig</th>
<th>Poultry</th>
<th>Mutton</th>
<th>Lamb</th>
<th>Total</th>
<th>Lamb share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940s</td>
<td>51.1</td>
<td>7.8</td>
<td>4.6</td>
<td>20.6</td>
<td>11.7</td>
<td>95.9</td>
<td>12.1</td>
</tr>
<tr>
<td>1950s</td>
<td>54.0</td>
<td>7.3</td>
<td>4.4</td>
<td>21.5</td>
<td>12.9</td>
<td>101.2</td>
<td>12.7</td>
</tr>
<tr>
<td>1960s</td>
<td>42.0</td>
<td>9.5</td>
<td>6.4</td>
<td>21.5</td>
<td>19.1</td>
<td>98.6</td>
<td>19.4</td>
</tr>
<tr>
<td>1970s</td>
<td>53.2</td>
<td>13.2</td>
<td>14.3</td>
<td>9.6</td>
<td>18.2</td>
<td>109.5</td>
<td>16.8</td>
</tr>
<tr>
<td>1980s</td>
<td>45.2</td>
<td>16.1</td>
<td>21.1</td>
<td>5.4</td>
<td>16.1</td>
<td>102.0</td>
<td>15.8</td>
</tr>
</tbody>
</table>

Table 2. Lambs in fat score x carcass weight categories (%)

<table>
<thead>
<tr>
<th>Carcass weight (kg)</th>
<th>Fat score 2</th>
<th>Fat score 3</th>
<th>Fat score 4</th>
<th>Fat score 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-20</td>
<td>0.7</td>
<td>5.4</td>
<td>16.3</td>
<td>—</td>
</tr>
<tr>
<td>20-24</td>
<td>0.07</td>
<td>2.4</td>
<td>18.3</td>
<td>0.16</td>
</tr>
<tr>
<td>&gt;24</td>
<td>—</td>
<td>0.07</td>
<td>3.6</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Note: 50% of lambs are below 18.0 kg carcass weight

THE PRIME LAMB PROGRAM

The program is based on a careful analysis of opportunities for the prime lamb industry. Organisation and industry consultation and involvement across all sectors of the industry are integral to its implementation and success.

The Prime Lamb Program addresses the total market chain from breeding of lambs to retailing of products. It involves 4 State Departments of Agriculture (N.S.W., Vic., S.A., Tas.), CSIRO, AMLC and AUSMEAT in a coordinated effort to develop appropriate strategies and systems for Elite lamb production, processing and marketing.

A consistent supply of Elite lambs must be available throughout the year if markets are to be developed and maintained.

Much of the research information required to produce Elite lamb is already known — the focus of the program is to develop and prove strategies-and demonstrate systems for producing lambs of the required specification across Australia in each month. The goal (25,000 t) would be met by about 100,000 Elite lambs being available each month.

Subprograms

The program is addressing industry problems and opportunities in the systematic approach within 4 subprograms and 10 project areas. These are:

1. **Breeding and reproduction** — to provide producers with the access to genetic resources and genetic improvement techniques which will enable them to breed Elite lambs. Projects involved and their locations are:
   (i) carcass research and data analysis (Rutherglen, Vic.)
   (ii) sire progeny testing (Rutherglen, Vic.; Glen Innes, N.S.W. and Struan, S.A.).

2. **Growth and production** — to demonstrate a range of proven technologies to produce Elite lambs at lower unit costs in the major prime lamb production areas. Projects are:
   (i) Production Costs Studies (Orange, N.S.W.; Bendigo, Vic.; Struan, S.A.)
   (ii) Production Systems Studies (Cowra, N.S.W.; Shepparton, Vic.; Struan, S.A.; CSIRO Adelaide and Canberra)
   (iii) Constraints and Opportunities Surveys (Cowra, N.S.W.)
   (iv) Production Systems Validation Trials (Cowra, N.S.W.; Rutherglen, Vic.; Hamilton, Vic. and properties in major lamb producing regions)
   (v) Nutrition Studies (Cowra and Camden, N.S.W.; Rutherglen and Hamilton, Vic.; Launceston, Tas.).
3. Processing — to develop and to implement rapidly the technology needed to improve the marketability of lamb in high value markets.
   (i) Meat Quality Studies (Rutherglen, Vic.) aimed to ensure maintenance of quality. Other processing work may be developed.
4. Market development — to develop and sustain a marketing system for higher value Elite lamb which would provide producers with clear market signals concerning consumers’ preferences, and to promote the consumption of higher value lamb. Projects are:
   (i) Market Development (Rutherglen, Vic.; Armidale, Cowra, N.S.W.)
   (ii) Market Signals Studies (Orange, Armidale, N.S.W.)
   Market development work will be progressively initiated in other states as the program develops.

THE FUTURE
Much remains to be done to ensure the program goal is reached. It is critical that market signals operate and all sectors of the industry benefit from the Elite lamb concept. Strategies to ensure year round supply have yet to be fully developed, and supply must be matched with demand at prices which encourage production. The industry’s future is dependent on the production and successful marketing of products that consumers are seeking. Elite lamb can fulfil that expectation, but a broad range of stakeholders must communicate and co-ordinate their efforts and express tangible confidence in the concept if prime lamb production is to be a viable and profitable industry in the future.

MARKET OPPORTUNITIES IN AUSTRALIA AND OVERSEAS

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For too many years the Australian fat lamb industry has lived in the dim dark ages. With good pasture and no pressure to fully stock it, there has been a tendency to produce ‘pretty’ lambs to suit a particular environment or farmers’ needs.

Now as we head toward the year 2000 and the beginning of a new century we find for the first time that it is difficult to survive with many financial pressures upon farmers. They have to examine markets and market a saleable product which maximises returns in their environment.

Most other food items have adapted to the modern consumer of today. They require low fat, nutritious products with microwaveable potential, smaller portion size, and products with consistently good eating qualities. Elite lamb and Fresh Australian Range Lamb (FARL) ideally meet these criteria. Specifications for FARL are 18-26 kg, i.e. they include the 22-26 kg weight segment of the Elite lamb, and the aim of the program is to lift Australian lamb prices with an expanded export market for high value lamb.

In the coming years one thing is particularly certain, and that is that all overhead costs will rise, therefore to minimise costs on a per kg basis, the carcass weight of the animal must rise enabling numbers processed to remain constant whilst increasing output per plant. This will be necessary due to the extra work involved with the further processing needed to achieve new boneless cuts. With the development of these new cuts there will be a significant lift in prices obtained, but for this to flow back to the farmer a consistent supply of ‘elite type’ lambs must be available for 52 weeks of the year. If this is not achieved no positive results will be gained as the processor/packer cannot seek out new markets with confidence.

Markets for new cuts are encouraging, through Elite lamb in the local market and FARL lamb for the overseas markets, as these products fit ideally into the concept of cookable items in the 2000s.

Breeding and management programs will have to be changed so we have a supply of ‘meat lambs’ at the age of approximately 6 months, and not a dual purpose lamb producing both meat and wool. A lamb of this age will produce the ideal carcass and eventually a better return for farmers.

A comprehensive marketing and education program needs to be developed and then maintained over the coming years to sell these new cuts to the final consumer. If this is done, the market potential is very encouraging. The FARL program with intensive consumer education has led to an 80% increase in use of these new cuts in the USA over the last 12 months. A similar and continuing increase is indicated in the coming year, with the likelihood that within 5 years some of the more traditional cuts of certain items will disappear. The new cuts should maintain market growth.
These cuts are practically suited to all countries after the promotional education. The leg cuts in particular will be suited to certain Economic Community markets. However, market potential is severely constricted due to the quota system presently in place in that market.

In summary, the traditional lamb industry will perish unless we have new value-added cuts from the larger and leaner product available for 52 weeks of the year.

PRODUCTION SYSTEMS FOR ELITE LAMB

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Larger lambs have a greater chance of being over fat since sheep put on an increased proportion of fat to lean as they approach maturity (Kirton 1982). Consequently lambs are usually slaughtered well before maturity to ensure that consumers obtain the leanest lamb possible. Typically lambs are sold at 4-5 months of age and 36-38 kg liveweight, or about half their mature weight. This early disposal is inefficient both commercially, as many costs are charged on a per head basis, and biologically, as it is more inefficient to produce fat than lean (SCA 1990). Heavier lambs are often discounted in the saleyard, usually because they are expected to be over fat; hence the penalty is applied to additional weight rather than extra fat. Management changes are necessary to increase leanness at heavier weights in lambs, as well as alternative marketing methods and meat preparation. Modifications are needed in growth rate, weight at sale and body fat.

GROWTH RATE

**Sire**

Genetic variation within a terminal sire stud could lead to a difference between sires of 6 kg in the progeny, at an average progeny liveweight of 50 kg (R. Banks pers. comm.). Thus fast growing sires identified through Lambplan should be selected. Between stud variation could lead to a range of possibly 10 kg, i.e. 45-55 kg liveweight at average progeny weight of 50 kg (R. Banks pers. comm.). Once data are available from the Elite lamb sire progeny tests, which involve about 180 sires over 3 years, rams from the top performing studs should be utilised.

**Dams**

The dam should also be a large framed sheep. It is recommended that producers use Border Leicester x Merino ewes that are 5 kg heavier at mature weight than those traditionally used. Both first cross and Merino ewes are being used in the progeny testing at Struan, South Australia.

**Sex**

Cryptorchids or ram lambs grow about 25 to 70 g/day faster than wethers and wethers in turn grow 10 to 30 g/day faster than ewes (Lee et al. 1990; Thatcher et al. 1991; Hall and Holst unpublished data). Thus the time taken to grow them out to 50 kg liveweight could be shortened by about 30 days depending on overall growth rates. Research into these benefits is continuing at Cowra and Rutherglen.

Selection for Elite lambs

Lambs selected at lamb marking or weaning should be heavier, large framed lambs (usually males). This will probably mean that they are predominantly single born, from early in the lamb drop. Selection criteria will be defined by further research at Cowra and Rutherglen.

Growing period and nutrition

To achieve Elite lamb weights the simplest system is to grow lambs for a longer period to gain the extra weight. Research at Rutherglen is ensuring that older lambs (up to 9 months) are equivalent in quality to present trade lambs. A nutrition workshop identified key periods for lamb nutrition as July and August and summer. Regional differences will ensure that: (i) some regions are more appropriate than others and modelling studies by CSIRO, Canberra will define the most appropriate regions and turnoff times within regions; (ii) joining may have to occur earlier to ensure there is a longer growth phase for lambs on good quality pasture. Validation studies on farms will confirm ideal joining times; and (iii) special purpose crops, pastures or supplements may have to be provided to extend the growing phase. Summer fodder crops are being studied at Hamilton and in Launceston. Rutherglen and Cowra are examining grain and Hamilton and Launceston, silage supplements.
LEANNESS

Sires

Between breed differences in percent fat in the carcass varied from 22.7 (Texel) to 29.8 (Dorset Horn) with the Poll Dorset intermediate (Wolf and Smith 1983). Preliminary results from the central progeny testing program suggest that differences between progeny from the leanest and fattest sires within 1 stud could be expected to be about 5 mm in GR at the same weight (R. Banks pers. comm.). Again, between stud differences could bring about differences of 3-4 mm of fat. The larger the mature size of the sire, the greater the chance of a leaner lamb at 22 kg carcass weight.

Ewes

A large-framed ewe will ensure progeny are slightly leaner than those from traditional ewes when killed at the same weight.

Sex

The recommended production system is that ewe lambs be slaughtered at 36-38 kg and males be carried through to liveweights of 48 kg or heavier live weight. At similar weights, entire males have 2-4% less chemical fat in the carcass than wethers, which in turn have a similar amount less than ewes (Bass et al. 1990). At 37 kg, ewes could be expected to have GR tissue depths about 2-4 mm greater than wethers, which in turn will be 3 mm greater than rams or cryptorchids (Lee et al. 1990; Thatcher et al. 1991; A. Kajons pers. comm.). As weight increases, ewes would eventually have GR’s of over 20 mm (fat score 5).

Nutrition

Some evidence from controlled individual feeding experiments shows that supplying additional protein to the small intestine of over-fat lambs on an energy deficient diet will increase the proportion of lean in the lambs (Vipond et al. 1989). However, there is no evidence that lambs fed as a group on pasture will produce a similar result. This is partly because of the large range in intakes, the selection of feeds which will vary protein and energy intakes and the equalising nature of rumen fermentation. Protein should be adequate for fast growth rates. Nutrition studies at Camden, N.S.W. and Rutherglen are examining effects of protein and energy ratios on growth rate and composition.

Growth path

There is some evidence (Jones et al. 1983; Bass et al. 1990) that when animals are slaughtered at the same weight they will be leaner if they are: younger, fed on low rather than high energy diets, fed on pasture compared to grain, restricted later rather than earlier in life or are slaughtered before a liveweight maintenance phase later in life. Thus summer/autumn fed lambs which have grown slowly because of poor quality pastures would be leaner than those grown at rapid rates when high quality pastures are available in spring. Thatcher and Gaunt (1992) showed similar potential after an initial growth setback with subsequent realimentation, and outlined information required to develop new management systems.

Combinations of production components

Combinations of management options must be exploited to ensure Elite lambs are produced year round. Data from an experiment, in which 3 very different feeding systems were evaluated in southern N.S.W. over the very dry summer-autumn 1990-91, showed that the proportion of lambs that met Elite specifications at an average 8 months of age was as low as 6% for ewes from sires with a Lean Growth Lambplan index of 90%, compared to 64% for cryptorchids sired by rams from the same stud with an index of 110% (Fig. 1). The proportions of Elite lambs also varied greatly with the 3 feeding systems.

DEMONSTRATION AND VALIDATION

Possible systems for Elite lamb production in different regions were developed by ‘expert’ panels of producers and advisers in New South Wales (Simpson et al. 1991), Victoria (Reeve and Harris, pers. comm.), Tasmania (Jackson, pers. comm.) and South Australia (Gyles, pers. comm.). The systems incorporate Lambplan identified rams, recommended joining times, weaning times, lamb selection, use of cryptorchids, feeding treatments, specialised feeding systems and marketing system. The N.S.W. systems could meet the objective of a continuous supply of Elite lamb by sourcing from different regions in different months. The validation process is an important part of the Elite lamb program because the theoretical workshop recommendations can be validated, problems can be identified and overcome and data can be provided for economic and biological modelling in each state. Additionally, the validation process allows producers an opportunity to participate in industry developments,
Fig. 1. Effect of sire (HI, sires 110% lean growth index; LO, 90% lean growth index) and sex (CRY, cryptorchid; WE, wether; EWE, ewe) on the proportion of Elite lambs.

demonstrates a real system which will aid information transfer and allows farmers to be a key source of information which should increase the chances of a high adoption rate (Turnbull et al. 1990).

DEVELOPING A MARKET INFRASTRUCTURE FOR ELITE LAMBS

L. P. THATCHER

A major problem in the development of the market for Elite lambs has been the fragmented nature of product availability. Lambs of the required specifications have always been grown, but the number is small (McLaughlin, this contract); availability was for restricted periods and carcasses were scattered amongst all abattoirs. Consequently, retailers wishing to purchase heavier and leaner lambs could not easily identify a regular source of supply.

The basis for developing the market for Elite lamb is to have carcasses of the required specifications available throughout the year, whereas in 1989-90 about 80% of lambs over 18 kg and with fat score 2-3 were produced from January to March in Victoria. Consumers are not interested in the reasons for seasonality of supply, they expect to have the product available whenever they need it.

DOMESTIC MARKETS

A study of the North American market by 'Eastern Market Research Service' (Anon. 1986), which examined the potential for boneless cuts in that market, emphasised the importance of an established domestic market before developing exports. This concept is important since the background study for the Prime Lamb Program conducted for the Meat Research Corporation outlined the necessity to attract export earnings to lift profitability.

Recent market promotion by Australian Meat and Livestock Corporation in domestic and export markets has concentrated on boneless cuts. Currie (1986) showed that these cuts were more attractive to consumers if taken from carcasses of 25 kg with a GR of 6-15mm. Consumer research (e.g. Hopkins et al. 1985) found that people would select cuts from larger and leaner carcasses, but this was without financial commitment from interviewees. Subsequently, Backhouse (1989) studied buying patterns in a supermarket and found that many consumers purchased leg steaks for $A9.99/kg whilst an alternative in the store was side lamb for $1.99/kg.

Market development has concentrated on increasing a consumer demand to 'pull' Elite carcasses through the market chain, hopefully lifting prices as demand increases. Several activities have supported this approach.

(i) Butcher workshops have demonstrated cutting procedures, and provided information about the overall program to about 300 retail butchers in Victorian urban and rural centres. Discussions also aimed to allay fears about meat quality.

(ii) Wholesale and restaurant promotions have been run in some major country centres, as well as in Melbourne. These aim to put higher-value lamb on to menus, where previously no lamb alternative existed.
Promotion by AMLC has concentrated on boneless cuts, and the aim has been to get away from a commodity selling approach, to a generic ‘product’ approach.

A quality assurance program ensures that Elite lamb product obtained from retailers involved in the program is equivalent in tenderness and colour to other lamb being sold in the store. This is important because there were prejudices against large lamb — it was expected to be tough, dark-cutting and ‘dry’.

INFRASTRUCTURE DEVELOPMENT

The key issue has been to initiate a stream of product through a known market channel, and make sure the product is always available at identified retail and wholesale outlets. It has been necessary to build up a series of alliances across industry sectors in order to stream the available lambs to those consumers wishing to purchase them. The infrastructural development has several key areas and involves establishing the links between meat processors (6 in Victoria, 2 in N.S.W. and 1 in Tasmania) and producers of Elite lambs. These processors must be linked to key retailers. Other features are the analysis of price mechanisms to determine ways to introduce the new product, developing sales over the hooks and convincing retailers to buy Elite lamb carcasses which are ticketed to certify that they meet specifications. There are several features of this program.

(i) **Product Development Officers** working with Departments of Agriculture can develop and then nurture the links between producers, processors and retailers. These people provide the key to developing the market system and they can provide information to all industry sectors about production and marketing systems. They can also provide feedback about potential problems and additional research can be initiated if necessary.

(ii) **Sale by specification** is essential to the program. The problem is that lamb sales through the saleyards essentially averages prices of lambs because individual lots include a wide range in weight and fatness, and producers are unable to identify a high-priced specification and aim to produce it. Hence, no incentive is provided to encourage producers to meet more accurately consumers’, requirements (Hall 1988). An essential component of improved systems is the provision of feedback sheets to farmers detailing specifications of lambs sold and prices received. Workshops are run by Ausmeat and Departments of Agriculture to teach agents and producers the essential skill of carcass assessment.

O’Halloran and Anderson (pers. comm.) are examining the prices paid by abattoirs for various carcass specifications and cross-referencing these to subsequent wholesale prices. The aim is to encourage sale by specification through this examination of the pricing mechanism, which will stimulate the introduction of selling over the hooks. Also it will provide a basis for contract and forward selling.

(iii) **Price grids** which offer premiums for meeting the targeted specifications have been established at cooperating abattoirs. Feedback sheets provided by abattoirs through AUSMEAT detail the specifications of the lambs sold, showing the producer how closely specifications are being met.

(iv) **Forward Contracts** signed between processors and producers are encouraged because they provide some certainty in the availability of lamb on a year around basis. A contract with a fixed price allows producers and processors to determine the premiums required which allow producers to use more expensive specialty feeding systems when appropriate lambs are in short supply.

EXPORT MARKETS

There is no direct research being conducted in the export market. An earlier study (Thatcher 1986) showed that there was an export potential in North America for shelf-ready boneless lamb cuts. Subsequently the aim has been to link into the Fresh Australian Range Lamb program being run by the AMLC in North America. W. Hill (this contract) has demonstrated the potential for raising export income using the Elite lamb.

CONCLUSION

This series of papers has shown that lamb marketing and development is now a nationally coordinated program. It has the marketing of a specialty, high-value product, the Elite lamb, as its foundation; this marketing bias provides research objectives for lamb production and the development of systems to ensure availability of the product throughout the year.

REFERENCES


