FARM MANAGEMENT AND THE GRAZIER—RESIDENTIAL SYMPOSIUM AT THE QUEENSLAND AGRICULTURAL COLLEGE ON JULY 2 AND 3, 1974

Theoretical and practical aspects of farm management were discussed in a series of papers and panel discussion sessions. The discussion sessions were supplemented by field demonstrations of a winter pasture production system (Mr. F. H. Kelinschmidt), techniques for assessing the nutritive value of pastures (Dr. T. H. Stobbs), woody weed control (Mr. J. A. Robertson) and animal breeds and breeding (Mr. M. J. Josey).

THE ROLES OF A MODERN FARM BUSINESS MANAGER

JOHN W. LONGWORTH
Department of Agriculture, University of Queensland, Brisbane

The objective of this paper is to provide a frame of reference rather than a guide to action. I want to present one view of management. Each individual has his or her own concept of "management" but perhaps the thoughts expressed in this brief paper may prompt some revision of preconceived ideas.

The basis of my approach to describing the various roles of a modern farm business manager is summed up in three letters "LAE". These three letters provide a skeleton upon which to hang other ideas.

L(abour)	— patience, perseverance, persistence	
	— energy, strength, health,	*Labouring Role*
	— manual skills	
	— husbandry, skills for livestock, pastures and crops	
A(dministration)	— day-to-day organisation	
	— record keeping, letter writing	*Administrative Role*
	— socio-legal matters (laws, wills, estates, etc.)	
	— man (and women) management	
E(ntrepreneurship)	— definition of goals and objectives	
	— problem recognition	*Entrepreneural Role* (thinking/ deciding/ planning/ risk-taking)
	— specification of alternative solutions	
	— choosing the "best" solution	
	— fitting various "best" solutions into an overall plan	
	— implementation of whole-farm plan	
	— bearing risks and responsibilities	

In Australian agriculture most owner/managers are their own best labourer. The labouring role needs no further elaboration other than to say that managers often see this role as their major function. This, of course, is a most unfortunate state of affairs.

The administrative role is also self-evident but often does not get the time or attention it deserves. The day-to-day management (= administration) of labour (including the manager's own labour) is a most important facet of modern agricultural business management. Simple time-and-motion studies could greatly increase labour efficiency on many properties.

The most neglected role of the modern farm business manager is the entrepreneural role.[1] Very few managers spend enough time thinking and planning. Yet this is the most profitable and most important function one can ascribe to

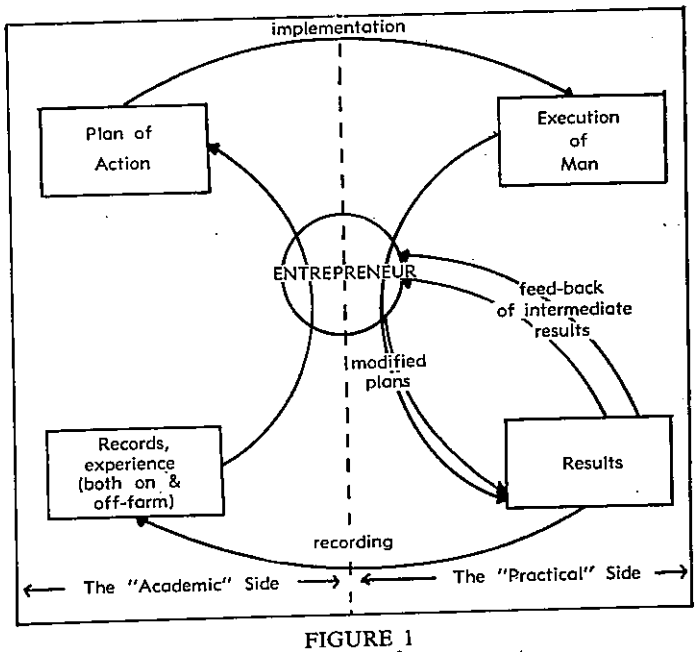

FIGURE 1
The cyclical nature of management

the manager. To demonstrate the central nature of the entrepreneural role in modern management consider Figure 1.

Experienced managers will quickly accept the notion that management is essentially a cyclical process as depicted in the diagram. Unfortunately the left hand half of the cycle, which I call the "academic" side of the management cycle, is usually overlooked almost entirely by the practical manager. The real world manager finds all of his time occupied with the right-hand side, or "practical" side, of the cycle. On this side one can see that to implement the farm plan one needs to perform the labouring role. To handle the day-to-day feedback from the farming system being worked, one also needs to be an administrator and decision maker. However, real-world managers tend to get so bogged down with actually doing the work and coping with short-term emergencies, that they never really devote much, if any, time to being an entrepreneur, a thinker, a planner. Not infrequently this kind of manager (one who emphasises his labouring and, to a less extent, administrative roles) will dismiss planning (and thinking by implication) as "useless academic garbage"! On the other hand, unfortunately, people responsible for teaching and extension in the field of farm management dismiss the "practical" aspects of management (the right hand side of the diagram) too lightly.[2]

In my view good management is a cyclical process incorporating both an "academic" and a "practical" side. One should not, therefore, over-emphasise either half of the cycle. They are both essential to "good" management. Since, in the long run, it is the entrepreneural role which holds the key to success we shall examine this aspect of management a little more closely. As already suggested, the thinking/deciding/planning/risk-taking role of the manager can be viewed as a series of steps.[3]

Definition of goals and objectives. While this step appears perfectly straightforward, very few people can state their goals clearly and concisely. When one asks "What's it all about?" the answer is never simple. Some objectives are logically

inconsistent with others; some goals are short-term and others long-term; some are mere pipe-dreams while others must be achieved or there may be dire consequences. Nevertheless a good manager is an entrepreneur who knows where he is going and why. He is a man who has clear goals and objectives for his business.

Problem recognition. A management problem exists if one faces a situation where the system being managed is not generating results consistent with the expectations and goals of the manager. The ability to recognise and/or anticipate problems is the hallmark of a good entrepreneur. In farming, where timeliness is so important, the ability to foresee bottlenecks and other problems and to take precautions in advance to make sure things are done "on time" is a critical component of success.

Specification of alternatives. Once a problem is identified there will always be more than one alternative solution. A prudent manager does not rush off to implement the first solution which comes to mind (even if it worked last year). A few minutes, hours, or even days thought, depending upon the magnitude of the problem, will usually pay handsome dividends. Once a few alternatives have been considered one must choose the "best" approach to the problem. If the problem is sufficiently important, some careful pencil-and-paper work using gross margins, partial budgets, parametric budgets or even more sophisticated decision-making tools, may be warranted. One important skill a successful entrepreneur needs to develop is the ability to decide: *first*, whether the problem warrants a formal analysis; and *second* what kind of formal analysis is appropriate.

Plan specification. Once the "best" solution to the problem has been chosen it must then be built into the whole farm plan or at least checked to see that it is consistent with the existing plan of operations.

In the last ten years or so farm advisory workers have come to realize that the farm business needs to be viewed as a whole. For example, solving a specific agronomic problem without any consideration of the impact the solution will have on the rest of the farm business is no longer acceptable. The current emphasis on the "whole-farm" approach to extension work is to be commended, especially if the "whole farm" is defined to include the farm family. In the 1970's the welfare of the farm family cannot be neglected when one is considering a plan of operations for the farm.

Implementation of the plan. This step usually calls for the farm entrepreneur to put on his labouring "hat" both metaphorically and literally.

Bearing the risks and responsibilities. While many practical men can easily dismiss (and hence avoid) the need for thinking and planning, they inevitably have to face the final test of the entrepreneur. Has he the guts and fortitude to live with the consequences of his management? Perhaps even more importantly, will his family live with the outcomes? Is he prepared to learn from experience or does he write "bad" results off as bad luck?

Conclusions

The modern manager has three rather different roles to play. Traditionally the major emphasis has been on the "L" in the "LAE" trilogy. While some attention has been consciously given to the "A" role, most property managers in Australia leave many facets of the "E" role to others (e.g., the bank manager, the accountant, the solicitor, the farm adviser). The modern manager, however, can no longer afford to abdicate from (nor neglect) his most important role, namely the role of entrepreneur.

Management is a cyclical process. The good manager in his role as an entrepreneur needs to sit fairly in the center of this cycle and pay as much attention to the academic or thinking aspect of the cycle as he does to the practical or hard-working half of the process.

Footnotes

[1]The traditional training program for property management (if one could call it a "program") in Australia has been the "jackaroo" system. Unfortunately the jackaroo system, like all on-the-job apprentice-type training programs, emphasises physical skills and day-to-day decision-making of the "fire-fighting" category rather than the entrepreneural role. Worse still, there are several rather old and widely read books on property management which focus entirely on management skills required for the labouring and administrative roles without mentioning the entrepreneural role. For example, one is hard pressed to find anything about entrepreneurship in E. H. Pearse, *Sheep and Property Management* (Sydney: The Pastoral Review Pty. Ltd., 1951).

[2]Academic farm management experts have been known to claim that most farmers are "managerially illiterate"! This kind of extremism is unlikely to encourage a balanced view of the three roles of the modern farm manager. Even the most "practical" Australian book on farm management from the academic viewpoint, seriously neglects the administrative and labouring roles (see J. P. Makeham, *Farm Management Economics* (Armidale: Gill Publications, 1971).

[3]While not claiming any originality for this approach, the interested reader may find the more detailed discussion in John W. Longworth, "Farm Management Games and the Teaching of Farm Management", *Australian Journal of Agricultural Economics*, Vol. 13, No. 1 (June, 1969) more satisfying than the brief outline presented here.

EVALUATING WHOLE FARM RETURNS

N. U. PAYNE
Queensland Agricultural College, Lawes

Most farmers either want, need, or have to look at their operation to see if it can either be made more profitable, less unprofitable or simply to assess the present position at some time or other. It could be that they are up for overdraft review, wish to bring in a son to the business, contemplate some development scheme, consider selling out or just want to know what is going on.

The return that a primary producer obtains on his investment is calculated by relating an income figure to the value of invested capital. This can be compared with percentage returns from savings bank investments, interest bearing deposits, debentures or shares.

The logical starting point for whole farm performance evaluation is to establish the value of the investment. Unless the farm was recently purchased, the value will have changed through inflation and development and a detailed valuation of physical assets will be required. This assessment needs to be as accurate as possible so that a realistic rate of return can be calculated.

Having established the value of the investment the next step is to calculate the year's result. Traditionally, farmers have regarded tax returns as an indication of the year's result. Now that special concessions have been removed there is not much difference between tax return accounting and so-called management accounting. Nevertheless, in tax accounting, write offs are permitted that acceptable accounting principles would not allow. Tax figures could be adjusted by using more realistic depreciation rates, by adding back in special write offs and by using market value for stock. The end result of this profit and loss calculation yields the net profit or net income.

The rate of return is calculated from the operating profit which is the surplus that accrues after all costs of production such as fuel, fertiliser, outside labour, depreciation, etc. have been charged against revenue. Interest is excluded as an expense in calculating operating profit. This assumes that the property is wholly owned by the farmer and makes inter-property comparisons easier. Two other costs of production are the value of the work done by the farmer (farm family) and the return on the total capital invested (including bank loans).

The work done by the farm family—the opportunity cost of labour—is valued as the amount that could be earned in the next best job opportunity available and will vary with individual skills and training. The other cost, that of capital, is called

the opportunity cost of capital. The value placed on this is the amount the farmer would wish to get as interest if the money was invested. Again, this amount will vary with individual assessment of risk and liquidity.

Deduction of the opportunity cost of labour from the operating profit gives the return to assets employed which, expressed as a percentage of the property valuation, allows the return to be compared with ruling rates of interest. Further deduction from the return to assets employed of the opportunity cost of capital gives the return to management. In financial terms this figure represents how much better (or worse) off the farmer is through having used the capital and labour resources in farming rather than in the next best alternative.

Example:

Assume the following position—

Gross Income	$65,000
Cash Expenses	$45,000
Depreciation	
Op. Profit	$20,000
Assume this operator could have earned $5,500 in another occupation, his wife also assisted and she could have earned $4,000	
∴ O.C. of unpaid family labour	$9,500
Return to assets employed	$10,500

The absolute figure of $10,500 is on its own not very meaningful, so we relate it to the value of the asset that produces it. In this case assume $200,000

$$\text{Percentage return} = \frac{10{,}500}{200{,}000} \times \frac{100}{1} = 5.2\%$$

Now, with property valuation of $200,000 and a ruling rate of interest of 8% the O.C. of capital would be the interest income foregone, viz. $16,000.

Return to management = $10,500 — 16,000 = $—5,500. This figure says that as a result of using the resources at his disposal in agriculture our operator is worse off by an amount of $5,500 for his (and wife's) work. Looking at it another way, if the farmer and his wife worked in a job they would earn $9,500 from salaries and $16,000 interest income from capital making a grand total of $25,500, $5,500 more than the property income.

Although interest on borrowed money was not included as a charge to obtain the $20,000 operating profit, part of the O.C. of capital would be the bank's share. Inclusion of interest as a cost of production (which it really is) would have reduced the O.C. capital by a similar amount so that the end result is the same. However, the percentage return on assets employed would have been different.

A lot of producers would have been happy with a 5.2% return but if other producers in the vicinity are making 15% on their capital the farmer may wish to examine the profitability of individual enterprises as described by Mr. Young.

EVALUATING RETURNS OF INDIVIDUAL ENTERPRISES

J. M. YOUNG
Queensland Agricultural College, Lawes

Mr. Payne has indicated that any farm business undertaking should yield a return sufficient to cover a fair return for capital plus a margin for managerial and family labour. While this is essential information, the whole farm approach will not indicate the profitability of various enterprises that contribute to the overall profit. The returns from individual enterprises must be calculated so that the available resources can be utilised efficiently. Enterprise accounting may meet this requirement.

ENTERPRISE ACCOUNTING

To illustrate this procedure a hypothetical example will be developed of a grazier with two enterprises—
(1) a lot fattening enterprise and (2) a pasture fattening enterprise. For simplicity it is assumed there is no breeding activity, simply purchasing stores and selling fats. For convenience the figures from the whole farm approach for capital investment, gross income, cash expenses and depreciation, and operating profit will be used in the present example (Table 1).

Returns

Analysis of cash records (cheque butts, a/c sales, etc.) should allow dissection of sales and purchases (note that immediately records enter consideration). However, to obtain the real gross income the differences between opening cattle on hand and closing cattle on hand must be considered. Technically, these are inventories, lists of numbers with appropriate valuation. Net realisable value should be used for calculating inventory changes. Gross income from each enterprise can then be calculated (Table 1).

Costs

Cash expenses are broken into two categories—variable expenses (or those that vary with production) and overhead expenses (or those associated with ownership of the business). In order to assess the profitability of each enterprise, all expenses, whenever possible, should be allocated. This, unfortunately, calls for better records. Some expenses can be directly allocated, e.g. casual wages. Petrol, oil, lubricants (P.O.L.) is one problem area, but an accurate allocation can be made from records which might include a tractor hours log.

Gross margin and gross contribution

The gross margin is, by definition (gross income) — (variable expenses) and this is an important figure in farm management. It is used in several techniques for farm planning where activity combinations are examined to make best use of resources. Note that at this time the whole farm expenses have not been considered. Overheads are now allocated to obtain the contribution each enterprise makes for (a) meeting whole farm expenses and (b) providing the profit. The gross contribution of each enterprise can now be calculated by subtracting the total overhead from the gross margin (Table 1). Deduction of unallocated expenses from the gross contribution gives the operating profit.

TABLE 1

Enterprise Profit and Loss Statement

	Enterprise 1		Enterprise 2		Whole Farm	Total	
Sales	47,000		60,000			10,700	
—Purchase	—16,000		29,000			45,000	
		31,000		31,000			62,000
+—Inventory Change		—1,000		+4,000			+3,000
Gross Income		30,000		35,000			65,000
Less Enterprise Variable Expenses							
Casual Wages		3,500		1,500	—		5,000
Animal Health		1,500		1,500	—		3,000
P.O.L.		1,000		500	500		2,000
Electricity		200		700	100		1,000
Sprays, etc.		500		500	—		1,000
Selling, cartage		900		900	200		2,000
Repairs—plant		900		800	300		2,000
Total Ent. Variables		8,500		6,400	1,100		16,000
Gross Margin		21,500		28,600			50,100
Less Enterprise Overhead							
Repairs—structure		—		—	1,000		1,000
Permanent Wages		7,500		5,000	7,500		20,000
Ins. & Reg.		200		100	700		1,000
Rates and Taxes		—		—	1,000		1,000
Administration		—		—	1,000		1,000
Depreciation		1,000		1,000	3,000		5,000
Total Ent. O'Hds		8,700		6,100	14,200		29,000
Gross Contribution		12,800		22,500			35,300
Less unallocated expenses							
Variables					1,100		
O'Head					14,200		15,300
		OPERATING PROFIT					$20,000

Return to Investment

To make a valid comparison between the two enterprises the gross contribution must be related to the capital investment. Assume that Enterprise 1 (lot fattening) requires land, specialised fencing, troughing, plant as well as stock—investment, say $100,000. Enterprise 2 requires more land, but little in the way of plant, etc., and of course stock—say $70,000. Now if this is the case, Enterprise 1 with its 12.8% return, compares very poorly with Enterprise 2 with a 32% return.

PROFITABILITY OF A PROPOSED PROJECT

The enterprise accounting system can be used to draw up a budget for a projected proposal. Gross income must be estimated together with both variable and

related overhead expenses. Assessment of returns is extremely difficult and yields and prices should be examined over a period of time so that values can be adopted which are representative of the returns. The investment figure must be established to make the profitability figure meaningful but care is needed to distinguish between capital items and revenue items. In a pasture project, clearing and establishment costs are capital or investment items while maintenance is a cost item. Some capital items last for many years while others may only last the life of the pasture. The latter should be written off over the effective life.

In the traditional approach the budget profit figure is presented as a percentage of the necessary investment and this must be equal to, or greater than, the borrowing (or opportunity) cost of the capital for the project to be acceptable. The margin over and above will reflect many things—an allowance for management skill, a provision for risk and so on. However, the traditional approach is not the best method because it ignores the life span of the project and so ignores time value of money.

A partial budget approach is useful for a simple analysis of alternatives. This is particularly true when considering alternative projects for an existing situation. The basic concept is to weight added returns against added costs. Data estimates will be required for the following:—

(1) Added income derived
(2) Added costs involved
(3) Income foregone
(4) Costs saved

CONCLUSION

Whole farm and enterprise accounting methods are suitable for assessing the profitability of the farm business. Farmers who do not have the time or the inclination to use these methods should use their professional advice—accountant, consultant, D.P.I. advisor. This may cost additional money but the added returns will far outweigh these costs.

MANAGEMENT PROBLEMS IN A PROPERTY DEVELOPMENT IN THE DAWSON VALLEY

W. J. D. SHAW
"Walloon", Theodore

"Walloon" is in the Dawson Valley, some 30 km east of Theodore. It is the remaining part of a large property which used to be 60,000 ha and now comprises some 10,800 ha. The soils are developed mainly on Camboon andesite and on granite soils in equal portions. The property runs from Castle Creek and Lonesome Creek in the east and south and rises to the Dawes Range in the north. The altitude of this higher land is about 400 m. The andesite country is mainly undulating ridges but the granite country is mainly higher and steeper ridges. The average rainfall is about 625 mm, with the maximum about 1,250 mm and the minimum I know of 300 mm. The land is well grassed principally with black spear grass on the granite and forest blue grass on the andesite. In most years there are heavy frosts and temperatures of −3°C are not uncommon.

Objectives

I am now going to discuss the problems my brother Norman and I met in developing "Walloon". The problems of course differ according to the country,

but before going ahead with any development we had to decide on the ultimate objective. In broadest terms this was to turn off more sale stock at an economic cost.

Having defined our objective, we knew that improved pastures would carry more cattle, and that forage crops also had an important role. However, we had another good look at the property and decided first to make maximum use of the good native grasses which we thought were not fully utilized, before we undertook further development. In short, our decision was to upgrade our pasture management and our stock carrying to the highest safe level and proceed from there.

Grazing management

Over many years it had been considered that a reasonable carrying rate on this country was 1 beast to 6 ha, and that is what we were carrying. We intensified this by three main techniques.

Urea feeding: In a bad drought year we tried urea which we were able to get in block form, called "Uramol". Urea was supposed to be dangerous, and we did at first lose a few cows. However, the stock liked it and did very well on it, and we lost very few cows while others not using it lost many. We have also found that if urea was used when the grass started to dry off the stock regulated their own intake. We still use urea consistently and do not get any deaths, even after rain. The only time we had trouble with it was when for two years we had no good summer rains, the volume of grass dropped dramatically and we ran out of roughage. As long as urea and dry grass are available we can get through any normal dry period. I consider urea has been a major factor in raising our carrying capacity. Furthermore, and most importantly, the cows keep on cycling and the calving percentage is maintained.

Patch burning: Another technique we found valuable is what I call "patch burning". In this we try to get between 25 and 50% of the pasture on the granite country burnt by the end of May, but in patches spaced all over the paddocks. This is not easy to do, but it can be done and is worth the effort. After burning, the stock concentrate on the unburnt areas which reduces the stands of dry, long matted grass. If winter rain does fall there is fresh grass for the stock. A further advantage is that the burned areas provide islands which assist in fire fighting if an unwanted fire does break out. As a rule we do not burn pasture on the heavier, darker soils where the pasture is mainly forest blue grass.

Water: We put in more bores and storage tanks so that each paddock had at least two main supplies. We also constructed a number of small dams, which would fill quickly and last for 4 months or more. These were sited as far away as possible from the old main supplies and usually near the tops of small gullies. You will realise this takes stock away from the main bores and on to pasture which had not been used to any great extent previously. In short we endeavoured to make the fullest use of our annual crop of native grasses. Overall the result was the raising of our stocking rate from a beast to 6 ha to a beast to 4 ha.

Next improvements

We were now carrying an average of 2,600 head of which 800 were breeders and our sale stock were about 600 head each year. Some people would have carried more but we thought that this was a safe total. One important factor here is that water supplies are difficult in this country. Many bores have had only a limited life and we have repeatedly had to seek new supplies. Hence we were not prepared to risk increasing the total herd size.

The question was how could we increase the turn off. Obviously we had either to increase our breeding herd to get more calves or buy store cattle for fattening. However, we discarded the latter alternative. In the past our family had bred and fattened our own stock and also bought and fattened stores but we had found that fattening and breeding our own on this type of country was the best economic proposition in the long term. So the answer was to increase the size of our breeding herd. We therefore investigated ways and means of carrying this out.

Forage cropping

On "Walloon" we found an area of just over 400 ha suitable for cultivation and generally with only a 1 degree slope. (More slope than this gives erosion problems). This is on andesite country and on it we knew we would be able to grow oats, barley, lucerne, sorghums, millets, cowpea, dolichos, all of which were grown by some farmers in the Theodore area. This 400 ha could be worked by one man with the right equipment and we estimated that between 500 and 1,000 fats could be turned off according to seasonal conditions.

We thought that if we increased the breeding herd to 1,150 cows we would have 900-950 calves each year, plus steers, cull heifers, and cull cows. However, if we were able to sell the steers before three years old (mostly about 2 years) and the cull heifers at 20-24 months (either as fats or breeders) we would still have an average total of 2,600-2,700 head and, by having animals at saleable weight younger than before, we would still not have increased the size of the herd. The estimated initial cost was $45,000 (note this was almost 6 years ago).

Improved pasture

We then had a look at what could be done by sowing improved pastures. At that time there were no legumes known that would persist on our clay soil. Work was being done by C.S.I.R.O. and D.P.I. and encouraging results had been found with Siratro on granite country. However no one was prepared to say definitely it would persist at that stage. We had no evidence that introduced grasses such as green panic or buffel would be much better, if any better, than our own forest blue grass or spear grass.

So the position was:—

1. On the andesite country we could possibly get a small improvement by sowing buffel, but there was no known legume that would persist.
2. On granite, possibly Siratro and green panic would do well, but there was no guarantee of persistence.
3. These tropical pastures suffered severely when heavily frosted.

So it seemed as though the granite land was the only place we could look for increased production with sown pasture. However, there was another factor of great importance. Most of the granite areas were held under leasehold tenure which made them unattractive to spend large sums on improved pastures.

Our answer was therefore to concentrate on forage cropping.

Webb Farm

As a result of all the above considerations Webb Farm was created. This is the area of 400 ha on Camboon andesite, referred to previously. It is subdivided into nine cultivation paddocks each of which has been surveyed and in which contour strips of grass have been left to combat erosion. Water has been reticulated to

each paddock and a system of laneways enable stock to be taken to the stock yards without going through the paddocks. The area has its own yards, dip, loading ramp and air strip. A modern house has been built for the farmer. The machinery used is a Chamberlain "Countryman" tractor, disc plough, scarifier, combine seeder, chisel plough, and rotary slasher.

We use a basic rotation of pasture-fallow-oats-millet/cowpea-pasture. Each year we try to plant 120 ha of oats for winter-spring feed followed by a summer crop of millet/cowpea. In each nine year period each paddock will have five years under pasture, but we have had to vary the programme sometimes because of different seasonal conditions. Stocking intensity on the area also varies according to rainfall and hence crop growth. However, steers are moved to the area at weaning or as soon as possible after weaning. Cattle have to be sold by two years old, and we try to sell one truck load, 22-26 head every month. We are now reviewing the cropping programme and our intention is to include more dolichos in the rotation.

Capital cost. Based on our average herd of 2,700 head the initial cost was $17.50 per head or per beast area.

Our initial cost was $47,500.

The capital cost on a per ha basis was:

	$ c
Clearing	19.91
Water	21.09
Fences	11.07
Machinery	30.31
House & Sheds ..	24.16
	$106.54

This exercise has just been the beginning, but it has enabled us to increase the number of calves without increasing the total number of stock.

Future developments

The next step will be to try to improve the pastures in the breeder paddocks, and we are starting with the granite country. This may seem to conflict with our previous conclusions, but the situation has changed since we made our original decisions. It is now known that pastures of Siratro with green panic or buffel perform extremely well on granite country similar to ours, and it is known that Siratro can be introduced into native pasture without full clearing and cultivation. Hence low cost development is possible. Our first effort was an aerial sowing of Siratro and green panic over about 100 ha of undisturbed native pasture last summer, and we got a very good establishment of Siratro. Nevertheless we still believe that for our situation we made the right decision in putting forage crops ahead of pasture.

FROM MARGINAL DAIRYMAN TO MARGINAL GRAZIER

R. PECHEY
"Pechey", Crows Nest

The farm is located on the edge of the range near Crows Nest. The humid

subtropical climate is modified by the 690 m altitude and mean annual rainfall of 94 cm falls mainly in summer.

About 80 ha of the 196 ha farm was originally vine scrub (cleared 1917) and the remainder heavily timbered with mainly eucalyptus species. The country is hilly with a variety of soils including chocolate clays and gravelly lateritics and small areas of krasnozems and podzolics. Temperate pasture species have not been very successful, the main pasture components being lucerne, rhodes, paspalum and kikuyu. In 1967, 60-70 milking A.I.S. cows plus replacements were carried—a total of 120 head. Butterfat production was 145 kg cow^{-1} and a 12-sow piggery was used to consume skim milk.

Problems and solutions

Over a period of time there arose a number of serious problems associated with this dairying enterprise. Financial returns from butter diminished with little prospect of future improvement. The demands of the dairying enterprise required long working hours of some 80 hours per week leaving little opportunity for leisure. Cultivation was required to provide high quality fodder for milking dairy cows and the costs of this operation were substantial. In addition, soil structure was deteriorating with cultivation producing an erosion hazard.

In an attempt to improve financial returns a change was made from dairying to beef production. A beef bull was used to produce vealers initially but this was later changed to production of yearlings following difficulties in finishing and/or marketing vealers. The piggery was retained to help diversify the operation and cultivation was replaced by sown pastures. Fodder conservation had to be employed so that sufficient animals could be carried safely.

Management problems in the new enterprise

During the first twelve months income was very low with pigs providing a useful contribution. General financial management has had to adjust to the bulk of the income being yearly rather than monthly as previously. Extra capital was required for fences and gates, fertilizer, clearing and seeding of 24 ha, and repairs to barns for fodder conservation.

A Brahman bull was used initially for the vealer program but weight gains were poor and the bull showed bad temperament. Better results have been obtained recently using bulls of the Hereford or Braford breed. Management of the pastures presents some problems because summer growth can become rank and unpalatable. Slashing will control growth effectively and keep the pasture acceptable to the animal but is intrinsically wasteful and costly. Crash grazing has been used to try to overcome the problem.

The choice of pasture species and schedules for initial and maintenance fertilizer dressings has been determined following consultation with D.P.I. advisers and other farmers in the area. Soils vary in their nutrient deficiencies and phosphorus "fixation" on some soils adds to the complexity of maintenance fertilizer programs.

Overstocking is a problem in a beef production enterprise with limited availability of land. Conservation of hay from pasture (paspalum, rhodes and white clover) is valuable for maintenance and survival feeding but is uneconomic for production. Fodder conservation is expensive with contract baling, cartage, storage and feeding out costs to be met. Attempts to use irrigation to alleviate the feed shortage have not been very successful because the spring water becomes salty during dry periods when irrigation is most needed.

A major problem during the last year has been the advent of the tick. A costly and intensive dipping program is now under way in an attempt to eradicate the tick but this problem may be a long term one.

Conclusions

The change to beef production has not greatly improved farm returns and working hours are still long so that leisure time is short. The economic problems of marginal farms are so difficult that conventional management options may not provide a viable economic solution. In such circumstances political decisions may have to balance economic considerations against the social aspects of rural communities.

IMPROVED PASTURES IN SPEAR GRASS

R. BRIGGS
"Swindon", Mt. Perry

"Swindon" is located about 80 km from the coast, south-west from Bundaberg. The property comprises some 8,000 ha of foothill country including hilly forest and spotted gum ridges and extending into rolling spear grass country towards Mingo. The annual rainfall is 96 cm and soils are mainly light textured gravelly and granitic soils overlying clay at 5-46 cm. Excluding the sown pasture area, the property is subdivided into 10 paddocks ranging from 240 to 1,200 ha. In its natural state most of the property is only suitable for breeding and store cattle enterprises with smaller areas suitable for cow and second class bullock fattening.

Oats

In this situation a sizable "tail" of the bullock mob failed to reach marketable condition and had to be held over for fattening in the following year. In 1965 an improvement program was commenced in an attempt to improve the quality of grazing available to the fattening bullocks. 40 ha of oats sown in that year allowed the "tail" of the mob to be marketed. The increased return provided capital to clear and plant another 80 ha for oats in 1966. Another fair crop was grown, but early signs of erosion and weed problems and the moderate yields of oats prompted an evaluation of improved pasture as a means of improving the quality of grazing.

Sown pasture

The 120 ha of oats cultivation was sown with a complex seeds mixture as soon as suitable rain fell following the finish of the oats. The mixture included green panic, Kazungula setaria, Siratro, Cooper glycine, Greenleaf and Silverleaf desmodium, Hunter River lucerne and lotononis. The basal fertilizer dressing was 375-500 kg ha^{-1} of Mo super (including fertilizer applied to oats) with 125-250 kg ha^{-1} of Mo super as a maintenance dressing. After a total of 750 kg ha^{-1} had been applied the maintenance fertilizer was applied every second year with Mo omitted. The desmodium seedlings died during hot, dry weather in spring and lotononis, glycine and lucerne did not persist. Growth of Siratro and green panic was excellent and Kazungula setaria grew well but was not as drought resistant as green panic. More recently Townsville stylo has been planted with very good results.

Following the first 120 ha planting some 120-160 ha of country has been cleared and planted each year, giving approximately 1,000 ha of improved pasture at the present time.

Pasture establishment

With experience gained during the course of this program, a satisfactory procedure for pasture establishment has been developed. A contractor is employed to clear and stick rake and some hand stick picking follows before the area is ploughed *once* with the property tractor drawing a 14 disc Chamberlain plough. Experience with the early sowings on the oats cultivations showed that fine seed beds on these light soils are not suitable for pasture establishment—seedlings are prone to burn off on exposed even seed beds (which lack the shelter of rough and cloddy seed beds) and erosion is a serious hazard. Although an air strip is available fertilizer spreading is cheaper by ground methods ($5 ha^{-1} cheaper than aerial) and a contract Air Blast method is used, provided that the ground is well cleared.

Stock performance

The improved pastures are used mainly for fattening bullocks and cull cows. Bullocks come into the pastures at three years of age and are marketed a year later at carcase weights averaging 340 kg. Both the carrying capacity and the turn off percentage have improved with sown pastures. For example, an area of 1,100 ha previously carried 180 bullocks of which approximately 120 would fatten in the year. Following the development of sown pasture on 200 of the original 1,100 ha the area now fattens 200 bullocks and carries 100 breeders in addition. Production of 340 kg carcase weight animals has suited the Japanese market but a smaller carcase may be required in the future. This could be achieved by turning the weaners straight on to improved pasture but considerable expansion of the sown pasture area would be required.

Conclusions

Several alternatives may be considered for future pasture improvement. Chemical treatment of timber makes a substantial improvement to the native pasture and is much cheaper than the relatively costly development of sown pastures. Townsville stylo is another possibility for low cost improvement, particularly with the steep increase in fertilizer costs. An unexpected problem for sown pastures has arisen following the successful eradication of dingoes with 1080 baiting—bandicoots and kangaroo rats have multiplied to plague proportions and are severely damaging new sown pastures, paying particular attention to Siratro nodules. While there are still many problems to be faced in the management of this beef production enterprise, experience since 1967 has confirmed the value of sown pastures for beef cattle in this region.

PROPERTY DEVELOPMENT ON NORTHERN NEW SOUTH WALES COUNTRY

STUART EVERETT
"Lynwood", Kyogle

"Lynwood" is a 1,200 ha freehold property situated 5 km west of Kyogle in the Richmond valley, northern New South Wales, the original 500 ha of which I purchased from the family estate in 1960. The rainfall is 1,000 mm and the soils are chocolate basaltics. There are now 160 ha sown to tropical legume/grass pasture

of Siratro, Tinaroo glycine, Greenleaf desmodium, Archer axillaris, green panic and Kazungula setaria.

The usual dabbling with temperate pasture species after I bought "Lynwood" led to bloat and the subsequent loss of eight prime steers in the spring of 1962. I couldn't see myself sacrificing profit, and furthermore the temperate pastures were highly susceptible to drought and *Amnemus* weevil attack. Our early spring period can be moist but suddenly rainfall can cut out in late September and ground temperatures can soar, burning up all available material of these soft species. Something had to be done. I became interested in the new species developed by C.S.I.R.O. which would stand up to the rather harsh summer conditions and which would give carry-over feed into the winter.

In November 1963 the first planting was carried out on plateau country which formerly carried blady grass and native wire grass species. The pasture, a mixture of Tinaroo glycine, Kazungula setaria and green panic, was sown on a fine seed bed with 250 kg $hā^{1}$ of Mo superphosphate. After seeding the conditions were extremely adverse, with very little rain aggravated by that fine seed bed. It was not until after the summer that the Tinaroo glycine forged ahead and set seed the next winter. The plateau does not get heavy frost fortunately, and since then the pasture has never looked back. I have won pasture competitions with it and it has also been featured in the early Tropical Pasture Journals, put out by Terranova, under the title "Green Gold on those Hills".

Kelly's paddock is an area of 72 ha which I purchased in 1967. The whole of this paddock was developed with Siratro and Kazungula setaria, and brought the total area sown to tropical pasture species up to 160 ha. I became interested in grass seed production in 1969, and I have produced approximately 10 tonnes of Kazungula setaria since then. Some of this has been used for further development of "Lynwood" and the remainder has been sold. It is necessary to close up for 3 or 4 months paddocks being used for seed production.

Cattle carrying on "Lynwood" have gone up from 250 breeders to 400 over this period with notable success in turning off vealers and better finished sheep-vanners for the Victorian market. I purchased a further 600 ha of adjoining land in 1973. A programme has been formulated to plant 120 ha per year using my own seed. The breeding herd is now up to 700 cows and I hope it will reach 1,000 cows within 4 years.

Management problems

I shall list the problems I have found although not necessarily in order of importance.

Species: Different species suit different areas even when they are in close proximity (e.g. alluvial valley floors, southern slopes, western slopes and plateaux). Basalatic plateau and basaltic slope areas are the most valuable. Species such as Tinaroo glycine and Greenleaf desmodium extend the growing season to almost 12 months. Planting the wrong species in lower areas can lead to a decline in legume content which should be kept as high as possible. Not only is there a visual response by cattle to high legume content of the pasture in coat and colour, but there is also a response in weight gain and total weight, general well being and calving percentage in cows (80% on natural pasture but 95% or more on high legume-content pasture). Species best suited to frost free areas are Tinaroo glycine, Siratro, Archer axillaris, Greenleaf desmodium, Kazungula setaria, Narok setaria, and green panic. Those better suited to lower slopes where frost is likely are Narok setaria and Greenleaf desmodium.

Seed bed preparation and planting: If possible an early ploughing in May or June is desirable to give a period of fallow. I think fallowing is more important than extra fertilizer and it seems to help the pasture establish rapidly in its first year. How-

ever, a rather rough seed bed is much more beneficial than a soft fluffy preparation, because seed can be protected in the crevices. There a small amount of rain will wash the clods to cover them, retaining soil moisture and most importantly providing protection for the young seedlings. Sowing can take place any time between October and March, even though this period can be subject to extremely high ground temperatures and hot dry winds. If pasture germination is unsatisfactory I do not recommend feeding it off until it has seeded.

Long term grazing: I like to set-stock tropical pasture, allowing one hectare per cow and calf, and equivalent acreage for fattening stock. In time of drought stock may be removed until pasture has recovered sufficiently. Paddocks for seed production are usually closed up from December until March. I have found that pasture has not declined using these methods unless the wrong species have been used in the pasture mixture. I have also found that Clarence and Cooper glycine, and Silverleaf desmodium do not persist.

Economic factors: As with any enterprise costs have to be watched. Seed prices vary, governed by the amount required and the time of the year that it is purchased. It is preferable therefore to buy seed out-of-season giving savings of up to 40%. Ground preparation costs can vary and they nearly always exceed the expected costs because of weather problems, machinery repairs and breakages. Sowing can be held up because of rain or drought periods. This means the ground is unproductive for long periods when it could have been used for grazing. The chocolate basaltic soils in this area break down fairly rapidly and a good pasture can be obtained with two ploughings on virgin country. Unnecessary ploughing adds to costs and can promote erosion problems as well as germination problems.

Fertilizer: The chocolate basalatic soils on "Lynwood" are rich in phosphorus, up to 110 parts per million. The practice so far has been to use 250 kg ha^{-1} Mo superphosphate at planting, although I think this amount could be reduced if the fallow method was used. I use 125-190 kg ha^{-1} of sulphur fortified superphosphate in the maintenance dressings, applied aerially.

I am interested in the development of bio-super. This could lead to a reduction in costs of up to 50% compared with superphosphate, and also a possibility that the amount actually applied may be less. This would mean a lowering of costs. I think the costs of spreading fertilizer from the air will increase over the next few years. Pilots' wages are being reviewed at the present time to bring them into line with senior commercial pilots. Costs of running and maintaining aircraft will also increase. It is therefore important that the amount of fertilizer applied per unit area be kept to a minimum to reduce costs.

Thoughts for discussion

We all know that farmers are rather slow to utilise new methods. This has been proven in many areas in Australia, for example the northern tablelands of New South Wales where white clover, phalaris, and fescue pastures have been available for over 30 years, but less than 40% of the areas has been sown to these species. There is the same reluctance on the north coast as far as tropical species are concerned. It may take a new generation of farmers to exploit the full possibilities of these wonderful pastures. However, I am confident of their success and shall continue to plant them because I know of their benefits.

LAND USE MANAGEMENT AND LANDSCAPE

J. E. COALDRAKE
Environmental Division, A. A. Heath & Partners Pty. Ltd., Brisbane

"The supreme asset of all peoples is now the earth."
—Solzhenitsyn (1973)

About twelve years ago when I attended at the birth of the Tropical Grassland Society the objectives were to bring together the scientist and the farmer to increase both the quantity and the quality of grassland and its products. The scientists were seeking an outlet for their newly-won knowledge, the farmers were seeking an increase in the quantity and the sureness of their incomes and therefore of their profits. As businessmen they could scarcely be blamed for that.

It is a hidden tribute to the success of the working alliance between scientist and farmer that a society such as this should now be willing to spare even one hour to discussion of the things that I am invited to talk about. It is intriguing because many of those things do not add to, or even maintain profit for the individual. But they can add to the richness of living both for the individual farmer, and for society.

Whatever the particular trials of the economic moment may be, Australia is now basically a wealthy country. We live in the generation when wealthy societies of the European type have turned to an interest in Conservation.

"Environment", "Ecology" and "Conservation" are terms that I first met in my professional training over 25 years ago, chiefly through the influence of the late Professor J. G. Wood of the University of Adelaide. They reached the front page of the daily press about 5 years ago. They have become key words in a lot of doomsday talk designed to scare. This is not necessary, and there are signs that the exaggeration so often built around those three terms is beginning to produce a backlash. We should all hope that instead of a backlash, there will be a return to a position between the extremes to "Stop everything", and "Do anything". Because from here on we have to live with a sensible concern for the environment if our children are to find life worth living. This is true for the farmer equally as much for the urban dweller.

The farmer and the forester are the chief custodians of one of the major resources possessed by any nation—the land. In Australia their responsibilities are increased by some inescapable facts relating to rainfall over the continent. Roughly one half of Australia is desert and further large areas are semi-arid. We have to produce most of our food and plant fibre on about 40% of our total area. Within the latter we also have to find most of the space for working and living (including recreation) for our urban population.

Since man learned to live in cities thousands of years ago the farmer has faced a dual responsibility:

(1) To feed not only himself but also the city man.
(2) To manage his land so that succeeding generations had a continuing resource to work with.

There are plenty of barren lands around the world where societies neglected the second requirement.

We are now, of course, beginning to talk of the things encompassed in the quotation at the opening of this lecture.

The aborigine lived in Australia for over 30,000 years as a hunter-gatherer living as a part of the landscape and altering it little, if at all. European man could not live here in the European style without substantially altering large areas of the landscape. In less than 200 years our ancestors and our contemporaries have, between them, wrought amazing changes over enormous areas. Our capacity to

continue altering landscape is now frightening since the bulldozer replaced the axe, and all the other adjuncts of modern farming came into use.

But these same tools and systems of modern farming also give us the capacity, the wealth, and the time to turn some effort towards making our rural landscape a more pleasant place to live in, and a more inviting scene to visit for *the* 90% *of Australians who are urbanites.*

There may be some members of the Tropical Grassland Society whose only interest lies in turning more dollars from more acres of grassland. They have a right to this viewpoint, but one wonders how long they will be left to enjoy it free of public criticism; so also must those members of the Society's Committee who invited me to give a lecture on this subject.

Agriculture, in the broad sense that includes grassland, has not yet come squarely into the sights of the activist wing of the modern conservation movement in Australia. Forestry, on the other hand, has "graduated" in this respect within the last 2 years, and is now the object of increasingly venomous attacks. The turn of Agriculture may not be far off. There are exceptions, but in general Australian agriculture has no reason to hang its head in front of the saviours of landscape who would lead such an attack.

They can be reminded that they are dependent on agriculture for their food, for some of their fibre, and for much of the wealth that supports them. All of these things help also to provide the leisure time and the means necessary to their active campaigning for the saving of landscape.

These mounting pressures from the conservation movement for the care of agricultural land relate partly to the fact that most Australians live close to the best agricultural lands. Nearly 80 per cent of Australians live within 40 kilometres of the coast. We are especially huddled against the central eastern seaboard where, in the 1,600 kilometres between Wolongong and Gladstone, 35% of our total population lives. Climate places most of our grassland farming within reach of these people during their leisure time. They will be led to look over your farms with increasingly critical eyes for your husbandry of the landscape.

By "*Landscape*" I am referring to the total complex of countryside in a given area. Not just your grasslands and croplands, but also the hills that may frame them, the streams that wander through them, and the buildings that may enhance or mar the scene. Central to much of the Australian conservation movement's interest in landscape is the curious cult of the sacredness of natural landscape. This leads to the question of whether there are any Australians who have not found satisfying beauty in the rural landscapes of Britain and north-western Europe. Yet leading ecologists have stated that "there is no natural landscape" left in these regions. Hopefully we are now entering a period when more rural landscape in Australia will begin to acquire some of the gracefulness that helps to attract Australians to Europe. This does not need to be an expensive process.

Ecology has its uses (and its fascination), but ecology and ecologists do *not* have the answers to all our problems. As with any new religion some recent converts tend to be over-zealous. Having listened to ecologists you should then question their evidence and their arguments—hard and often. Do not let the advocates of "ecological living" talk down to you or browbeat you. Try asking some of them what generates the income on which they live. It is production such as people like yourselves achieve.

You could, however, question the clearing of every acre of virgin land within your sphere of influence. In particular you could ask if the increase in production sought could be achieved from land already cleared, but not producing to anything like its proper capacity. In the same general direction you could question the excessive sub-division of prime agricultural land. There are problems of economic and social justice to the individual farmer involved here, but they do not provide a reason for avoiding the issue.

A first and most important choice that is now open to us is in the careful selection of which parts of our landscape are to be used and which are to be preserved, or restored after being taken out of use. Australians have led the world in developed techniques for assessing virgin land in relation to potential use. We are as skilful as anybody in re-appraising rural land for re-allocation of land use. Grassland has an important role in the latter case, especially in the reclamation of land committed to cropping and proven unsuitable.

WAYS IN WHICH GRASSLAND FARMER CAN CONTRIBUTE TO AND BENEFIT FROM CARE OF LANDSCAPE

There are numerous ways in which the grassland farmer can prepare to meet this demand. Some conscious effort in this direction may help to lessen the unfortunate polarisation that seems to be developing between city and country. This type of multiple land-use will also provide more pleasant living for the owner and manager of the landscape.

(1) Maintaining production while maintaining the land in a fit condition to pass on to others. Grassland farmers can do this well.

(2) Helping to conserve some of the *everyday* things as distinct from the rarities. Some Rainforest is important for its rarity value. But a pleasantly timbered stream bank is going to be just as important to the urban dweller who can get there in 2 hours of travel, as Rainforest that he never sees because it is remote. And at the same time your stream, or farm dam can be a better habitat for birds and other wildlife. We can also learn a lesson from Europe in developing a close care for trees on skylines.

(3) Finally, you should recognise that we are now entering a period of perhaps 20 years during which many types of farmland will come to serve a dual function of production and recreation. Here the grassland farmer will not just have to bend before social pressures; he can develop secondary income by offering a service for which urbanites are willing to pay. Some will gladly pay for the chance of seeing something of farm life while living in a homestead or attached units. Probably the larger market is in providing access to rural land for caravans or camp-sites. Small pleasant areas of landscape, especially by water, are now a potential source of income for the farmer.

Under the economic stresses of 1974 the rationale of this lecture may have little appeal. But good times will return, and one hopes that the ideas presented above will begin to find practical expression.