Farming the grass curve in the context of changing opportunities in the Australian lamb market – a central Tablelands perspective

G.M. and G.J. Salmon

"Ambleside", Oberon, NSW 2787

Abstract: *This paper examines the opportunities, threats and realities of three systems of prime lamb production suited to the central Tablelands (lamb breeding and finishing in the one operation; store lamb breeding and pasture-based lamb finishing). Traditional systems of prime lamb production were well matched to the feed curve on "Ambleside" and resulted in relatively high levels of feed use efficiency, probably in the range of 40–45%. In the past 25 years, we have focused on trialling, developing and adapting grazing systems that will lift pasture utilisation rates above a target of 50%, using tactical grazing management to maximise feed use efficiency. High levels of feed use efficiency, and hence productivity, results from working with the natural feed curve, not against it. The key message is to adapt to changing market and climatic conditions by being flexible in the choice of target markets*

Key words: feed use efficiency, feed lambs, marketing flexibility

Introduction

The market focused approach of the Australian prime lamb industry aimed at producing larger leaner lambs, which began during the 1990s, has created exciting market opportunities for lamb producers and has done much to improve the profitability of lamb enterprises. Twenty five years ago there was only one market specification for lambs which were sold only on the domestic market. However, profitability was low, threatening the long-term viability of prime lamb production.

Today Australia has a much more sophisticated lamb market that services three market sectors, namely the domestic, export, and feeder markets. The challenge for lamb producers who wish to be both economically and environmentally sustainable is to target markets which are well matched to the production capabilities of their pasture resources.

By effectively 'farming the grass curve' producers can maximise the efficiency of pasture utilisation, increase kilograms of meat produced per hectare and lower unit costs of production. Moreover, grazing systems which match feed demand needed to reach target market specifications with the natural cycle of pasture growth, improve the sustainability and longevity of valuable pasture resources.

The reality for lamb producers on the central Tablelands of New South Wales (NSW) is that our short, but very abundant season of quality perennial pasture growth and the apparent trend toward drier and less reliable autumns makes the choice of target markets of critical importance. While lamb production on the central Tablelands was once well matched to the period of greatest efficiency of pasture growth and utilisation in spring, the lengthening of total production time needed to produce larger leaner lambs has pushed the finishing period into late summer and autumn, when both pasture growth and feed use efficiency are in decline.

In this paper, we will explore how we have adapted our grazing management to meet the challenges of changing consumer demand and climatic change while maintaining the economic, social and environmental sustainability of our prime lamb enterprise.

It will examine the opportunities, threats and realities of three systems of prime lamb production suited to the central Tablelands, namely:

- lamb breeding and finishing in the one operation
- store lamb breeding
- pasture based lamb finishing

Setting the scene

For the past 25 years, we have operated a 770 ha property, "Ambleside" at Oberon, which has an average annual rainfall of 830 mm. The estimated total carrying capacity of "Ambleside" is 12,000 dry sheep equivalents (DSE). In 1997, we purchased a 100 ha irrigation block, "Warrego", on the Fish River at O'Connell,

which was used for finishing lambs. "Warrego" has an estimated carrying capacity of 3000 DSE. We have recently sold this block. "Ambleside" maintains three main grazing enterprises: prime lamb production, weaner cattle production and a small stud Dorset flock to produce rams for our own use.

Poor utilisation of Australian pastures is often seen as the major limiting factor to the productivity of grazing systems. Since her student days Gillian has recognised the opportunity to improve productivity by increasing pasture utilisation. Traditionally, pasture utilisation rates on eastern NSW grazing properties are generally low, between 20 and 40% (Alcock 2006). In the past 25 years, we have focused on trialling, developing and adapting grazing systems that will lift pasture utilisation rates above a target of 50%. Basically, we use tactical grazing management to maximise feed use efficiency.

Enterprise goals

It follows that our main enterprise goals are to:

- maximise productivity as measured by kilograms of meat produced per hectare by using grazing systems that maximise feed use efficiency.
- sustainably graze perennial pasture species by matching seasonal feed availability to livestock demand.
- target enterprises and markets that match their pasture curve.
- minimise the cost of production by using low cost grazing systems that target efficient use of labour and natural resources (particularly pasture).

Characteristics of "Ambleside's" pasture curve

For the central Tablelands of NSW temperature rather than moisture is the limiting factor for pasture growth and animal production. On "Ambleside" the growth curve for improved perennial pastures is characterised by a sharp peak of lush spring growth (Figure 1). Far from being 'a silent spring', Oberon springs scream at graziers to be utilised for maximum production from livestock before pasture quality declines with the onset of summer.

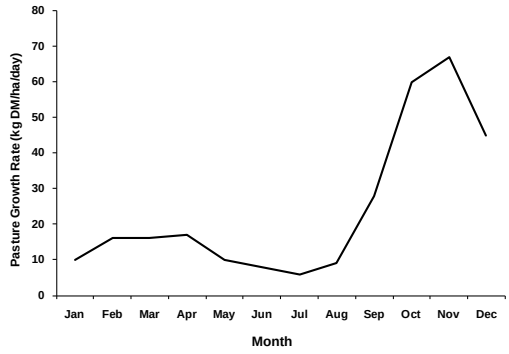

Figure 1. Estimated daily pasture growth for temperate grass and subterranean clover on the central Tablelands of NSW (Source: Meat & Livestock Australia 2008).

Traditional methods of farming the grass curve

In the 1980s, when we began our careers as lamb producers, the traditional system of lamb production was almost perfectly matched to the grass curve. Lambing was timed so that early lactation feed demand matched the onset of spring growth to make the best use of spring feed. Placing the highest grazing pressure during spring months maintained pastures in the vegetative stage to ensure high digestibility (>65% dry matter (DM) digestibility) and metabolisable energy contents of between 9–11 MJ/kg (Keys 1995) and a legume content of >30%. These factors contribute to maximum pasture use efficiency for weight gain of lambs. As Freer *et al.* (1997) showed, maximum weight gain in animals is also a function of the day of the year. At the latitudes of the central Tablelands (approx 33–35 degrees south) maximum efficiency occurs from early September through to December, but is lowest in autumn and early winter (Figure 2).

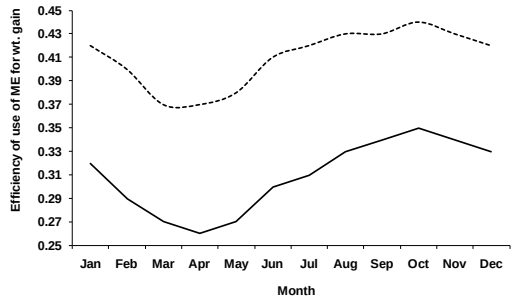

Figure 2. Pasture use efficiency for weight gain as a function of month of the year at pasture metabolisable energy contents of 9 MJ/kg DM (—) and 12 MJ/kg DM (- - -) (Source: Freer *et al.* 1997).

Thus lambing in spring ticked all the boxes for maximising lamb growth rates of around 250 g/day so that lambs reached a marketable weight of 35 kg liveweight (16 kg carcass weight) with a fat score of 3–4 in 15–18 weeks. At stocking rates of approximately 7.2 ewes/ha and lambing percentages of 130% this equated to the production of 150.4 kg meat/ha.

The majority of the lamb drop was turned off by Christmas, before pasture quality and quantity declined. Once lambs were sold, breeding ewes could be grazed through late summer and autumn at high grazing pressures to keep herbage mass in the critical 800–2500 kg DM/ha window. This strategy encouraged both the development of grass tillers and the setting of clover seeds in the autumn months, factors which are critical to late winter and early spring pasture growth therefore helping to drive lamb growth rates in the following spring. The traditional autumn break allowed fresh pasture growth to be used to build ewe bodyweights prior to joining to ensure high lambing rates the following spring.

Economic realities of traditional prime lamb production

Traditional systems of prime lamb production on "Ambleside" were well matched to the feed curve and resulted in relatively high levels of feed use efficiency, probably in the range of 40–45%. However, the economic realities of lamb production during the 1980s meant that lamb enterprises were economically unsustainable.

Declining domestic consumption of lamb during the 1980s, due to negative consumer perceptions about the 'fattiness' and versatility of lamb lead to low farm gate prices and extreme price volatility, which meant that returns to producers were low, and often below the cost of production. In 1986, despite topping the market for lambs at a price of $26/lamb, we calculated the cost of production to be close to $28/lamb. Clearly, something had to change.

The 1990s … a decade of change

In the 1990s the lamb industry, lead by its peak industry body now known as Meat & Livestock Australia, were successful in developing key export markets to the United States of America, north Asia and the European Union. These markets demanded a larger leaner lamb than the domestic 16 kg carcass weight lamb. Since the 1990s, genetic improvements targeted at producing larger leaner lambs and improved grazing practices have lead to a steady rise in the average carcass weights of lambs produced in Australia (Figure 3).

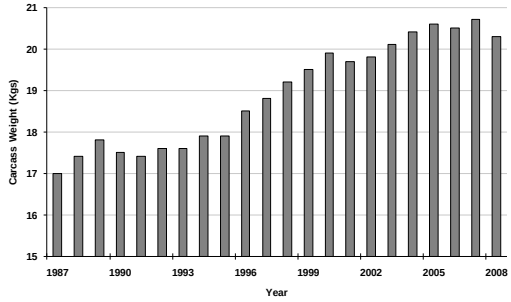

Figure 3. Change in average Australian lamb carcass weight from 1987–2008 (Source: ABARE 2009).

It is important to acknowledge the role that improvement to prime lamb genetics has made in achieving larger carcass weights. However, we are firm believers that changes to grazing management on "Ambleside" have been of equal importance. As Thatcher (1999) put it 'While it is well recognised that the engine room for growth in the lamb industry in the past decade has been vastly improved genetics in the prime lamb flock, it is the feeding process that provides the fuel.'

In the period between 1989–2008, carcass weights for lambs produced from Ambleside have risen from 16 to 22.5 kg.

Implications of increased carcass weights on feed use efficiency on "Ambleside"

Logically, producing a larger lamb carcass extends the production time for lambs well into the autumn period, which, as we have seen, is the period of lowest efficiency of pasture use for weight gain and, due to a succession of dry autumns, was also a period of insufficient growth of quality lamb finishing pasture. Producing lambs to meet market demand for ever increasing carcass weights became a real challenge on "Ambleside".

Initially, our response to this challenge was three-fold:

1. reducing ewe numbers (stocking rate) to allow for increased feed demand of producing larger lambs.
2. sourcing terminal sire genetics that targeted higher growth for lambs.
3. growing fodder crops such as fodder rape to fill the autumn feed gap.

The reality of these strategies was that despite achieving a higher price for lambs, both productivity in terms of kg meat/ha and feed use efficiency fell. The reason was simple – we were working against the feed curve not with it. So while the economic sustainability of our lamb enterprise had improved, the sustainability of our pasture-use was under threat.

In 1997, the opportunity arose to purchase a 100 ha irrigation block on the Fish River at O'Connell capable of finishing up to 3000 lambs. This allowed us to separate our lamb enterprise into two distinct operations, breeding and finishing. The big advantage of weaning lambs off the Oberon block at 12–14 weeks and finishing them on irrigated pastures and lucerne, was that we could return to our traditional system of farming the grass curve at Oberon, while still realising the economic opportunities of higher prices for larger leaner lambs. By returning to a pattern of deferred grazing of lambing pastures in autumn, pasture growth in late winter and early spring significantly improved compared with the period of trying to breed and finish larger leaner lambs in the one operation.

The overriding advantage of a segregated breeding and finishing prime lamb production system on "Ambleside" and "Warrego" was that lambs reached marketable weights at an earlier age. Therefore, the amount of feed and water resources consumed per kilogram of meat produced was significantly reduced.

Specialised lamb finishing 2002–05

Following the success of separating breeding and finishing operations into two distinct enterprises, particularly in terms of improved pasture use efficiency, we began to explore the opportunities of becoming specialised pasture lamb finishers.

In a traditional prime lamb enterprise, approximately 70% of pasture is utilised in maintenance of the breeding flock (Dickerson 1978). The three basic concepts behind our idea of specialised lamb finishing on pastures were to:

- use the 70% of pasture growth traditionally used to maintain breeding ewes to grow out lambs, thereby increasing the kilograms of marketable meat produced from the same pasture resource base.
- realise the genetic growth potential of lambs by optimising the use of high quality pastures, and
- improve the efficiency of pasture utilisation resulting in lower costs of production and hence improved profitability.

In 2002, with the assistance of Ashley White from the Department of Primary Industries, we used fodder budgeting and gross margin budgeting models to design a lamb finishing system to be used on 400 ha of "Ambleside".

Proplus, a fodder budgeting tool was used to calculate the number of lambs the finishing enterprise could support each month. Proplus calculated that for every lamb raised in traditional second cross breeding enterprise, four lambs could be finished using the same pasture resource base. Thus, while 2500 lambs were produced to larger leaner lamb weight of 20+ kg in the breeding enterprise, 10,000 lambs could be finished using the same pasture resources.

In the model proposed by White *et al.* (2002), store lambs of known genetic potential would be purchased from early spring at liveweights of approximately 30 kg. These lambs are finished on high quality spring pastures at "Ambleside" with target growth rates of at least 200–250 g/day. At these growth rates lambs would be ready for the domestic market (45 kg liveweight) in less than eight weeks and will reach export market specifications of 47–50 kg in around ten weeks.

Autumn remained the critical period for pasture management in the finishing model. To reduce environmental risks associated with erosion, and to promote tillering of grasses and seed set of legumes, fodder budgets should be managed to maintain more than 800 kg DM/ha through autumn. To achieve this, the finishing system was designed so that 90% of lambs were sold by February and only 10% carried through to the following autumn.

And so it was that in the spring of 2002 that we boldly and bravely purchased 10,000 lambs to test the finishing model. Lambs born in June–August were purchased from producers around Boroowa on the south west Slopes of NSW. This area was chosen because its pasture growth curve complemented the growth curve of the central Tablelands (Figure 4) and its proximity to Oberon minimised freight costs. Lambs were then rotationally grazed on perennial pastures with at least 30% legume and a digestibility of 75–80%. The overall goal of the finishing system was to make optimum use of spring pasture growth in order to make the best use of the window of opportunity for high weight gains in feeder lambs.

Threats to the finishing model – it is all about margins

The biggest threats to the lamb finishing model are the marketing and financial risks. Managing the margin between the price received for the finished lamb and the cost of purchasing, transporting, feeding and selling the lamb is absolutely critical.

In brief, the White *et al.* (2002) model managed and planned for these risks by establishing strategic alliances with feeder lamb breeders and lamb processors, and securing forward contracts for a major proportion of lambs sold.

Realities of the lamb finishing model

In the first two years of operation, the trial lamb finishing operation on "Ambleside" delivered the following positive outcomes:

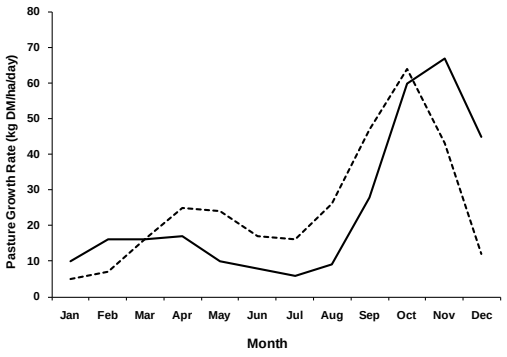

Figure 4. Estimated pasture growth curves for the central Tablelands (—) and south west Slopes (- - -) of NSW (Source: Meat & Livestock Australia 2008).

- a 50% increase in kg meat/ha marketed.
- a 15% reduction in per kilogram cost of production.
- an improvement in pasture use efficiency from 45% in the breeding system to 57% in the finishing system.
- a 35% increase in profitability based on gross margin analysis.

A critical success factor in achieving these production targets was the use of rotational grazing at high stocking rates on small paddock sizes to increase feed use efficiency and maximise kg of meat /ha. At one stage we trialled the use of Technograzing, which is an intensive system of rotational grazing, before deciding that the most effective system was to rotationally graze 400 lambs on 8 ha paddocks.

Long-term realities of specialised lamb finishing systems

Since 2005 the increased demand for feeder lambs driven by feed lotters wishing to finish lambs on grain, significantly reduced the profitability and viability of pasture-based lamb finishing enterprises. Higher prices for feeder lambs reduced profit margins below $20/hd, a level that we believed was economically unsustainable. At current prices for feeder lambs, which are above $100/hd, the capital invested in purchasing lambs represents a very significant financial risk!!

Current opportunities

In the past two years, the lamb market has evolved to include specifications and accessible opportunities to sell feeder lambs. For us this has created the opportunity to return to the traditional system of lamb production by targeting the feeder market and selling store lambs at 40–45 kg liveweight. Under this system lambs are sold either at weaning and certainly prior to the autumn break. Given a good autumn break the option exists to finish lambs to domestic market specifications, thus giving the enterprise some marketing flexibility. The above average seasonal conditions of the past two autumns has created the opportunity to build ewe numbers by purchasing first-cross ewe lambs that have been grown out to joining weight of 45 kg and joined at 8–9 months of age.

If stocking rates could return to traditional levels of 7.2 ewes/ha on the 400 ha used in the lamb finishing model, 9.36 lambs would be produced/ha or 187 kg meat/ha, with an estimated pasture utilisation of 45% (Table 1). Improvements to genetics and grazing management made in previous years are critical to achieving these targets. In 2011, store lamb prices achieved for lambs sold in January made this a very feasible option.

Threats to feeder lamb production

The current value of the Australian dollar represents a threat to this level of profitability. The long-term economic sustainability of targeting the feeder market depends on receiving a good price for feeder lambs which is of course driven by supply and demand.

Conclusions

Our experiences suggest that achieving high levels of feed use efficiency, and hence productivity, results from working with the natural feed curve, not against it. The key message is to adapt to changing market and climatic conditions by being flexible in the choice of target markets. This ensures that feed demand is well matched to feed supply throughout the year. While finishing lambs under irrigation and specialised lamb finishing served their purpose, in what we now view as the transition years in the evolution of the modern market focused lamb industry, at current prices for feeder lambs they are not sustainable options for lamb producers on the central Tablelands of NSW.

Finishing lambs under irrigation achieved high growth rates and excellent productivity. However, rising energy costs and concerns around the use of water for irrigation compromises the economic sustainability of this enterprise. Gillian is conflicted by using water resources for producing meat. It is more efficient to use water for vegetable crops which have higher productivity/megalitre of water used.

The economic realities of market volatility, which lead to reduced and uncertain margins for specialised lamb finishing in recent years, and the significant risk factors involved, compromise the advantages this system has in improving feed use efficiency and kg meat produced/ha. At current prices for feeder lambs, a return to the traditional model of lamb production offers the opportunity for lamb producers to effectively farm the grass curve. Time will tell how long this opportunity will remain.

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Table 1. The estimated key performance data of the three lamb producing systems on "Ambleside".

Enterprise	Stocking rate (DSE/ha)	Estimated meat production (kg meat/ha/yr)	Estimated pasture utilisation (%)
Traditional 16 kg lamb	15.8	150.4	40
Breeding/finishing producing 22 kg lamb	9.7	128.7	<40
Lamb finishing	15	225	57
Feeder lamb 18 kg lamb	15.8	187	45