

INTENSIVE GRASSLANDS MANAGEMENT - HILL COUNTRY FARM

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This will be the up-to-date story of a rather drastic change in the grazing management of a breeding ewe flock on a small hill country farm on the slopes of the Ruahine Ranges, above the Pohangina Valley, some 22 miles from Palmerston North. While the area of 540 acres is small compared with many of our hill country properties, it is believed that the results so far obtained from the system of grazing management which is being developed, will be of interest and value to many hill country men who are concerned with the deterioration in their carrying capacity since the bush burn days. Some very recent statistics regarding the size of sheep flocks in the North Island indicate that this small farm with its flock of 1,750 is among the 4,300 flocks of between 1,000 and 2,500 and that there are only some 1,400 bigger flocks in the whole of the North Island though there are upwards of 7,000 flocks of under 1,000 sheep. The figures for the South Island show that flocks generally are smaller than those in the North Island, and the same comparison holds good from the point of view of the numbers of sheep being handled. This farm then will bear comparison with the majority of New Zealand Sheep Farms, including hill country farms,

SOILS, TOPOGRAPHY AND CLIMATE ETC.

The soils of the farm have been derived from the Greywacke Mountain backbone, and vary from 4 - 6 inches of light brown free sandy loam (in some places stony) over light yellow gravelly loam on stony gravels, to 4-6 inches of dark grey silt loam on greyish yellow somewhat compact silty clay loam. The land is naturally free draining and the water supply from springs and streams is good. The original bush was moderately heavy on the lower slopes consisting of rata, rimu and maire, with patches of totara and some birch on the steeper ridges. The country is generally rolling hills intersected with deep ravines, one of which cuts the property into two, uneven sections. There are some stony terraces and some very steep hill slopes. The country lies generally well to the sun but is exposed to westerly and southerly winds. The rainfall is approximately 50 inches and the country which is some 1,300 feet above sea level is subject to light snowfalls which seldom remain on the ground for any length of time. About 150 acres is ploughable.

FARMING HISTORY:

The 540 acres now being farmed as a separate unit, since June, 1941, was part of a 1,737 acre block which was taken up in 1894. Few details of the development and carrying capacity up to 1930 are available, except that the country was sown with the best grass and clovers available. In 1930 the whole block of 1,737 acres carried 2,000 ewes, 600 hoggets and 40 breeding cows and by 1932 the ewes had been reduced to 1,900. In 1933 the 540 acre section, which is now the writer's farm, wintered 400 ewes and 600 hoggets (no records of how the cattle were run at that time). At this time (1933) when I took over the management of the whole block, the 540 acres was fenced approximately as it is now and the other 1,200 acres into about 18 paddocks, the two largest being 150 acres with the remainder about 50 acres each. Despite this somewhat close subdivision the pastures under more or less set stocking with sheep and a relatively light stocking with cattle, had deteriorated to dominant browntop with little clover showing. There were considerable areas of bracken, fern and bidi bidi was very prevalent, necessitating early shearing. A portion of the ploughable country had been broken up and sown down but the pastures were thin, with flat weeds, particularly the field daisy, very prevalent. These paddocks were white with daisy in the spring.

EARLY IMPROVEMENTS IN MANAGEMENT - THE USE OF CATTLE :

About 1934 a start was made with shutting up paddocks in turn for a month or so in the autumn and then grazing these closed paddocks hard with cattle, in an endeavour to clean up the *bididi*. The results were encouraging but slow. The proportion of cattle to sheep was increased during the next few years and the cattle were moved round the farm for most of the year, except the winter and spring. The next development in grazing management was the mobbing of the sheep in the late summer and autumn, and shifting the mob round the farm after the cattle. At this time, I was farming the whole block of 1,730 acres, and with the mobbing of the sheep I began to notice a much more rapid improvement in the pastures which were also getting much cleaner, the *bididi* and bracken fern being cleaned up and the grasses competing well with the daisies and other weeds. I was thus able to increase the carrying capacity in sheep again, a comparison between 1933 and 1941 figures being:-

Wintered 1933 -	1,900 ewes,	600 hoggets,	40 cows,	30 weaners
" 1941 -	2,220 "	717 "	132 "	110 "

I took over the 540 acres of my present farm in June, 1941.

FURTHER DEVELOPMENT OF GRAZING MANAGEMENT :

I was in the army in 1941, 1942 and 1943, and progress in grazing management was held up, more or less set stocking with very little planned movement of stock round the farm being done for these years. The stocking for this period was as follows:-

Wintered 1941 -	950 ewes,	250 hoggets,	35 a.a. cows,	44 weaners
" 1942 -	950 "	350 "	34 "	32 "
" 1943 -	950 "	370 "	36 "	32 "

I was back on the job early in 1944 and was very disappointed in the appearance of the pastures and the stock.

ROTATIONAL GRAZING:

I immediately commenced a system of rotational grazing which I know has had a marked effect on the pastures, both ploughed and unploughed, and on both steep and rolling country, and which I feel because of the short time (from 1944 to 1947) that has been in operation, still has very big possibilities in increasing the carrying capacity of the block. The system I have developed is as follows: From weaning time (early January) right through to lambing, all the ewes, about 1,000, are in one mob and are moved round the farm, paddock by paddock irrespective of the size of the paddocks. The lambs, about 500, make the same rotation in front of the ewes. Owing to the big variation in the size of the paddocks which range from 5 - 10 acres up to 60 and 80 acres, the sheep are shifted every one, two, three or more days, according to the size of the paddock, rate of growth, etc. My aim is to leave the sheep in each paddock long enough for them to graze the whole of the pasture down to an even short sward without eating it right out bare. If the growth is comparatively slow the lambs are moved immediately ahead of the ewes, but if the growth is fast and tending to be too long for the lambs, they are moved some paddocks ahead to shorter feed which has not been spelled so long. In this way the lambs can always be kept on the shorter fresh pasture they do best on.

Autumn Saved Grass for Winter Feed:

About the beginning of April when the ewes are getting too fat, approximately half the farm (according to season) is grazed only very lightly and a good part of the autumn growth of grass is thus carried on this half of the farm into the winter, while the ewes and lambs are restricted in their rotation to about half the area. As growth slows up in the late autumn and winter, this reserve is gradually used up, until by about the end of August it will be all gone. By this time the grass is beginning

to come away again and a very noticeable result of my system of grazing management is the fact that the pastures now grow all the winter and certainly come away much earlier in the spring.

MANAGEMENT THROUGH LAMBING:

The ewes continue in one mob as they come on to lambing and as soon as lambing commences they are shifted every day, the ewes that have lambed being shed from the mob as it proceeds to the next paddock each day. By the time the ewes have made one circuit of the farm the lambs that were first dropped are old enough to be collected into a small mob which is put into one of the paddocks furthest from the homestead. Ewes, and lambs, as they become old enough, continue to be collected into this paddock from time to time until it has about the number I think the paddock will hold, when I start filling another paddock with ewes and lambs. Meanwhile the unlambed ewes and hoggets continue with the rotation. I eventually arrive at the stage where I have all my late lambers in a small mob in two or three paddocks close to the house where I can keep an eye on them without much trouble. I have all my lambed ewes in about three of the bigger paddocks with the lambs in each paddock about the same age. This simplifies the matter of docking, which I like to do when the lambs are about two to three weeks old. The lambs are docked in the paddock and as soon as this is done with the first mob, a new rotation is started with two paddocks, the ewes and lambs being shifted from one to the other. When the second mob has been docked, these are added to the first and the combined mob is shifted around four paddocks. After docking the next small mob is added and two more paddocks brought into the rotation and so on until the majority of the lambs have been docked. As soon as the lambs are old enough not to be easily mis-mothered the whole mob is started on the full rotation again, which is continued until weaning.

Throughout the lambing period the dry sheep are confined to two paddocks which are spelled alternately and as the rotation is taken up again they follow the ewes and lambs. This systematic grazing management of the ewe flock has been carried out during the past three and a half years and I would like now to recount some of the advantages which have resulted.

IMPROVEMENT IN THE PASTURES:

The system of grazing in mobs, rather than set stocking with sheep in most of the paddocks, as is the custom on hill country, was started not for the benefit of the stock so much as in the interests of the pastures. These to commence with, were very mixed and varied considerably in origin, composition, rate of growth, size of paddocks, weediness and amount of second growth. About 150 acres had been stumped and ploughed many years ago and some 30 acres had been reploughed in the last 15 years, but none since 1940. Portions of the area, mainly the ploughed country, had been topdressed. In 1942 6 tons was used, this was reduced through rationing and has since been increased to 10 tons this year. Topdressing has therefore not played a very prominent part in the very obvious improvement being made in the pastures, whether ploughed or unploughed, steep or rolling, and whether in small paddocks or in large. Bracken fern has almost entirely disappeared (and this country can grow bracken fern) biddi biddi is found in odd spots and no longer necessitates early shearing. There is only one small patch of ti-tree on a steep face and I have found no size of spreading. I am convinced that the periodic grazing of a 1,000 ewes in the biggest paddock of 87 acres will prevent seedlings of such plants from getting established except in a few very inaccessible spots. The pastures have changed considerably in composition. There is now showing in all of them an increasing proportion of perennial rye, cocksfoot and dogstail and particularly of white clover. This improvement of course is most marked where assisted by topdressing, but it is definitely occurring in untopdressed areas. The density and evenness of the sward has improved considerably with a decrease in the amount of weeds such as daisies etc. One of the most

noticeable features is the improvement in the winter growth and the fact that the pastures come away much earlier and more vigorously in the spring. In the past two years I have done a certain amount of oversowing with Pedigree and Mother certified white clover and the results are very encouraging. This oversowing has been done in conjunction with topdressing, and already quite a good showing of vigorous white clover indicates that it is a practice worth developing.

IMPROVEMENT IN CARRYING CAPACITY:

Since 1944 when the intensive system of grazing was commenced on the 540 acres, the carrying capacity has steadily improved as follows:-

	Ewes:	Hoggets:	Wethers:	Total Sheep:	Cows:	Weaners:
1944 wintered	950	400	20	1,370	31	27
1945 "	1,000	500	75	1,575	42	30
1946 "	1,050	575	100	1,725	20	36
1947 "	1,100	450	200	1,750	16	19

All wethers have been fattened and sold in August-September. Wool weights have increased from:-

13,250 lbs. in 1943/44 to 14,180 lbs. in 1944/45,
16,000 lbs. in 1945/46 to 14,500 lbs. in 1946/47.

The drop in 1946/47 season being due to, the sale of 262 woolly sheep estimated to produce over 2,000 lbs. of wool.

While these increases in carrying capacity and wool weights, are in no way spectacular, they do represent something worthwhile and are a very clear indication that deterioration in hill country can, in my opinion, be stopped by an alteration in the grazing management. An increase, in less than four seasons, of 28% in the total sheep carried, of which 16% is represented in breeding ewes, with a corresponding increase in the wool clip. of 2,390 lbs., is surely encouraging and I take it as a clear indication that a continuation of my methods will see a still further improvement. I have still of course, yet to exploit the manure bag 'over-the whole farm, since, as yet, no more than 80 - 90 acres has been topdressed in any year, and the average area during the past ten years has been very much less. In addition to the increase in numbers, I have noted a decided improvement in the general condition of the ewes, the lambs are better, and sickness and deaths have been very much reduced. My ewe losses. have been reduced to from 2 - 3% between tupping and docking.

CATTLE: IN RELATION TO SHEEP:

On this fairly high rainfall country, and particularly where bracken fern and **bidi bidi** are prevalent, the proportion of cattle to sheep is generally considered to be of importance in the efficient management of the country. A ratio of 1 cattle beast to about 6 acres is often stated to be desirable, -My experience with big mobs of sheep moving round the country leads me to believe that with such a system of grazing the cattle beast loses much of its importance. I have now none of the general roughage scattered over the whole farm at the beginning of winter, but I have grass specially saved on part of the farm with the rest well grazed. My main-problem now is that of cleaning up and bringing back to sheep feed any paddocks which may get away in the main flush of spring growth. It will be noted that I have already reduced the number of cattle wintered from 72 in 1945 to 35 in 1947. This is a reduction from 1 cattle beast to about 8 acres, to 1 cattle beast to about 15 acres. With the development of topdressing and a consequent marked increase in the quantity of feed available in the late spring and early summer, it is probable that a policy of buying cattle in the spring and fattening these will have to be undertaken, The winter carrying capacity will be then devoted to ewes and lambs for flock replacements.

SUB-DIVISION IN RELATION TO GRAZING MANAGEMENT:

During the period under review, no new fencing has been done. It will be noted from the plan, that the block is well sub-divided but that the paddocks are generally very uneven in size. This is because of the fact that this area was the homestead block of a larger property. While the number of paddocks, 11 main ones and 8 small ones, has helped in the organisation of the system of grazing, the irregular sizes and varied condition of the pastures has made the job of efficient management considerably more difficult. My experience indicates however, that no special reorganisation of sub-division is essential to putting such a scheme of grazing management into operation, the size of paddock and condition of the pasture deciding the number of days it is advisable to keep the sheep in each. Ten to twelve main paddocks would be sufficient for an effective application of the methods described.

SOME OTHER IMPORTANT CONSIDERATIONS:

I have indicated the main advantages of systematic stocking of hill country in regard to the pastures, the carrying capacity and the well being of the sheep. There are several other very important aspects which I feel should be discussed.

EFFECTS OF SPELLING AND GRAZING:

The results of the past few years have convinced me that the secret of pasture improvement lies very largely in the 'periodical spelling followed by rapid pruning down by a large number of stock which at the same time gives a heavy and uniform dressing of animal manure over the whole area. I am further convinced from my observations that while the spelling in the summer and, more particularly, during the autumn growth period, is very important, the best effects of spelling are obtained in the spring when the good grasses and clovers are making their main growth effort. Close and continuous grazing at this stage must result in the punishment of the more palatable species and when growth exceeds the requirements of the animals, it is the less productive and less palatable grasses such as browntop and danthonia and of course the weeds which get away.' When spelled in the spring, as is the case on this property, each species has a chance to develop leaf and root and when grazed off in a few days by a large mob of sheep practically everything irrespective of palatability is eaten off ready to make fresh growth again. I am almost convinced that sheep alone can control all types of secondary growth, at least they can prevent the development of such growth from seedlings, if used in the way I have described.

WORK IN RELATION TO GRAZING MANAGEMENT:

I must admit here, that any systematic scheme of shifting stock throughout the year means that the sheep-farmer or his shepherd, must be continually on the job. I do insist however, that the work is neither uninteresting nor monotonous and that the time taken up in the actual shifting is very little indeed. From early October to the following June or July, when the sheep are in effect in two mobs (the ewes with and then without lambs and the replacement lambs or hoggets as the case may be) it is a matter of opening and closing a couple of gates every few days, the sheep shifting themselves. I have found this job easier and quicker than riding round the whole farm periodically to inspect the stock. As the mobs pass the homestead and the sheep yards periodically in their movement round the farm, it is a simple matter to regularly put the sheep through the yards and do any foot-rot treatment, dagging, crutching or drenching etc., that may be required, without any extra mustering or driving. Further, a very complete inspection of the sheep can be made regularly and any requiring special treatment can be kept back in a special paddock, joining up with the mob the next time round.

SPECIAL ADVANTAGES AT LAMBING TIME:

Contrary to general opinion, I believe that in addition to the very great benefit to the pastures, having the lambing flock in one mob reduces both work and worry at this busy time. I work this property on my own except for casual labour for special jobs. The sheep become very used to being shifted and except at lambing time it is a very short and simple job. In the thick of lambing it is a bit more difficult, but if done quietly the shedding of the ewes just lambed as the mob passes to the next paddocks is not so difficult as it would appear. It is essential though that this job be done carefully and the shepherds' dogs must be under good control. Rowdy dogs running through a mob at this stage could do a lot of harm. One well trained dog can do all that is required with a mob of 1,000 or more and not be overworked. I have found in practice that I can shift the ewes, tend to any requiring attention and shift and look over the hoggets quicker than was the case when the ewes were scattered about the whole farm under set stocking. When there are several mobs of lambed ewes with a mob still unlambéd, together with the wethers and the hoggets, there are of course a number of mobs to be looked over and shifted, but this is the case for a very brief period only. For the sake of the pastures and indeed for the benefit of the stock themselves, I consider that the rotation should be continued-throughout the year. I should like to issue a word of warning at this stage however, when paddocks are spelled for up to two weeks or more, particularly in the late spring, growth is apt to be too long for ewes and lambs. It is my practice to leave out paddocks from the rotation when this happens, pushing the mobs forward to more suitable feed. It will always be found that a few cattle will cut back the feed on such paddocks and they can be brought back into the rotation as and when required without any harm being done to them. As a matter of fact this longer spell is generally very much to the benefit of the paddocks concerned. I know of two sheep-farmers who tried rotation grazing and then discarded it. In both cases discussion of the matter indicated that they both shifted the sheep at such long intervals that they were alternately starved and then given long lush feed, with results that can be imagined. When properly handled and shepherded, I have found my sheep to keep extremely fit and well. My losses with both hoggets and ewes have been much lighter than they were under set stocking. Ewe losses are down to 2½% to 3% from tugging to docking.

CONCLUSION:

My plans for future development include the provision of further shelter belts on this exposed country. I have already planted quite a few thousand trees chiefly in such shelter belts. There will probably be some re-arrangement of fencing to give more uniformity in the size of paddocks. Tracks have been put in consisting of 12 foot roads for the easier transport of materials such as manure into the farm and for the easier movement of stock from one paddock to another. Wider gates to cope with a bigger flock are also on the programme. My experience with the small quantity of fertiliser so far applied, together with the evidence available that ryegrass and cocksfoot are still prevalent indicates that in combination with the systematic grazing, management in operation, topdressing and oversowing with clovers is certain to prepare the way for still further and quite considerable increases in carrying capacity.