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Group monitoring, a basis for decision making and technology transfer on sheep and beef farms

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Abstract

Group farm monitoring is a team approach to technology transfer involving farmers, consultants and researchers. Biological and financial components of farm production are monitored to provide data for decision making and a knowledge of the farm which is shared among the group.Scientists from the Whatawhata Research Centre (WRC) provide comparative information and relevant technology. Production gains on the monitor farms have been achieved within 3 years and further gains are possible. Group farmers benefit from renewed enthusiasm in farming and an increased interest in new technology. Key success factors are group ownership of decisions and outcomes and the credibility of consultants and scientists who are seen to stand by the technology delivered. MAF Technology consultants initiated farm monitoring in the Northland area and have benefited as have farmers through the WRC contact, which provides a broad spectrum of information from a multi-disciplined research group. Based on the Northland success, group farm monitoring has been accepted as a model for technology transfer throughout New Zealand.

Keywords group farm monitoring, information, decision making, technology transfer

Introduction

Further improvement in the performance of sheep and beef farms in New Zealand is constrained by the apparent slow adoption of new technology by farmers.The potential adopter of new technology is assumed to move through several stages in the acceptance process, i.e. awareness, interest, evaluation, trial and finally when new technology replaces the old, adoption (Jolly *et* al. 1985).

There can be many barriers to the adoption of new technology. Extension personnel have little involvement in the development of technology. Agricultural scientists have little contact with extension personnel and almost no interaction with farmers. Lacking the flow of locally adapted technology, extension services are systems without a message. At the same time unless research is translated into practical technology agricultural research loses much of its purpose (Ruttan 1987).

Group farm monitoring

Group farm monitoring includes a partnership with farmers who, together with extension personnel and scientists, build up through the collection of relevant information, an understanding of the monitor farm. New technology is seen to be applied and 'owned' by the members of the group. Farm monitoring for decision support and technology transfer has a precedent in the dairy industry. Watters (1990) described a farm monitoring programme with the Taranaki Agricultural Research Station, and Des Clayton of Ruakura number 2 dairy ran a successful dairy farm monitoring programme in Northland. Group farm monitoring developed as the result of a challenge from MAF Technology consultants in Whangarei to the Whatawhata Research Centre (WRC) to improve the performance of sheep and beef farms in Northland. The Te Akau farm monitoring group developed through the initiative of local farmers seeking to improve their contact with the WRC.

The WRC science personnel provide the monitor information, its analysis, and include a link between the different monitor groups. Farmlet trials run on the 'Barkers' area of the WRC provide comparative information and a potential production target for farmers. The full group (farmers, consultants and scientists) meet quarterly on the monitored farm. The group also includes the veterinary surgeon associated with the monitor farm. Of the farms currently monitored by the WRC, Peter and Belinda Gunson's farm at Waikiekie, Northland, and Herbert and Nola Shorten's farm at Te Akau west of Hamilton, involve 25-30 local farmers; the third farm, John and Lyn Thomson's farm, Pikiwahine, Northland, involves only farm consultants.

Methods

Farm monitoring

This programme encourages farmers to monitor their farms, and initially they were asked these questions:

1. What should be measured to provide a minimum of information for sound decision making'?
2. What can be measured practically, taking into account costs and farmer's time?
3. What measurements and information collecting will be acceptable to the monitor farmers?

Most of the information needed must be collected by the monitor farmer. This includes: a monthly livestock reconciliation; details of sales and purchases (kg carcass and kg liveweight, income and costs); details of wool production; lamb production (e.g. lambing percentages); calving production (e.g. in-calf rate, calving spread); areas of hay/silage and yields; areas cropped and yields; climate records (e.g. rainfall, max/min temp, soil temp at 10cm, wind run, grass min temp); liveweights at key times; a diary of farm activities including records of drenching and dipping, etc. All this information is recorded by the monitor farmer on a chart provided by the WRC. Other information collected as part of the monitoring programme by MAF Technology staff, include pasture growth and farm cover (kg DM/ha) in May, August, November and February. Other indices such as facial eczema spore counts or drench resistance tests are measured as required.

It takes a full year of monitoring to give sufficient information on which to confidently base recommendations. However the monitor farmer may react to the influence of the group and the monitor information on his own behalf at any stage. Even after 12 months of monitoring, the monitor farmer is left with the final decision to use or take up any of the recommendations made by the group. Assistance is given by members of the group (usually consultants and scientists) with the implementation of any of the recommendations the monitor farmer may decide to take up.

Stock live weights

The monitor farmers although fully committed to the project found that through their heavy work commitments they were unable sometimes to weigh stock as required. To reduce the time spent weighing and still get a good indication of liveweights and weight gains, minimum key weighing times were determined and marked on the farm monitoring record chart for all stock classes. Minimum stock numbers from a flock/herd needed to give reasonable accuracy (80% confidence) were determined as follows: lambs (weaning 150, other times 75), ewes (100), cattle (all classes 20). The criteria used to determine these numbers are available from the authors.

To avoid discrepancies that can occur between weighings because of gut fill, it is important to ensure stock are weighed at the same time of day and off similar pasture residuals. Cattle should be weighed full, off pasture not restricting intake on which they have been grazing for 24 hours, e.g. a new feedbreak. Sheep should be weighed empty, e.g. at the end of a break.

Area of farm (hectares)

An accurate farm map is a key piece of monitoring information. This is usually measured off an aerial photograph with paddock boundaries identified and taking care to use a number of actual field checks for scale. Care must also be taken when comparing production information for hill country farms because of the difference between map or horizontal area and surface area. On steeper blocks surface area can be as much as 10-15% more on a farm basis, or 20-25% more on a paddock basis, than indicated map area.

Results

Decision making and farm monitoring

Information provided from the chart (monthly stock record and stock live weight) enables the feed demand pattern for the farm to be determined. Pasture growth determined feed supply, whereas farm cover determined the available feed. The computer model Stockpol (McCall *et* al. 1991) helps put this information into a framework for decision making. It can be used for feed budgeting, determining stock policies (e.g. when to buy and sell stock) and highlight problems such as lambing percentage or calving spread. This approach has also helped identify what data can be expected to be provided for decision support systems.

The Shorten farm at Te Akau has been monitored for one year. Now with the advantage of this information changes are being recommended, the results of which will be seen in the next 1 to 3 years only the results from the Northland farms which have been monitored for 3 years are included here.

The Thomson farm

A high fertility, well subdivided farm with strong ryegrass-white clover pastures which has followed the general trend in Northland by moving from a sheep:cattle ratio of 55:45 to 26:74 in 3 years. Rather than replacing breeding ewes with breeding cows a more profitable buy-m cattle finishing policy was adopted. This increased autumn feed demands and created feed deficits which led to low pasture cover at the beginning of winter, making it impossible to feed larger finishing cattle at more than maintenance. As average pasture cover on its own was insufficient to define the feeding level at the beginning of winter, a description of the range of feed (i.e. the feed wedge) derived from the individual paddock measurements was available to compare actual cover requirements of the various stock classes.

Management and stock policy

The Thomsons have reacted to the information gamed from monitoring by:

1. Changing stock disposal times from January to August to a complete reversal of August to January. This approachrecognises autumn as the critical feed deficit period.
2. Buying in stock from January to August as feed levels permit.
3. Improving autumn feeding with a green feed brassica crop.
4. Amalgamating stock classes and mobs to improve winter feed management.
5. Moving from a 30-month steer finishing policy to a 1 -year bull finishing policy, an 1 S-month local trade heifer/steer fishing and a 27-month export steer/heifer policy.
6. Increasing cow numbers.

As a result of these stock policy changes (illustrated by Figure 1), in 1991/92 feed demand increased from August to December but reduced from February to June compared with the 1988/89 base year.

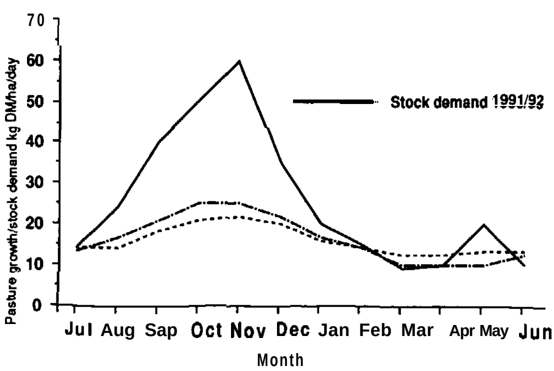

Figure 1 Pasture supply and demand changes through stock policy (Thomson farm).

The Gunson farm

A low fertility farm with 10% in kikuyu pasture where the move towards cattle has been slower, changing from 60:40 to 50:50 sheep:cattle over the 3 years. Low stock performancerelating topoorfeedutilisationwas initially identified as the biggest single constraint to production on this farm. Althoughpastureproduction was low (70% of the Thomson farm) the first challenge for the Gunsons was to get better utilisation of feed already available. The objective was to reverse the downward profitability spiral by lifting animal performance. As animal performance improves finances will become available to improve soil fertility, pasture composition and subdivision.

Stock policy and management

The Gunsons have reacted to the monitor information from their farm by:

1. Improving winter feed management by feed budgeting, allocating feed priorities and rotational grazing.
2. Selling all male lambs by 1 March each year.
3. Moving from a 2-year cattle finishing system of heifers, steers and bulls to a l-year bull beef system.
4. Improving water supply and subdivision.
5. Improving animal performance by improved feeding through better feed management (bull weightprofiles are illustrated in Table 1).
6. Better calf purchase and rearing.
7. Better management of kikuyu pastures in summer autumn.

Tables 1 and 2 illustrate the upward movement in animal performance achieved on the Gunson farm.

Table 1 Bull live weights (kg) on the Gunson farm

Aae	4 mo					8 mo
Date	1 Dec	1 Mar	1 June	1 Sept	1 Dec	1 Feb
Target Weight	100	180	220	290	400	460
Achieved 88-90	90	160	184	252	360	430
Achieved 89-91	100	164	210	289	407	450

Table 2 Production per stock unit (kg) on the Gunson farm

	1988189	1989/90	1990/91
Wool/ssu	4.16	3.74	4.25
Sheep meat/ssu	8.70	8.80	11.60
Beef meat/csu	20	22	30
Total meat/ha	132	154	183

Discussion

Good information is essential before any decision can be made about using new or existing technology or even in making a basic farm management decision. The chances of a desirable result being achieved are greatly improved when decisions are based on sound judgement.With the increasing complexity of sheep and beef farming in New Zealand an increasing amount of information is needed for decision making. This information is essentially the measurement of economic and biological performance and not only does it aid decision making but it also provides an indication of the outcome of the decisions made. This is critical for sheep and beef farmers as the delay and difficulty in assessing the response of farm performance to operational change must be one of the main constraints to adopting new technology. This is in direct contrast to the dairy farmer for whom the impact of decisions are likely to be seen in the vat next day. Further, by assessing the performance, relative to targets, at key times there is the ability to adjust the goals if they are off line. There is nothing worse to dampen the incentive to adapt if failure is rccognised only at the end and there is no understanding or explanation as to why goals were not reached.

Each monitor group is in effect a team which has grown with time to provide an atmosphere of respect and confidence between participants. Farmers say that the key benefit they have got out of the project so far has beenrenewedmotivation. They are taking anew interest in their farms, and are hungry for new technology. The full benefit of technology transfer will occur when with the guidance and recommendation of the whole group, the monitor farmer makes a decision to adopt management/policy changes or to accept new technology. The concept of a team of farmers together withconsultants andresearchers using farmmonitoring to promote technological changes has now been accepted as a model throughout New Zealand. The team has 3 effective components: the farmer, the consultant and the researcher. While extension and research have unique and different needs, their destiny and functions are closely intertwined.

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