PLANNED ANIMAL HEALTH AND PRODUCTION SERVICES — AN ECONOMIC EVALUATION

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SUMMARY

The physical and financial results of an intensive veterinary advisory service are described. The programme utilized the individual and joint skills of veterinarians and agriculturalists in pasture management, stock nutrition, breeding efficiency and disease prevention. Eighteen dairy farms received advice and their progress during the three-year programme is measured by comparison with 15 control farms. The net gain in milkfat production reached 41.4 ± 12.0 kg/ha in the final season. The financial gain in the same period reached $62.7 ± 21.6/ha. Both the milkfat and financial differences are highly significant.

INTRODUCTION

The Veterinary Services Council (VSC) instigated a project to test the feasibility of a planned animal health and production service (PAHAPS) late in 1972. The service embodied a broad approach to preventive medicine — broader than that exemplified by the commonly used vaccination programmes or the eradication schemes against major contagious diseases.

A veterinarian was employed to work with a group of farmers in the manner of a farm consultant. He was free of the usual clinical veterinary duties and could therefore concentrate on improving production through disease prevention, improved nutrition, and whatever else was necessary on each farm.

Similar planned herd health schemes operate in North America, England and Australia (Cote, 1976; Esslemont and Ellis, 1975; Blood and Morris, 1971). Overseas experience is, however, of a town supply rather than a seasonal dairying environment. The VSC subcommittee conrolling the project considered that the New Zealand approach should be a "whole farm" one. This means that all the farmer's problems would be tackled with an emphasis depending on their economic importance. The individual and joint skills of agriculturalists and veterinarians have been applied according to the needs of each farm.

This paper presents the economic evaluation of this three-year project involving 33 Waikato dairy farms. Eighteen experimental farms received an intensive advisory service, while 15 control farms, with similar per hectare production in 1970-1, supplied production and financial data without direct involvement in the programme. The farms were selected as matched pairs — so three of the control farms have acted as controls for two experimental farms. The member of the pair which received the intensive advice was chosen randomly.

METHOD

A full description of the on-farm techniques employed and case histories of each experimental farm are being published by the VSC. The following brief outline is intended only to aid the interpretation of the economic results.

The pairs of farms were selected late in 1972 and the remainder of the 1972-3 season was used to become thoroughly familiar with each experimental farm but no advice was given. At the end of the familiarization period, a lengthy prospectus containing an assessment of priorities was sent to each farmer. These programmes dealt with pasture management, stock nutrition, breeding efficiency and disease control.

Pasture management illustrates the teamwork of the farm advisers with the veterinarian. Fertilizer policy, weed control and pasture renewal were handled by farm advisers while the veterinarian took the leading role in advising on grazing rotation and conservation. To strengthen his background in pasture management the veterinarian had contact with staff of the Ruakura Nutrition Centre and adopted their system of pasture assessment (Hutton and Bryant, 1976).

To improve stock nutrition it was considered necessary to have thorough monitoring systems. Experimental farmers were asked to weigh their herd during the dry period and the veterinarian also made use of condition scoring. This information was used to adjust feeding levels and to group cattle before calving. To monitor nutrition during lactation, arrangements were made to obtain a copy of the 10-day slip directly from the dairy factory. The milk weight and test were used to construct production graphs comparing the current season with the previous ones on the experimental farm and also for comparison against the control farm.

The nutrition of young stock was monitored by weighing and visual assessment. Later in the project, liveweight targets were

derived. Feeding levels which achieved these growth targets would lead to a low level of anoestrus when the yearling heifers came to be mated. The spread grazing technique for young stock was adopted by two-thirds of the experimental farms.

Breeding efficiency and nutrition are closely related. For this reason the level of anoestrus is used to monitor the adequacy of feeding before calving. The timing and spread of calving were established together with the level of infertility. Each farm's optimum calving date was assessed, taking stocking rate and pasture growth into account. All of the experimental group were persuaded to comence mating their heifers before the mature cows with the aim of offsetting the delayed cycling in second calves so prevalent in Waikato dairy herds.

A condensed calving usually permits more accurate stock nutrition. Although the optimum calving spread has to be assessed in relation to the stocking rate and the labour situation on each farm, the common aim was to have 80% of the herd calving in the six weeks spanning the median calving date. A preliminary analysis on submission rates and returns was carried out 28 days after the commencement of mating. After mating, a full analysis of submission and return records was used to diagnose management problems.

Disease prevention concerned mastitis, facial eczema, bloat and metabolic diseases. These diseases have a herd effect and consequently a much greater economic importance than specific non endemic diseases affecting the occasional cow.

The mastitis programme involved California mastitis testing (CMT) of the whole herd three times each season. The quarters reacting repeatedly to CMT were treated with long-acting antibiotics at drying off. Teat spraying and machine testing played a part in reducing re-infection during the following lactation. Culling was recommended for cows which did not respond to treatment.

On farms which were prone to facial eczema the only satisfactory method of control was found to be in spraying of a part of the farm combined with on-farm spore counting. Bloat required minimal attention because the farmers had already found the control method that suited their farm. Blood tests were used to diagnose hypomagnesaemia and some trace element deficiencies.

The veterinarian sought specialist assistance to tackle problems concerning subdivision, water supply, drainage, finance, taxation and the transfer of assets to the farmer's family.

The economic analysis is based on actual physical production but prices are standardized. Milkfat is valued at $1.40 per kilogram each year. Stock sale and purchase prices per head are constant and they reflect the market outlook in late 1976. Changes in the number of stock on hand are valued at their June 1976 market value. Any increase or decrease in the value of stock on hand must be taken into account since the change represents excess stock sales or purchases.

Expenses towards animal health, breeding, dairy shed, feed and fertilizers are deducted from the gross profit to obtain a gross margin per hectare. Other operating costs were not deducted because they were not significantly influenced by the PAHAPS. Each cost item is inflated to 1976 prices using the Dairy Farm Costs Price Index (*Monthly Abstract of Statistics,* Statistics Department).

No veterinary consultancy fee is included in the animal health expenditure. The experimental farmers were not charged for the service.

These adjustments have been made so that the analysis reflects the prospective outcome for farmers who might consider entering a planned animal health scheme in 1976-7. To assess the likely gain a farmer must multiply the per hectare results by the area of his own farm and deduct the consultancy fees.

RESULTS

The physical and financial results of the two seasons prior to the commencement of the project have been averaged to obtain a base against which changes in performance may be measured.

Climatic conditions were unfavourable in the first year of the project. Data from dairy companies suggest that production dropped by 9% compared with the two previous seasons, which is the equivalent of 30 kg milkfat/ha in the control group. The

TABLE 1: ANALYSIS OF PRODUCTION INCREASE OVER THE AVERAGE OF TWO PRE-EXPERIMENTAL SEASONS (kg milkfat/ha)

	Experimental	*Control*	*Difference ± S.E.*
1973-4	6.1	— 6.6	12.7 ± 11.4 (NS)
1974-5	52.6	19.1	33.5 ± 11.2 (**)
1975-6	66.8	25.4	41.4 ± 12.0 (**)

NS, Not significant.
**$P < 0.01$

actual drop was 6.6 kg/ha while in the experimental group production increased by 6.1 kg/ha. The production difference between the groups increased to 33.5 kg/ha in 1974-5 and 41.4 kg/ha in 1975-6 (see Table 1).

The net financial returns follow a similar trend. The increased animal health expenditure and a higher culling rate on experimental farms have outweighed the small production advantage in the 1973-4 season. The small increase in returns on control farms in 1975-6 is partly caused by a decline in stocking rate, reflected in a negative stock accumulation.

TABLE 2: ANALYSIS OF GROSS MARGIN GAINS OVER THE AVERAGE OF TWO PRE-EXPERIMENTAL SEASONS ($/ha)

	Experimental	*Control*	*Difference ± S.E.*
1973-4	— 30.9	— 27.3	— 3.6 ± 18.9 (NS)
1974-5	43.1	8.7	34.4 ± 19.6 (†)
1975-6	65.1	5.6	62.7 ± 21.6 (**)

NS, Not significant.
†$P < 0.1$
**$P < 0.01$

A reliable comparison of animal health costs has been difficult to obtain. One farmer bought a three-year supply of bloat oil, two sets of accounts included subsidiary sharemilking contracts, two control farms changed their sharemilker, and one set of accounts did not differentiate between animal health and stock food items. These farms have all been excluded from the comparison in Table 3 (16 experimental *vs.* 10 control). The 1971-2 season alone has been used as a base because the cost of dry cow treatment at the end of the 1972-3 season influenced the comparison in that year.

TABLE 3: ANALYSIS OF ANIMAL HEALTH COSTS ($/ha)

	Experimental	*Control*	*Difference ± S.E.*
1971-2	12.30	9.75	2.55 ± 2.10 (NS)
1973-4	17.12	9.35	7.77 ± 2.88 (*)
1974-5	21.40	10.82	10.58 ± 3.53 (**)
1975-6	19.27	14.28	4.99 ± 3.84 (NS)

NS, Not significant.
*$P < 0.05$
**$P < 0.01$

DISCUSSION

The highly significant improvement by the end of the experimental period can be attributed to the complementary efforts of the farmers, the veterinarian and farm advisers. The net return is of an order which should make commercial, planned animal-health ventures an attractive proposition.

The scheme was not expected to result in a significant gain in the first year because many of the measures employed have a long-term cumulative effect. Mastitis control was expeced to have the most immediate effect, while improved young stock nutrition would have a limited chance to express itself in production within three years.

The results on individual farms indicate that large units and farms with high productivity at the outset made the greater gains in this three-year programme. The farms which required development or major changes in their farming system were slower to respond. It is considered that further gains could be expected with a continuing service — in particular on developing farms. On the other hand, a monitoring service may suffice on highly developed units after three years of intensive advice.

Most recommended techniques were adopted. The objective data collected on each farm helped to convince the owner of problems or inefficiencies and that recommendations were tailored to conditions on his particular farm. The consultants preferred to involve everyone, including farm workers and the owners who employed sharemilkers. Whenever possible the progress was relayed to all parties as a means of fostering continued interest.

It is estimated that the farm staff were involved in 58 hours of extra work per annum. This included 29 hours of farm walks and discussion, and 18 hours of weighing. The majority of farmers found weighing a chore and the time spent on it was halved by the end of the experiment.

Commercial, planned animal health services are currently being offered to about thirty farmers by three Waikato veterinary clubs. Experience from these ventures and from this project suggests that commercial schemes will be most successful where a veterinarian specializes in planned animal health. Where a veterinarian has only a few clients, it is doubtful if he could acquire the necessary expertise and keep abreast of new developments. A larger veterinary group should be able to find the thirty clients needed to support a full-time specialist. The university could also play a very important role by giving future veterinary graduates a thorough training in broad-spectrum preventive techniques.

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