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Working papers

IMPROVEMENTS IN KENYA'S LIVESTOCK ECONOMY:  
LESSONS FROM THE S.R.D.P.

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WORKING PAPER NO. 226



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JULY 1975

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RN 322286

IDS



095303

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Improvements in Kenya's Livestock Economy:

Lessons from the S.R.D.P.

Findings and Recommendations

General

1. Grade cattle development in Kenya needs to be based on a strategy for consolidating and extending existing 'clean' and 'semi - clean' areas. This should indicate priority areas for major effort.
2. Among the SRDP areas Kakamega District offers a number of promising indicators and should be considered a priority, but not Migori or Kwale.
3. The appropriate strategy for improvement in beef - producing areas still needs consideration.
4. The maintenance of cattle dips in the country as a whole is atrocious. Because of external diseconomies from non - dipping (social benefits from dipping), as a radical proposal we recommend free dipping if not in all Kenya in strategic development areas as the basis of a frontal approach on the disease control/dairy development problem. This would be for a minimum transitional period of three years. Maintenance should be taken over by the Veterinary Department. Costs should be financed from taxation (perhaps on cattle sales) as with other public goods, like roads, yielding social benefits.

Tetu and Nyeri District

5. The advanced livestock development indicates what can be achieved, and can be considered something of a model for other areas. The history of livestock development in the area points towards a frontal approach as the best strategy, rather than a piecemeal one, and an approach which incorporates the mass of farmers rather than only progressive, yeoman farmers.

6. The credit/extension experiment for the promotion of dairy cattle appears to have been highly successful, and merits replication elsewhere.

Migori - Macalder

7. The Macalder HG. is unlikely to be used at this stage of livestock development in the area. The feasibility of some water investment to permit the establishment of a small coop ranch should be investigated.
8. A study of milk marketing in the area, proposed some time ago, should be carried out.
9. The model dairy farms are not appropriately scaled in relation to average farmers in the area.
10. The disease problem precludes efforts at substantial grade dairy cattle development at this time.
11. A.I. services also cannot be profitably developed throughout the area as a whole.
12. However, if the recommendation for general free dipping is accepted (only), then an attempt to establish a mini - clean area around Oyani Farm could be made, including a grade cattle credit programme and an AI. run.

Vihiga - Hamisi

13. There is contradictory evidence about the relative profitability of dairy enterprise (at existing mortality rates) and alternative farm activities in the area. However dairy production appears at least competitive, if not superior, and the need to move towards the long term goal of a disease - free area in which mortality would be halved, as well as the immediate nutritional benefits appear to move the balance decisively in favour of dairy enterprise.

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14. However dairy enterprise promotion should be combined with a frontal approach on the disease problem, based on a programme of free dipping.
15. The attempt should be made to distribute cattle as widely as possible among smaller farmers, replicating the Tetu experimental extension method.
16. Default rates should be calculated separately for borrowers losing cattle through disease and those not.
17. The grade cattle credit programme should not be abandoned, but attempts made to expand its scope.
18. The 6 per cent rate of interest charged should remain but an attempt/<sup>made</sup>to remove the subsidy obtained by defaulters by more strenuous attempts to recoup loans.

Kwale

19. The 94 - acre farm plan is inappropriately scaled for the area. Extension efforts should be concentrated on proposals which would not create inequalities. The small - scale dairy unit for a 10 - acre farm is much more promising.
20. Much more farm level research needs to be carried out in the mixed farming areas.
21. The area should not be considered a priority for grade cattle development, though more research needs to be done on milk supply and marketing.

Kapenguria

22. The system of stock routes has been extremely difficult to establish and facilities provided so far have been largely unutilized.

23. One reason for this is that the proposed system does not coincide entirely with the natural flow of cattle traffic. This flow should be more carefully studied before such routes are designed.
24. A cattle buying agency should be established acting as an intermediary between livestock owners and the K.M.C., with the specifically development function of encouraging sales and stabilising markets in pastoral areas. The aim should be to offer guaranteed outlets at a low minimum price. Where economical, the local D.R.O. could be used as a buying agent. In general government should play a much more positive role in relation to the marketing of livestock in pastoral areas.
25. Disease control measures and dairy production should be concentrated within a "mini - clean area" within Inagei Location.
26. Neither bull camps nor A.I. services have been successful in Inagei. The latter are largely premature. Possibilities for A.I. in the 'clean' area of Leland should be examined, in preference to bulls.
27. The sheep farming development in Leland is extremely promising. The possibility of accelerating the implementation of the programme should be investigated.

#### Pigs and poultry production

28. Periodic and spasmodic efforts at promotion of pig production in different areas of Kenya are a waste of time. Calculation of the simple economics should be made in Nairobi, to be updated continuously as the prices of feed and of pork vary, in order to determine favourable periods for promotion of production.
29. Promotion of pig production should be extended to include production for self - consumption of one or two pigs.
30. Promotion should be concentrated where a proportion of the required feedstuffs are available on the farm.

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31. However much greater emphasis should be placed on poultry/egg production than on pigs.
32. As with pigs, the Planning Division of the Ministry of Agriculture should monitor the prices of inputs and outputs, and make a careful appraisal of the economics of poultry production.
33. The potential within traditional poultry production, as opposed to "modern poultry industry", should be examined.
34. The Vihiga project for a central brooding house should be carefully monitored to test the possibility of providing "wholesale distribution" of one - day old chicks, and of cooperative organization of the enterprise. Strong assistance and supervision should be provided during the early stages.
35. Poultry has a better potential in Migori than pig production, but will require simultaneous efforts to organize marketing.

Improvements in Kenya's Livestock Economy:  
Lessons from the S.R.D.P.

Kenya's livestock economy is extremely heterogeneous. Physical environments vary through the whole spectrum between semi-desert and rich agricultural areas and thus farming systems from pastoral nomadism to intensive mixed farming. The cultural backgrounds of farmers and pastoralists are equally disparate. We shall therefore discuss separately the general problems of livestock economy and in another chapter, those of the ranching areas.

The "special" element in S.R.D.P. livestock programmes

There is very little 'special' in the S.R.D.P. sense (i.e. experimental and potentially replicable) about efforts at livestock development in the S.R.D.P. areas, and in some respects we should not expect anything else. In the case of livestock the general requirements of a development programme are fairly clear and have been so almost from the outset: increased interest by pastoral peoples in commercialized operations, the introduction of proper range management and control over livestock numbers in the range areas, control over disease, upgrading of livestock and improvement of marketing facilities. The problem has been rather one of implementation, together with lack of funds. It follows that improvements under S.R.D.P. have been largely within the confines of this framework, and are more difficult to distinguish from what could be a normal development programme than in the case of, say, crop experimentation.

Table 1 gives the projects listed as under the S.R.D.P. in each of the six areas at the time of our evaluation. The comments made on project description later in this report on the general development administration of S.R.D.P. apply with particular force here.



<u>Migori SRDP</u>	<u>Kapenguria SRDP</u>
1. Livestock marketing	1. Livestock marketing
2. Model dairy farms	2. Group ranching
3. Animal disease control	3. A.I. services, Wangei
4. Dips programme	4. Bull camps
5. Pig demonstration	5. Fodder and ley establishment
<u>Mbere S.R.D.P.</u>	6. Stock and milk census
1. Ranches	7. Dip construction
2. Livestock production	8. Sheep development, Leland.
3. Livestock improvement	<u>Vihiga S.R.D.P.</u>
4. Disease control	1. Dairy cattle and milk production
5. Dips	2. Livestock staff build - up
<u>Tetu S.R.D.P.</u>	3. Pig production
1. Dairy products	4. Poultry production
2. Beef production experiment	<u>Kwale S.R.D.P.</u>
3. Dips	1. Mwereni group ranch
4. Pigs and poultry production	2. Animal Health and Husbandry.

Table 1 Livestock projects in the SRDP Areas

There are still listed projects which are in fact no longer in existence. Some of these are failed projects, such as the idea of bull camps in Kapenguria, but which nevertheless do not get deleted; others are projects which never got "off the ground", such as fodder and ley establishment in Kapenguria, and pig production in Vihiga - either because they were not approved eventually, or funds proved inadequate, or because the local officers themselves realized at some point that they were impracticable. In the case of the beef production experiment in Tetu the Area Coordinator (admittedly by new) could not specify the project, and it turned out to be one listed in the original SRDP proposal of 1969 which had simply been carried forward.

There are, secondly, what may be termed 'non - projects', activities which cannot properly be termed projects. Some consist of very general titles, such as livestock production (Mbere), animal health and husbandry (Kwale) and livestock marketing

(Kapenguria). Others are at most component parts of an integrated programme such as dip construction and 'disease control and improvement' (Mbere), not in itself a productive activity. In the case of dips a special element is the offer of 50 per cent funding by the government from S.R.D.P. funds as an incentive to self - help: but this could only with the greatest imagination be described as a project.

Finally there are activities which may be new to the area but which are already in practice elsewhere. These may be experimental, but not replicable - the experiment being rather whether the activity may be replicated in this area. This would be true of A.I. services in Kapenguria and Vihiga, and of pig and poultry production.

Thus the livestock projects actually in existence under S.R.D.P. turn out to be either part of what would be a 'normal' livestock development programme in Africa, or part of an integrated or larger - scale effort to improve the livestock economy, or are simply new to the area rather than of the experimental/replicable type. This does not mean that no general lessons may be drawn from the livestock experience under S.R.D.P.: indeed we shall attempt, by reviewing together the experience of these areas,<sup>1</sup> to indicate some sort of 'strategy' for livestock development outside the ranching areas. Before turning to cattle, we consider briefly SRDP projects for expanding pig and poultry production.

#### Some comments on pig and poultry production

The promotion of pig and poultry production is included as projects in several of the S.R.D.P. areas: pigs in Migori, Vihiga, and Tetu, and poultry in Vihiga and Tetu. Livestock officers in the other areas are also involved in their promotion, if not as S.R.D.P. projects. There is very little to report regards the actual projects, but a number of observations can be made on the development of pig and poultry production.

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1. In the case of Mbere, only ranching is considered, in the next chapter.

Pig production

In the case of pig production, the first observation we may make is of a tendency for livestock officers in each area (this applies generally, not just to these three S.R.D.P. areas) to ascribe the difficulties faced in promotion to the special problems of the locality or to associate them with the local people. Thus in Migori, where a demonstration <sup>unit</sup> / was started in September, 1973, at Ovani Farm, it is stated that "the main constraint is the farmers' lack of interest in pigs" and also that "people are not used to eating pork." There is reference in Migori, in contrast to their own experience, to the "very successful" production in Kakamega District. If however one inquires in Kakamega, it is difficult to trace this success. In Vihiga it is stated that "only two farmers produce good porkers", of which one is a missionary farmer and one is the former head of a Farmers' Training Centre.

In fact there appear to be some very rational, economic reasons for the restriction of both production and consumption. The first is the availability and cost of feedstuffs. As mentioned in Migori, a pig "needs one bag of maize a week or it is starving". The problem is, in the first place, that pigs eat much the same basic food as humans in Kenya - maize; and this is not available as a surplus on small-scale farms. Likewise small farms do not generate large quantities of waste products, turnip tops for example, which can be fed to pigs. This is a major handicap to production in Vihiga for instance. As a result producers here are heavily dependent on purchased feedstuffs the price of which is currently very high. Thus not only does the high price of feed relative to the price of pork make pig production a rather unattractive proposition at the moment, but the effect of costly feed on the sale price itself restricts demand. The second hindering factor on the activity is in fact the limited local markets which exist for pork. Excluding Uplands, local demand for commercial output in Kenya comes especially from institutions such as schools and hospitals (themselves with limited ability to pay); while Uplands makes its purchases especially from localities nearer to its Rift Valley factory.

A second observation to be made is that the promotion of pigs in area seems to be a cyclical or periodic activity. Thus in Wihiga the local D.O. was actively engaged in the promotion of pig production, with considerable success, in 1956 - 58, nearly twenty years ago. At this time a great many farmers became interested, growing cabbages, especially, and native potato leaves for feed. Estimates of pig production in Tetu show that the activity is by no means new. Table 2 gives, as an index of

Year	1967	1968	1969	1970	1971	1972	1973	1974
Number of sows	623	n.a.	1971	1835	915*	599	703	572

Table 2: The number of sows kept by farmers in Tetu Division, 1967 - 74.

SOURCE: Tetu Division Annual Reports.  
(\*includes gilts)

production, the number of sows kept by farmers. Since 1969 - 70 the number of sows fallen by two-thirds. Two factors apparently underlie this trend, the rising cost of feed over the period as a whole and lack of markets, especially in the period 1969 - 70, when there was obviously excess production on the established pattern of the 'hog cycle.' During 1969, as revealed in a pig census in December, the total number of pigs in Nyeri District rose by approximately 80 per cent, and the number of pig keepers by 50 per cent. While some 10,500 pigs were ready for marketing outside the District in 1970, the cooperative union had a contract with Uplands for only just over 7000. Producers were apparently seriously discouraged about this time and with the further unfavourable factors mentioned, production has not recovered since. This experience indicates the importance of finding specific markets if pig production is to be expanded, and secondly that it is not so much 'lack of farmer interest' in pig production which is the constraint, in any part of Kenya, so much as the economic factor. In particular if production is stagnant in Nyeri, where there is good access to the main outlet, Uplands, the prospects elsewhere are not likely to be favourable.

Despite this, there are periodic references in Ministry of Agriculture files all over Kenya to 'the need to persuade people to eat more pork', with suggestions either for consumer campaigns or new drives to encourage producers. These can only have an adverse effect on the value attached to extension advice, as well as wasting the time of livestock officers, if they are not related to calculations demonstrating a favourable economic basis. Very largely, the economics of pig production involves knowledge of only two prices, the price of feed (input) and the price of pork (output). It should not be left to livestock officers all over Kenya to guess these: it should be routine for the Planning Division of the Ministry of Agriculture in Nairobi to monitor these two prices and inform local officers of the appropriate time to emphasise pigs.

A second point worth emphasizing is the need to distinguish between commercial and 'subsistence' production of pigs. The commercial market in any area is generally quite circumscribed, depending on the extent of interest by Highlands and the number of local institutions making purchases. Promotion should be extended to 'subsistence' production, i.e. production for self - consumption: it may be easier for small farmers to sustain one or two pigs for their own eventual consumption, using offal from their farm, supplemented by some commercial feed, rather than breeding and keeping larger numbers of pigs, an activity inevitably dependent on commercial feed.

Finally, whether commercial or subsistence production is being considered, promotion should be concentrated in those areas where a proportion of the required feedstuffs is likely to be available on the farm, if possible as waste products.

#### Poultry production

Poultry is a much more important farm activity to promote because of its easy integration into traditional farm activities, the much wider local market (commercial and subsistence) for both eggs and broilers, and the important nutritional aspect.

Poultry production is not listed as an S.D.P. project in Kapenguria but comments made locally with respect to it are revealing of the general position. Modern poultry industry in the District, it is said, "tends to be erratic", and "a farmer picks it up and either abandons it half way or goes to the end then swears never to reestablish it again." The reasons for this are again the high cost of feeds and the high competition from local eggs on a limited market. The cost of eggs from high grade birds on commercial feeds is said to be higher than the ordinary 'local' eggs. This is again indicative of the need for the Ministry of Agriculture Planning Division to monitor the prices of inputs and outputs in poultry production, but also for more careful appraisal of its economics than has been made so far. Secondly it suggests even more strongly than in the case of pigs the need to examine the potential within traditional poultry production, which production is clearly both important and competitive, rather than simply focussing on a small number of 'progressive' or 'modern' poultry farmers.

In Tetu two S.D.P. poultry projects were planned, for broilers and for layers (the latter consisting of sending interested farmers to the local farmers' training centre for training), but not implemented, mainly because of the unfavourable impact of rising feed costs. Despite this, some indications exist in Tetu of the potential for poultry production, as shown in Table 3. What is significant here more than the increase in the total number of birds in the last year is the increase in the percentage of exotic birds from a (very) rough estimate of 16 per cent to nearly 30 per cent in two years, indicative of the possibilities for increasing productivity in poultry production as a whole.

	1972	1973	1974
No. of exotic birds	4,151	4,682	7,245
No of nature birds	22,456	21,419	24,673
Total poultry	26,607	26,101	31,848
percentage exotic	18	22	29½

Table 3. Recent trends in poultry production in the Tetu Division

SOURCE: Tetu Division Annual Reports.

While poultry is an SRDP project in Vihiga, expansion has been assisted throughout the whole district by I.D.A. loans through the A.F.C. as shown in table 4. The local market for eggs is

Year	1970	1971	1972	1973	1974	Total 1970-74
Loans approved (shs. '000)	7.7	6.9	18.0	50.3	179.0	261.9

Table 4. I.D.A loan approvals for poultry, Kakamega District, 1970-74.

apparently very favourable, and there is no problem of disposal. It was not possible to make a detailed investigation of the local industry, or the impact of the loans issued. The aim should be ensure to ensure as wide a distribution of poultry/eggs production among small - scale producers as possible: the extent to which the programme above is consistent with this aim might be examined. The SRDP project in Vihiga is for a central brooding house, to cost K22,500, run cooperatively by farmers to take delivery of one - day old chicks for subsequent redistribution among farmers. Currently, because of the distance from the hatchery and lack of proper care of new chicks by farmers, there is a very high mortality rate. Both the ideas, of providing local 'wholesale' distribution facilities and of cooperative operation of the enterprise, appear to be well designed to have the most widely - spread effect on poultry production. This is therefore an important experiment which should be carefully monitored, but which will require considerable assistance and supervision during the early stages.

The poultry industry in Migori has always been underdeveloped. Just before the S.R.D.P. started, in 1969, there were only 270 improved poultry in the division. The local supply of eggs is apparently small and subject to wide fluctuations. The eggs are small and often stale, pointing to a marketing as well as a production problem. A 'poultry breeding and marketing' project was listed in 1972 - 3, to include the setting up of a nucleus poultry unit at Oyani Government Farm to supply day - old chicks to farmers, but this has not yet been implemented. In 1973-4, three successful farmers (only) are reported in the division, with 266 laying birds, with 32 other farmers interested, however. This activity appears to have much greater potential than pig production. However it requires simultaneous efforts to organize marketing, which do not appear to have been made so far.

#### Problems of Livestock development in Migori/Macalder

There are estimated to be about 100,000 cattle in the two Divisions of the Migori S.R.D.P. These are mainly Zebus, with only a few grade cattle. The former exhibit the usual features of the traditional livestock economy of low milk yield and wide calving interval. The general plan at the outset of the S.R.D.P. in 1970 was to promote dairy production in the highland area, comprising the Kanyankago Hills and part of the Kuria Hills, and beef cattle in the lower zone extending towards the lake shores, this on the basis of cooperative ranching.

In particular it was thought that 400 square kilometres of "moderately good ranchland" in the Central Migori River valley and 300 square kilometres of sandy ridges in the western area of Mohuru Kadem might sustain viable ranches for fattening stock. These suggestions do not appear, however, to have been taken further, or another one for sheep development in Mohuru Kadem, also made in 1970.

Livestock development in the Migori area faces two major problems: that of disease, associated in part with the transit trade in livestock from Tanzania, and that of stock theft. In addition it is said that the attitude of the local Luo farmers towards livestock is unfavourable to commercial development.



The project area straddles an important traditional trek route for cattle passing from Tanzania to Uganda, as well as to the Kenyan market in the Kisumu area. In 1970, for instance, permits were issued for the movement of some 20,000 cattle, well in excess of the estimated offtake, and indicating a substantial trade. Whatever the benefits of such trade, it has made control of stock diseases in the area extremely difficult, and the area has frequently been closed for quarantine purposes for periods up to nine months. Since the trade would be difficult to stop, even if this were desirable, the sensible idea was formulated of trying to channel it through a controlled system of stock routes and holding grounds along which movement would depend on vaccination being effected. Ranches for fattening stock might also be incorporated into the system for additional commercial benefit. We can consider the merits of this "livestock marketing project" first.

Two holding grounds were for Macalder, in the centre - west of the area, and Lichota in the east. Neither has been successful, though the latter has not been completed. The Macalder holding ground was a substantial one of some 6000 acres. Only one consignment of 35 cattle has stayed there so far. Even threats to withhold traders' licences if they did not utilize it were ineffective. A spray race for cattle which was erected had to be dismantled, since it was in any case not in use, for fear of theft. The second holding ground was located at Lichota in the east to accommodate the more easterly stream of traffic heading for Kisumu, and also to be near to the cattle - owning Kuria who were "more interested in cattle than the Luo" and reluctant to bring their cattle right into the Luo area for fear of conflict or theft. At Lichota compensation had to be paid to landowners, at a cost of over £K 16,000 and another £K3,000 was to be used for a spray race, fencing (2,500 cedar posts were purchased) and paddocking the area. While this is not yet operational, optimism is not high in view of the experience at Macalder.

There appear to be two main reasons for the failure to use the holding ground at Macalder. The first is that although it was designed to absorb cattle passing along the traditional route to Uganda, it is some distance to the east of the actual route, which passes more directly to Moma Bay from where the cattle are shipped. Traders do not appear to be willing to make the required diversion or to alter the location of their traditional auctions. This unwillingness, however, may be due to the second reason, which is that they would have to leave their cattle in quarantine at Macalder for a minimum of 28 days (a major inconvenience and cost to traders who move from one place to another) and to pay charges of shs 9/10 per head. What has to be remembered is that traders, unlike farmers, are only transient owners of the cattle and have little incentive to vaccinate unless they are actually prohibited from moving or delivering livestock to their destination. But neither Uganda, nor the local butchers at Ahero or Kisumu, require vaccination certificates. Another factor, of course, is the lack of substantial local supplies of cattle for sale which might otherwise have used the holding grounds. Had there been substantial use of the Macalder holding ground the absence of water supplies would have been a major problem, though there is a river from which pipes could have been installed at a cost. What could now be done is to estimate the cost of installing water supplies to permit grazing throughout, and thus the viability of establishing a small ranch either as a state or cooperative enterprise.

The problem of theft is an extremely serious one, and is in large part inter-tribal, provoking what has sometimes almost amounted to local warfare between the Kuria and Luo. This appears to be a major disincentive to cattle - keeping and in particular to cattle improvement. The strength of this disincentive is reflected in farmers' reluctance, already remarked upon elsewhere, even to keep two oxen for the purposes of ox - cultivation.

How important the supposed lack of interest of the Luos in cattle - keeping, or their reluctance to sell cattle, is uncertain. Certainly bride - price in the area - 40 beasts is mentioned - is high. More likely, however, this lack of interest in animal

husbandry reflects the opportunities for cultivation together with the combined disincentive effects of thefts and disease.

#### Milk marketing

Constraints on dairy expansion are output, marketing, and markets. As far as markets are concerned the absence of the K.C.C. in the area is a disincentive. There is the somewhat separate question of marketing facilities: lack of these is responsible for the fact that most of the area's output is marketed in the form of ghee. This itself is a constraint on the purchase of grade dairy cows. A study of marketing was proposed in 1970 but there is no sign of this having been carried out. Since 22 dairy cooperative societies do now exist, this study would appear to be justified. Later the establishment of a central milk cooler was mentioned, from which milk could be sent to the K.C.C. at Sotik; but in 1974 there was "nothing to report" on this proposal.

#### Model dairy farms

The main livestock production project is therefore the establishment of model dairy farms, of which four now exist, for demonstration purposes. The aim is "to demonstrate clean milk production and skill, records and bookkeeping, disease control practices, calf rearing techniques (particularly A.I.) and grazing management." The model embraces the establishment of one acre of mixed grass/legume ley, a dairy shed, including milking space and a store for feed, a calf pen, and <sup>a</sup>relatively elaborate crush.

However these farms do not appear to be appropriately scaled either from the equity point of view or from the point of view of demonstrating and replicating the model throughout the area. The farms would be 25 acres in size, representing a substantial holding in such an area. The estimated cost of shs 10,000 plus shs 1000 for pasture improvement have already forced the abandonment of the plan to scatter such model farms throughout the area, due to limited government funds, without which there is not likely to be much emulation. We may compare this with the average A.F.C. loan for grade cattle in Kakamega District of around shs 4000, which we criticize below as being too large. The constructions in any case appear unnecessarily elaborate, apart from the crush mentioned, with mbati roofing (a relative luxury on a house) over the milk shed, and

concrete flooring.

The other, even more serious doubt, is whether the promotion of grade dairy cattle in the area will go very far in the face of the endemic disease problem which exists. Even the grade cattle on the government farm at Oyani did not look especially healthy. And if dairy were to make a substantial contribution to the local economy it would need to be taken up by a relatively large number of farmers. To achieve this the expansion of A.I. services at a suitable time is to be preferred.

#### A.I. services

Though A.I. is not currently listed as a project, it was listed as project MOA 16 in the 1972-3 Programme. The present service is centred on Oyani Farm, but consisting as it does of one inseminator, without a car (the purchase of a VW was approved but not effected), carries out only about 180 inseminations a year: this compares with 40 per day on a single 'run' in Tetu Division, and 80,000 per year in all. This is indicative of the constraint imposed by transportation: however it is doubtful whether economical runs can be established without a 'clean - up' of the area and a major widening of interest in upgrading cattle. At the end of September, 1973, there were just 57 grade cattle in the area, owned by 16 farmers. This, again, compares with 22,000 grade cattle in Tetu, and illustrates the major indivisibility which exists in livestock development.

#### Dips

Although the dips programme is listed in Migori as a project, response has been significantly worse than in most of the other C.R.D.P. areas. Of the total number of 28 dips planned only 9 have been completed and only 6 are working. This does not reflect any weaker promotional effort, but only that here again an indivisibility is effective. Because cattle in the area are largely Zebu, more or less resistant to tick-borne diseases, there is very much less incentive to construct or maintain dips.

Migori as a non - priority livestock area

While it is likely that piecemeal establishment of livestock projects in the area will not be very successful in the absence of a major offensive against the disease problem there are sound reasons for delaying all - out efforts in Migori. In the first place even if this problem were dealt with, there remains a serious one of cattle theft. Secondly, there is good sense in permitting the transit trade from Tanzania to continue as it is for the present. Such movement is as essential to the East African common market, to which Kenya is committed, as trade in manufactured goods. And, a more direct consideration, perhaps, it provides important supplies of beef for Kisumu and the surrounding areas. It is very doubtful, also whether efforts to stem this trade could be effective at this time. Finally, while it may be necessary to grapple with this problem at a later date it seems better to concentrate livestock development efforts where returns will be more immediate, and to re - double efforts here later when success has hopefully been achieved in extending the 'clean' areas further south towards Kisumu.

The grade dairy cattle programme in Kakamega District

If we come to discuss animal production in Kakamega District, we shall be discussing mainly dairy cattle: with overpopulation and very small farm sizes, beef production is not likely ever to be feasible, and the locality can be expected always to be a deficit area for beef. At present Kakamega is an important market for Mandi beef, which is brought in on hoof direct, for sale in County Council auctions. On the other hand there is a high demand for milk, which can be produced on small farms, as demonstrated elsewhere in Kenya; although the Vihiga - Hamisi divisions alone are estimated to produce 1,700,000 gallons of milk, another 700,000 gallons, nearly half as much again, are imported.<sup>2</sup>

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<sup>2</sup>. H. Bellamy, Evaluation of Cattle Dips in Vihiga/Hamisi Divisions, Vihiga S.R.D.P., Mimeo., 1974.

It is not surprising therefore, that the main livestock development in the District, including Vihiga - Mamisi, is the grade dairy cattle programme. This programme, and related aspects such as grade cow mortality, has already received the attention of several investigators; but because of their contradictory conclusions and recommendations, as well as the importance of the programme, further careful examination is required.

The programme is based on an J.D.A. credit scheme channelled through the Agricultural Finance Corporation in Kakamega, which issues loans covering the purchase of cattle, fencing, dairy equipment, water development and pasture improvement. Though the project was begun in the 1960's it was in the 1970's that substantial financing became available. It was incorporated into the C.R.D.P. in 1970, but loans are distributed throughout the District and not confined to the Vihiga - Mamisi Divisions, as Table 5 shows. The plan in Vihiga - Mamisi was to introduce 100 grade cows in 1970 and subsequently 300 each year during the period 1971 to 1976. Loans were issued at 8 per cent interest, repayable in 5 annual instalments, with an initial 15 - month period of grace before the first instalment.

The prima facie case for high returns from grade cattle is the differential milk yield as compared to local Zebu cattle. A specific survey carried out in the area by Bellamy covering 12 grade and 28 Zebu cattle showed daily yields per cow of  $1\frac{1}{2}$  gallons and  $1\frac{1}{2}$  pints respectively. Data quoted by Weisel showed an advantage for grade cattle of 3 to 4 times the daily output of Zebu cows. Harmon and Zalla refer to 'impressive' <sup>milk</sup> yields in the area of 500 gallons per lactation.

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3. In addition to Bellamy, loc. cit., investigations have been carried out by P. Weisel, "Grade Cattle - Vihiga/Mamisi CRDP, A summary analysis," Discussion Paper No. 7., Vihiga C.R.D.P., September, 1974; and by E.D. Harmon and T. Zalla, A U.S.A.I.D. Sponsored Evaluation of the Vihiga Special Rural Development Project, Kenya, U.S.A.I.D., Nairobi December, 1974.

Division	I.D.A. Loans Approved		Estimated Grade Cow Population	
	1973	1974	1970	1974
Lurambi	208	173	550	950
Mumias	64	11	200	200
Central	47	106	250	300
Vihiga/Hamisi	52	47	300	600

Table 5. I.D.A. Loan Approvals by Division, Kakamega, related to Grade Cow Population.

SOURCE: Harmon and Zalla, loc. cit.

(Note: loans include all items, not just grade cattle; grade cow estimates extremely rough.)

The main problem has been the incidence of tick - borne diseases resulting in the deaths of expensive animals. Bellamy calculates a mortality rate of 61.4 per cent up to 1974 among animals purchased between 1968 and 1972. This is itself not a very meaningful figure, since deaths are cumulated above a period of several years, and a more accurate picture is given in Table 6. This shows that the mortality

	1968	1969	1970	1971	1972	1973	1974	1975
No. of animals alive at start of year	27	47	108	208	196	204	180	146
No. of deaths during year	3	7	15	31	37	37	34	-
Percentage dying during year	11	15	14	15	19	18	19	-

Table 6. Mortality among IDA - financed grade cattle, Vihiga - Hamisi, 1968 - 1974

(Derived from figures provided by Weiscl, supplemented by Harmon and Zalla)

\* Bellamy, loc. cit. There is an arithmetic error in Bellamy's table, however, and the mortality rate may be nearer to 50 per cent. Table 6 implies a corresponding figure of about this value.

rate although actually increasing over the period is currently just under 20 per cent a year, compared with what Vermon and Balla consider as 'reasonable' under competent management, 10 per cent. The existing rate implies a life per cow of around 5½ years.

Weisel, the Programme Analyst in the area, carried out some farm - level research in order to estimate the gross margin per acre (value of output less total variable costs, but including depreciation of the cow) for 'average' farmers in grade cattle and in alternative farm activities. These he found to be as follows:

Activity	Gross margin per acre (shs)
Grade cattle (for a stocking rate of 1.25 acres)	856
Maize (one hybrid, one local variety crop p.a.)	774
Maize (two hybrid crops p.a.)	1,040
Sunflower (two crops p.a.)	960
Hybrid maize and sunflower (one crop each)	1,010

Table 7: Gross margins per acre for grade cattle and other activities, Vihiga - Masisi: estimates by P. Weisel.

On the basis of this data Weisel concludes that grade cattle are not the most profitable farm activity for the area.

It has been pointed out, however, that Weisel's figures exclude from the cash returns the value of the offspring (one calf per year) of the cow. Given the small difference in gross margins calculated of around shs 150 between grade cattle and other activities, this itself would wipe out the advantage of the other activities. There may also be other errors of calculation which bias the results. Just before presenting his gross margin results, Weisel calculates average milk production per year over the 6 years of the project as 27,940 gallons, assuming 375 gallons per cow year of production. The error may be related to the mortality rate assumption, as Weisel refers to Bellamy's somewhat misleading figure of 61 per cent: using the data of Table 6, the number of cow years of production during



1968 to 1974 would be 803 cow - years or more accurately, if acquisitions and deaths were assumed to be evenly spread over the year, 734 years. These give estimates of average annual output of 43,000 and 39,000 gallons respectively, about 50 per cent above Weisel's estimate. If this error is <sup>carried</sup> over into the gross margin calculations (this is not clear from the information provided), it would reverse the results, in favour of grade cattle as an activity. Even if Weisel's figures are accepted as their face value, however, his estimates are based on partial analysis, whereas the case for the introduction of grade cattle we make here is based on the simultaneous adoption of a number of measures, particularly relating to disease control. Given the relatively small differential in gross margins cited, the effect of reduced mortality associated with a major reduction in the incidence of disease would be easily to reverse these results. It is important also to consider long term strategy, as well as immediate results.

Harmon and Zalla in any case do not agree with these results. They state<sup>5</sup> that "Incomes to farmers from grade cattle under average management conditions are considerably better than expected average incomes obtainable from hybrid maize, sunflower, or Mexican 140 beans in any combination when poor crop years and reduced yields during the short rains are considered. This is in spite of current very high mortality rates." If the latter are reduced, as we should envisage, the difference is even greater, for

"A farmer who is able to hold cow and calf mortality to 10% and manage his cows so as to calve every 14 months can obtain a gross margin of 1500/- per acre under current average stock rates and 1800/- per acre at one cow and calf per acre. Many farmers are already achieving this."

Our view, therefore, is that grade cattle should be considered a priority farm activity both in terms of short and long term objectives. A separate question has been raised by the other investigators, however, regarding whether a credit programme is necessary or desirable for the achievement of this goal. Details of the credit programme and its impact on the numbers of cattle are given in Table 8 and 9. This shows that despite the mortality problem

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5. Harmon and Zalla, loc. cit, p. 19.

	1968	1969	1970	1971	1972	1973	1974	Total
Total no. of grade cattle purchased	41	42	77	129	86	112	na	500+
No. of grade cattle purchased with I.D.A. loans	27	23	68	115	19	45	13	310
No. purchased without I.D.A. loans	14	19	9	14	67	67	n.a.	190+
No. of farmers receiving loans	11	10	26	55	10	20	5	139
Total I.D.A. loan funds expended ('000 shs)	12.0	31.3	112.3	176.3	28.6	84.4	30.4	507.3

Table 8. Purchases of grade cattle in Vihiga - Mamisi, Kakamega District, 1968 - 1974.

the numbers of grade cattle in the area have continued to expand: over 500 cattle have been purchased during the six years and the number of grade

	1970 <sup>1</sup>	1971	1972	1973	1974 <sup>2</sup>	Total 1970-74
No. of applications	127	131	63	172	243	736
Loans for cattle	249	264	142	432	632	1,699
Other livestock-related loans. <sup>3,4</sup>	167	138	69	217	256	847
Total, livestock-related loans <sup>4</sup>	416	402	211	649	888	2,536
Total, all loans	665	666	353	1081	1518	3,197

Table 9: I.D.A. Credit approvals, Kakamega District, 1970-74.

SOURCE: A.F.D., Kakamega.

(1) From April only

(2) Until November only

(3) For dairy equipment, fencing, water development, and pasture improvement

(4) (excluding poultry).

milking cows in the same area increased from 94 in 1968 to 491 in 1974. The importance of the dairy grade cattle programme within the AFC programme of agricultural credit for the District is given by the fact that 2½ million shillings out of 3 million for 1970-74 were used for cattle - related investment, about 83 per cent. The amount of funds invested has been maintained at a high and rising level over the five year period, particularly expanding in 1973 and 1974.

One important question which has to be considered is the impact of this credit programme on income distribution in the area or, at least, its equity aspect. From Table 9 it may be calculated that the average loan per applicant during the period 1970-74 was shs 4,285, and if a number of small loans for purposes other than grade cattle were left out of account, the figure for livestock loans would be greater still. The tendency to favour richer farmers was accentuated by an AFC policy of not offering loans to applicants without the title deeds to a policy of 5 or more acres, in an area, Vihiga - Namisi, in which the average farm size is 3 acres, or even less. This requirement may in fact not have been crucial, because loans actually went to farmers with much more than 5 acres. Weisel refers to a survey of 350 farmers in Vihiga - Namisi which showed the following results for grade cattle loans and a random sample of other farmers:

	average farm size (acres)	average non-farm income (shs.)
Grade cattle loans:	11.1	234
Other farmers:	3.0	138

Table 10: Bias in A.F.C. credits towards larger farmers.

For this reason the recent dropping of the 5 - acre requirement may not bring a significant change unless a deliberate effort is made to assist smaller farmers. Whereas Weisel, impressed by the high level of animal husbandry required for grade cattle or, alternatively, by the high cattle mortality rate in its absence, suggests 'the dropping of the existing objective of equity in income distribution' in order to ensure only skilled farmers receive grade cattle, it may be pointed out that grade cattle are

being very successfully kept in Central Province on no more than 5 acres. What is required is a frontal approach on the disease problem in the area in order to drastically reduce the risks to grade cattle. Apart from the equity aspect, the advantage of securing as wide a distribution of grade cattle as possible throughout the area is to improve nutrition by making cheap milk direct from the cow widely available. Already milk is fetching one shilling a litre in Vihiga in the local market, and farmers with a milk surplus are able to sell it to neighbours who will send their children with assorted containers to buy milk. Harmon and Zalla say that 'most of their milk is sold to neighbours.' This substantially reduces the price of milk by eliminating middlemen, in particular by not requiring the intervention of the K.C.C. In a seriously over-populated area such as Vihiga - Namisi, this nutritional benefit from the wider distribution of milk is potentially of the greatest importance.

Tetu's dairy production project, which was conducted as part of the C.R.D.P., might provide the right model for Kakamega District to pursue, thus securing the CRDP objective of replication, from Tetu into Kakamega. Here again credit through the A.F.C. for the purchase of grade cattle was involved, but the procedure was to start by selecting 300 farmers on a randomized basis for training in farm management and dairy production at the local Mambugu Farmers' Training Centre for a period of just one week, initially during March, 1970. None of the farmers selected owned grade cattle. Those who were less keen to proceed and those less obviously suitable were eliminated and the remaining 100,25 from each of four locations, offered credit for the purchase of just one or two grade cattle each. The average acreage owned by the farmers was only slightly higher for the sample group than the average of 4.8 acres in Tetu. Later, because of the scarcity of pasturage, credits were made available for folders, apparently with success, and even zero grazing has been successfully carried out in some cases. The scheme has since been multiplied, and now about five times the original numbers are said to have obtained cattle, partly by purchase from the first group, also passing through the short course of instruction at the F.T.C. This would suggest that the management problem can successfully be surmounted, in favourable conditions at least, without favouring large farmers and despite spreading the assistance much more thinly, including to those who are newcomers to the particular activity in question.

One negative aspect of the IDA - credit scheme in Kakamega is the high rate of default: in March, 1974, the loan repayment rate was equal to only 31 per cent. This is just one of the factors underlying the Harmon/Zalla recommendation that the IDA - credit programme be dropped from the Vihiga SERP, and presumably elsewhere. This is a highly surprising conclusion (shared however by Weisel) in view of their assessment of the returns from milk production. The conclusion is based on

1. the default rate.
2. their view that management (including dip - back up), not finance, is the obstacle to expansion
3. that farmers do not need the loans, and that "farmers are no longer coming forward to take up the loans in any significant numbers. Most are getting animals on their own."

Weisel also suggests that finance is not the limiting factor and that the high default rate may suggest the lack of "need" for credit. But it is difficult to see the connection between failure to repay and lack of need for credit. Failure to repay may be due either to inability to repay (which may arise out of the premature death of the grade cows) or unwillingness to repay (which is a function of inadequate supervision of loans and insufficient pressure to repay). To separate these two elements it would be useful to calculate default rates separately for borrowers experiencing and not experiencing serious mortality of cattle.

The second argument against providing credit is that management and standards of animal husbandry are the real constraints, rather than credit. This view is based on the high mortality rate: however Harmon and Zalla's calculations show that despite the mortality rate returns from grade cattle have been relatively high, and this no doubt explains why even without loans a great number of grade cattle have been voluntarily acquired (67 in each of 1972 and 1973). The Tetu extension experiment described above in any case suggests that the management bottleneck can be overcome or reduced. And if a frontal assault on the disease problem were to be adopted, as proposed below, the mortality rate should be considerably reduced.

The third argument is that credit is no longer needed, that "fewer farmers are coming forward for loans," and that "the people getting the loans are not those in need of credit." As regards the last point, if the attempt were made to distribute cattle among even more small-scale farmers, following the method of the Tetu experiment, this would not apply. While it is true that in 1972 and 1973 only 30 grade cows were purchased with I.D.A. loans, compared to 133 without, this is not a reason for slowing down the conversion from Zebus to grade cows, but maintaining its momentum. The percentage of grade animals is still fractional, and the need is to increase it, over time, towards 100 per cent, as we describe in the next section.

It is important therefore not to abandon this credit scheme, but rather to expand its scope, and place it within a wider framework of extension and disease control activity. Weisel also criticises the use of a subsidised rate of interest, and recommends that a commercial rate be applied (and to all smallholder credit, not merely dairy cattle). However 8 per cent does not appear unduly low, and since finance for development projects in large-scale manufacturing and other sectors is frequently available at this rate, Weisel's suggestion might bias investment against rural development. In fact the current balance of opinion is very much of the view that credit availability is biased against the rural sector and in favour of attempting to offset this in various ways. The much greater subsidy, and the most inequitable, arises out of a failure to chase defaulters, who may be relatively well-to-do. Efforts should be concentrated on reducing this default rate.

#### The Case for Making Kakamega District a Priority Livestock Development Area

It will appear odd, perhaps, to livestock specialists and officials to single out Kakamega District as a priority area for livestock development. One might more likely look to areas with plenty of grazing and a substantial surplus of cattle: whereas Kakamega is a deficit area in respect of both beef and milk supplies. In fact Kakamega is a suitable candidate for a frontal attack on disease elimination followed by intensive livestock development on the pattern of Nyeri District.

The area is contiguous to the 'clean' area of Kitale District and the aim would be to extend this belt southwards to include the more populated parts of Kakamega, and later on to expand the area further to the west and south in the direction of Busia and Kisumu. Already, according to an observer, 'it is almost impossible to move animals out of this district', because of the strict quarantine required of not less than 28 days in a government holding ground, and an additional 20 days for movement from Kakamega to Moi's Bridge. The area is well - designed for an effective disease eradication campaign in that cattle are generally tied, as in Nyeri District, and with plots mostly demarcated and adjudicated, unnecessary livestock movements are reduced to a minimum. The overpopulation of the area not only creates a need for non-land - intensive cash activities but has produced small plots and intensive agriculture which affords the greatest guarantee of grade animals being properly looked after.

The potential arising out of substitution of grade for local cattle appears tremendous. According to Bellamy's estimates for Vihiga - Kamisi only 1,333 out of 40,000 cattle 3.3 per cent, are grade cattle.<sup>6</sup> Weisel gives a figure for the number of grade cattle in Vihiga - Kamisi in December, 1973, of 1,304. Of these 491 were cows, compared to 23,400 native cows, a ratio of 2.1 per cent only.

A legitimate question is where the market would come from for the increased milk supplies associated with a large - scale substitution of grade cattle.<sup>7</sup> Weisel calculates that 'import - substituting' production of the present 700,000 gallons deficit would require only an additional 1,565 grade cows. This itself, being five times the present level, indicates scope for considerable expansion of the existing programme: but would not support the large - scale transformation envisaged here. The primary objective however would be to substantially increase local consumption of milk per head by increasing its availability and lowering prices. The scope here is itself large. Once local demand is fully satisfied however, the K.C.C. could no doubt intervene to purchase milk for export outside the area. At the same time if milk prices are to be reduced, it would be useful to reduce production costs also,

6. H. Bellamy, loc. cit, table on p. 2. We have assumed the figure of 85,430 for local cattle in North Maragoli is a misprint which should read 5,430.

7. It is of course not necessary that the present number of cattle be maintained. With the introduction of grade cattle, the total numbers could be substantially reduced, releasing land for other purposes.

in particular the cost of grade cows: this suggests much greater emphasis on the upgrading of the existing stock through A.I. services as compared to expansion of the present A.F.C. dairy cattle programme. This also has advantages from the equity aspect.

There are a number of promising indicators of progress in the area which encourage optimism.

The number of grade cows in Vihiga Hamisi has increased from 94 in 1968 to 491 in 1974. Cattle sold through auctions in Kakamega District has increased by 40 per cent in four years, from 23,733 in 1970 to 33,074 in 1974 (although this includes imported animals and is an index of consumption rather than production). As mentioned already, the dipping programme in Vihiga - Hamisi has been disappointing, both in respect of the numbers of dips built, compared to the targeted figure, and the standards of maintenance and operation. Usually, however, it must be said that whereas in 1972 only one private dip was operating in Vihiga - Hamisi, at the end of 1974 13 had been built, of which 11 were in operation.

A most promising element is the success of the A.I. programme in Vihiga. Before the first run was started in 1970, there was already considerable interest in A.I. services, especially in the eastern area, with farmers bringing their animals to the Veterinary Office for service. The East Run now comprises 45 servicing points in the space of some 250 kilometres, an average of one servicing point every 5 or 6 kilometres. The inauguration of this run itself stimulated interest elsewhere, and the West Run, which was started in 1974, now comprises 33 servicing points over a distance of some 120 kilometres. A.I. works well in over-populated areas for a number of reasons: lack of grazing means that farmers cannot afford to keep bulls, and are willing to castrate (more generally, they will be interested in the quality and productivity of animals rather than increasing their numbers); it will be possible with a limited number of runs to reach a relatively high proportion of the animals in the area, increasing the effectiveness of the programme; and it will be possible to operate at lower costs by servicing a reasonable number of animals per kilometre traversed, utilising economies of scale. We recommend therefore that there should be a concentrated effort to expand A.I. services throughout Kakamega District and that this should be seen not simply as a separate 'project' but as part of an integrated



livestock development plan for the area with the upgrading of the cattle population associated with a simultaneous effort at disease eradication.

Livestock development under Kwale SRDP

Excluding the major ranching proposal which we discuss at length elsewhere, there is only one specific livestock project listed in the Kwale SRDP project list: "Animal health and husbandry," listed as HQ1. 8. We did not discover the content originally proposed for this project, which appeared dormant.

Livestock are included in proposals to develop the mixed farming areas, including proposals for agricultural extension. These are still extremely tentative at the moment. A detailed farm plan exists for the Kikoneni area for a 94 - acre farm (38.34 ha.) of which 30 acres would be allocated to livestock and include a dairy farm. In an area in which the average farm size is 20 acres, according to one estimate, this development appears to be highly undesirable from the equity point of view. The proposed costs for cows and fencing alone of approximately shs 16,000 is far too much and out of line, for instance, with the loans of shs. 4,000 being given by the AFC in Kakamega for this purpose, which we have already criticized from an equity point of view; yet this would be only a part of the proposed financial assistance offered. A costing has also been made, and included in the SRDP Review/Replan, for a small - scale dairy unit designed for a 10 - acre farm. Such a unit, estimated to cost shs. 2,400, appears much more appropriate, though we were not able to investigate this further. What does appear to be lacking in support of the proposal, however, is evidence of research or data collection on local farm economics or, despite the importance of the Mariakani milk scheme, on the milk industry. The majority of stock in the SRDP area are in fact in the mixed cropping zone, and it seems possible that the attention accorded to group ranching in the ranchland area has been partly at the expense of research in these areas.

On the whole, this coastal area would appear not to deserve a high ranking in terms of livestock development. Very few grade cows are owned in the area, where there is a lot of tse - tse and tick - borne disease. At one time a considerable number of grade animals were kept in the Mhinda Hills, mainly by Makamba settlers, but most of these died in 1970-71 as a result of drought and an outbreak of R.C.F. Moreover the Digos who constitute the main part of the population in the coastal strip and mixed farming area are much less interested in livestock than the Durumas who live further inland for the most part. The potential however remains largely unexplored, and the main need seems to be for more farm - level research relating to both livestock and crops.

#### Livestock possibilities in Kapenguria

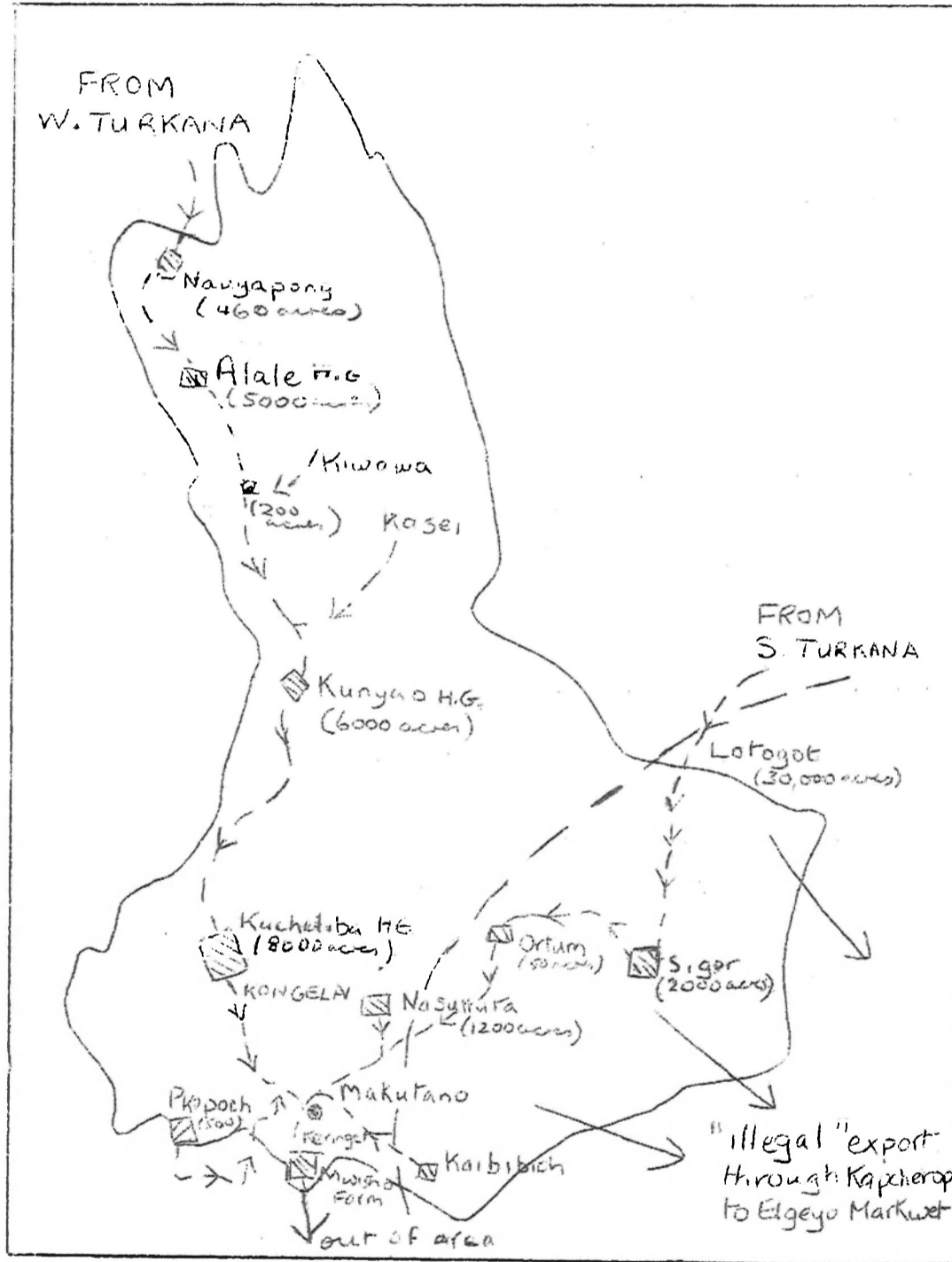
The most important livestock proposals in Kapenguria relate to the establishment of group ranching in the lowland area, prospects for which are discussed in the next chapter.

#### The Stock Route System (Livestock Marketing)

Partly related to this development was a major proposal for a system of stock routes passing through the area from the north and comprising a series of holding grounds and smaller outspans to be equipped with water and other facilities and used as staging posts for the shipment of cattle. These stock routes can usefully be seen as a part of a planned national system for which considerable World Bank finance has been made available.

The stock routes had two aims. The first was to funnel cattle coming down from Karapokot and Turkana in the north towards Kapenguria and down to Kitale via the major collection centre at Mwisho Farm. Fig. 1 indicates the position of the stock routes and the various holding grounds and outspans to be provided. Part of the purpose here was to give protection to the 'clean' area of Trans Nzoia, especially from contagious bovine pleuro pneumonia (CBPP) which is a particularly serious disease in the north but also to facilitate the movement (and thus sale) of the cattle themselves by providing inoculation and quarantine facilities at each holding ground. Secondly, and perhaps primarily the aim was to stimulate local sales of cattle, especially from the lower areas, and it is for this reason that the establishment of stock routes was to be combined with energetic

Fig. 1: The proposed stock route system in West Pokot



campaigns to persuade owners to sell. The previous IDG evaluation described the proposal as follows:

"To help facilitate increased marketing of cattle the Programme calls for the acquisition of a large holding ground/sale yard (Swisho Farm), reorganizing existing holding grounds and sale yards and improving facilities on each, and the establishment of new holding grounds. In addition an intensive effort to organize regular livestock markets in collaboration with UNO buying agents was to take place."

Apart from the physical amenities offered for facilitating the movement of cattle, and perhaps for the fattening of cattle at holding grounds (little was said of the detailed mechanics of the latter) protection would be offered against the periodic paralysis of the whole marketing system when auctions need to be cancelled as a result of disease outbreaks, since cattle would always be free to enter quarantine at holding grounds and to be sold immediately on arrival there. Quarantines would be much more effective than in the past when owners retained their cattle after inoculation and were supposed to keep them in isolation for 21 days thereafter.

The new system, taking over from the old County Council salesyards, came into operation in June, 1972, although some holding grounds were not fully equipped. This is still the situation, and many of the other specific problems in establishing the system described by Burns in the last I.D.G. evaluation have not been resolved. At Masukuta, the major holding ground near to Kapenguria, is said to have been "deserted" by L.M.D. staff as a result of a misunderstanding between L.M.D. staff and the population.<sup>8</sup> The same report describes the acquisition of Kacheliba holding ground, the main one for the western stock route and for the group ranching area as "deadlocked", together with that at Thopoch, also near the Pkopoch ranching area. At Kacheliba where the people had agreed to release

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8. op. cit, p. 4.5

9. Annual Implementation and Evaluation Review, Kapenguria, 1974.

8000 out of an original 10,000 acres (of very low carrying - capacity land) they are now unwilling to give any. At Pkopoch, which is intended to serve the local Rima area, the Land Adjudication Department have allocated only 500 acres out of the 2,500 wanted by the L.M.D. However, people still exist in the area who are reluctant to move. Some problems remain at the Sigor holding ground, and even at Mwisho Farm construction is not yet complete.

There are other, more fundamental problems, however. As indicated in Fig. 1. there is a considerable illegal movement of cattle towards the south - east which ignores the new system. This passes through Kapcherop and down the eastern side of the Cherangani Hills to Mlgoyo Marakwet. One estimate put this at about one-third of the total movement, this third coming mainly from Sigor Division, Leland Location and perhaps half of Kapenguria. How far this is a diversion for the purpose of avoiding quarantine restrictions (since these may be encountered again towards Kaptagat) and how much a natural flow is difficult to say. In the light of the failure also in Migori of the re - designed stock routes to trap the natural flow, however, it seems worth suggesting that more careful study by L.M.D. is needed of traditional trek routes as part of the planning of improved routes.

The second aspect is the apparent absence of cattle - owners and traders anxious to use such facilities, particularly at Mwisho Farm, as have already been provided. A contributory factor is of course, that the group ranches proposed have yet to 'get off the ground', but it should not have been expected that these would have increased sales very quickly. The north - south traffic through Mwisho Farm also does not appear to have materialised, until because of the cost of upkeep there is a project committee suggestion in January, 1974, of 'handing the farm over to West Pokot' or otherwise disposing of it. Finally, another major problem making traders reluctant to use the holding grounds is the inconvenience of the quarantine period which necessitates return trip to the area after 28 days, and 'locks up' their working capital in the interim. Moreover since the appearance of traders in the area is usually erratic, and the numbers small, it is difficult to organize auctions in conjunction with

the routes. The numbers of cattle are also erratic, so that there may sometimes be a great many cattle, and few traders, or vice versa.

There has therefore already been a considerable investment of time, and potentially of money, in the stock route system, without the anticipated development effect on the livestock economy. While closer investigation of the relevance of the system is clearly required, it may be that the basic approach is not the right one. In the next chapter we suggest that in the ranching area the D.R.C. should be appointed as a local buying agent for the L.L.D. or a new cattle - marketing organization so that he could purchase occasional cattle as they are offered for sale (to assist de - stocking as much as to provide a market).

It appears that in the area as a whole, including the north, the number of traders is small and their appearance erratic, while they are reluctant to pass cattle through quarantines and thus to use the routes provided. Consequently livestock - owners may have to travel long distances, with adverse effects on the cattle moved, to reach highly unreliable markets, involving a risk which must act as a considerable disincentive to sale at all. In the case of maize and other food or cash crops it has often been accepted in East Africa and elsewhere that incentives to producers can usefully be improved by institutionalised marketing arrangements or guaranteed minimum prices.

Consideration might be given here therefore not to comprehensive state marketing but to intervention through buying agents to guarantee sales at scheduled auctions at some pre - announced 'floor' price, which might be variable seasonally or from year to year. Such prices would be fixed low enough that traders attending auctions and offering reasonable prices would be able to make successful bids: but owners would be guaranteed a sale for beasts of 'fair average quality' (the problem of grading and valuation would obviously have to be gone into) without having to return with their beasts from an auction. At the same time the buying agents could attend auctions arranged in the northern areas and could bring cattle down through the scheduled stock route system, performing all necessary inoculations, thus ensuring that benefits from this system are obtained. This suggestion does not

represent a departure from principle since, as mentioned above, it was intended that K.M.C. buying agents should be directly involved in efforts to expand market opportunities. This does not appear to have happened, and while K.M.C. (Coast) is prepared to buy on hoof, K.M.C. (Athi River) does not do this. While it should not be necessary to subsidise the operations described, there does appear to be a need for some intermediary between the K.M.C. (and other local outlets) and cattle - owners in the more remote areas which would be charged with a more clearly development - oriented role than the K.M.C. is able to assume. If anything at all is to be done, on the production side, for the "peripheral" pastoral societies in Northern Kenya, it clearly must focus on livestock: if the system of stock routes is by itself likely to prove ineffective, this form of 'minimum intervention' should be considered.

#### The introduction of grade cattle

There is considered to exist a high potential for dairy cattle around Kapenguria, where it is thought that numbers "could be increased to 5000 within five years." At present there are about 1300 - 1500 dairy animals of mixed exotic stock (especially Guernsey) concentrated in Mnagei Location around Kapenguria. The quality of the animals is poor because of the low quality of the founding stock (often culled cows from Trans Nzola), as well as due to poor management.

The main obstacle to development is disease. Kapenguria is at the junction of the two major stock routes converging on Iwisho Farm. This is an area in which there is a continuous movement of Zebu cattle back and forth under the traditional Pokot system, as well as a considerable amount of stock theft, which spreads disease. Although grade cattle owners fence, and use spray pumps, mortality among grade cattle has been estimated as high as 30 or 40 per cent.

Credit for the purchase of dairy cattle has been quite limited so far, although 34 Ayrshire were recently obtained by farmers belonging to the main cooperative society on a special Cooperative Credit Production Loan, to be repaid through milk delivered to K.C.C. at Kitale. Difficulties in obtaining title deeds has hindered the expansion of loans, though recently 12 out of 18 farmers applying had loans approved, subject to membership of the cooperative and to improvements in relation to fencing and

padlocking, for the purchase of 2 or 3 cows each. Title deeds will be given to these farmers. The fact that the farmers already had an average of 10 grade cows already raises a serious question of equity. This may be justified in this case because of the particular need for careful management and protection against disease; but the possibilities for a wider distribution of grade cattle holdings within the cooperative society should be investigated.

At present K.C.C. (Kitale) send a vehicle daily to collect milk. Although the local price of milk is higher, cooperative members prefer the more reliable market (in periods of excess supply) which this provides. Despite the disease problem, therefore, there is a case for pursuing efforts to expand milk production within a circumscribed area (i) <sup>because</sup> of the K.C.C. market, (ii) because of the absence of major production alternatives in the area.

#### Bull camps and artificial insemination

The introduction of bull camps was a 1973-74 project for the purchase of 15 pure-bred bulls. Only five were bought, at a cost of shs. 2,000 each, of which one died.

Two factors contributed to failure. First, although these may have in theory an advantage over A.I. in more remote areas, the disease problem and form of livestock organization in such areas makes returns from upgrading uncertain. Secondly, the purchase was made without adequate consultation among S.R.D.P. officials, so that no satisfactory arrangements were made for the effective utilization of the bulls by farmers. To ensure some utilization the bulls were sold to farmers at shs. 800., a subsidy of 60 per cent, with the intention that they each be shared among four farmers and other neighbouring farmers charged for bull services, an arrangement which appears problematic.

While further bull camps are not planned in Mhagei, there is a current proposal for one in Leland Location, which should be looked at very carefully.



While bull camps have been abandoned in Mnagei in favour of A.1 (Project MOA 6), 'not much progress' is reported on this front. The original plan for a mobile service with roadside crushes has been abandoned<sup>10</sup> in favour of a static point system which implies a decision, which appears wise, to abandon any attempt at general upgrading in the area.

#### Sheep and other developments in Leland Location

An extremely promising project is the sheep smallholder credit scheme in Leland. Although Corriedale sheep were introduced into the area in the early 1960's, failure to look after these properly and lack of credit for the purchase of new stock led to a high degree of interbreeding and a decline in the quality of the stock and volume of wool production. At present there are about 2,500 woolsheep and local hairsheep in the area.

The scheme, which was initiated with 8 farmers in October, 1972 is for the supply on credit of new pure bred Corriedales from Molo. Each farmer receives one ram and ten ewes. All necessary drugs are supplied during the first year, together with supervision in dipping, foot - trimming and general maintenance. Lambs are not to be disposed of without consultation, and to avoid inbreeding rams are to be circulated among participants every two years. After one year the farmer is to return one ram, after two years a second, and after three years returns the capital in kind of one ram and ten ewes. Cash is not involved. By September, 1974,

98 sheep had been supplied under this SRDP programme. The plan is to supply 24 farmers by 1974 (8 farmers a year), that is, 264 pure bred sheep.

If wool prices are maintained, the prospects appear very good for this development in view of the excellent pasture in the area and improved access now provided by the road. Proceeds from wool increased from shs. 19,000 in 1972 to shs. 81,000 in 1973. One farmer visited had earned shs 1,350 the previous year. In view of this the scheme is quite conservative in a number of ways. If we count a ram as equivalent to two ewes, the farmer must, in addition to paying off his loan within three years, pay a rate of interest

10. Annual Implementation and Evaluation Review, 1974.

equivalent to approximately 12 per cent. These are quite stringent terms for rural smallholder credit. Secondly it is not clear why there should be the degree of self -- sufficiency envisaged in the provision of new stocks: at the planned rate new stock would equal only 10 per cent of the total after three years, despite the low productivity of local sheep, the large average size of holdings (of 200 to 400 acres), and the high degree of understocking. Finally it may be pointed out that the farmers selected so far all had forty or more sheep already. How far this restriction is necessary, and what the possibilities are for assisting new and less well - established farmers, might be investigated.

There is considerable local interest in obtaining loans for grade dairy cattle. However because of poor communications, the plan is to start with beef cattle, introducing dairying later. Five Aberdeen Angus beef bulls have apparently been already ordered for breeding purposes. Farmers are to be grouped in order to make communal use of bull services. With each bull serving forty to eighty cows a year it is hoped to produce 300 half - bred calves in the first year.

The problems associated with communal sharing of bulls have already been mentioned. There are considerable advantages for A.I. in such an area which is extremely compact, comprises high potential land, and is unusually easy to protect, as a highland 'island', from disease.

#### The example of Tetu and Nyeri District

We have already discussed the interesting approach to dairy production extension carried out under the Tetu S.R.D.P., in relation to possibilities in Kakamega District. Apart from 'dips' listed as a project here in Tetu as in other SRDP areas, and pigs and poultry, which was discussed separately, the only other livestock project listed is in beef production, which originates from the 1969 list of SRDP projects but has never been pursued.

While it is therefore not necessary to discuss further projects here, it is useful to compare livestock developments in Tetu, and in Nyeri District generally, as a guide to the long term development at which other areas might aim, in line with the S.R.D.P. goal of replicating good experience.

While other S.R.D.P. areas (and other areas) are 'experimenting' with the introduction of grade cattle on a small scale and often to progressive or 'model' farmers as in Migori, Tetu Division in Nyeri District is approaching the position where most or all cattle will be grade animals. Table 11 shows that the percentage of grade animals in Tetu

	1969	1970	1971	1972	1973	1974
Grade cattle over 1½ years	3,410	15,297	12,164	8,961	13,651	14,722
Grade cattle under 1½ years	12,451	4,681	4,550	8,530	6,650	7,339
Total, grade cattle	15,861	19,978	16,714	17,491	20,301	22,062
Indigenous cattle over 1½ years	2,673	7,205	6,909	4,365	4,109	3,146
Indigenous cattle under 1½ years	7,055	1,488	1,473	1,643	335	928
Total, indigenous cattle	9,728	8,693	8,382	6,008	4,444	4,074
Percentage grade animals, over 1½ years	56	68	64	67	77	82
Percentage grade animals, under 1½ years	64	76	74	84	95	89
Percentage grade animals, all ages	62	70	67	75	82	85

Table 11: Grade and indigenous cattle in Tetu Division, 1969-74.

SOURCE: Tetu Division Annual Reports.

(NOTE: Figures for earlier years especially, may be inaccurate)

Division was approximately 85 per cent in 1974 and likely to equal 90 or 95 per cent this year. The percentage of grade animals in Nyeri District as a whole is not quite so high, but not far behind, as shown in Table 12: in 1970 the percentage of grade animals was 59 in Nyeri District as a whole compared to 70 in Tetu Division. An indication of the benefits from the conversion to grade cattle can be observed in Table 13. Despite an already high production level of nearly <sup>four</sup> million kilogrammes of milk in 1972, production of milk <sup>in</sup> Tetu Division was nearly doubled within two years. Price

	1955	1959	1961	1965	1970
Grade cattle	1,000	4,500	8,650	30,000	53,000
All cattle	65,000	76,000	74,000	75,000	90,500
Percentage grade animals	1.5	6.0	11.7	40.0	58.6

Table 12: The increase in grade cattle population. Nyeri District, 1955 - 1970

SOURCE: M. Cowan, "Patterns of Cattle Ownership and Dairy Production: 1900 - 1965"

	1972	1973	1974	% increase 1972-74
Quantity ('000 kgs)	2,855	6,670	7,450	93
Value (shs. '000)	2,596	4,592	6,697	158

Table 13: Milk production in Tetu Division, January - November, 1972-74

SOURCE: Tetu Division Annual Reports.

rises assisted in bringing revenue from milk in 1974 to almost seven million shillings. The contrast with what might have been possible with Zebu cattle is obvious.

At the same time, while many areas are struggling to introduce A.I. services for the upgrading of animals, the problem of the Veterinary Service in Nyeri is not to obtain acceptance but to satisfy demand. Table 14 shows the recent expansion in the number of inseminations in Tetu Division. The number has more than doubled within four years; and

	1970	1971	1972	1973	1974	Total 1970-74
Grade cattle	33,708	42,644	66,277	75,362	74,415	292,406
Zebu cattle	2,632	3,719	4,996	5,058	2,893	19,298
All inseminations	36,340	46,363	71,273	80,420	77,308	311,704

Table 14. The number of artificial inseminations, Tetu Division, 1970 - 74.

(SOURCE: Veterinary Division, Nyeri)

is now averaging 80,000 per annum. Currently nine daily A.I. car runs, three motor - cycle runs and five static point services are in operation in Nyeri District: what amounts to a substantial operation.

It may be argued that this very substantial progress in livestock development has been achieved over a very long period. Certainly the introduction of improved stock started as long ago as the Depression years.<sup>11</sup> There were also some special factors in the area, particularly access to improved stock by purchases from the estates, starting in the late 1920's but most important from the 1950s. The early introduction of AI services was very important. According to Cowan "The main thrust, from 1956, to introduce purer grades of stock came from A.I" although "the most immediate source of upgrading was to come from the purchase of pure grades from the white estates."<sup>12</sup> It was also the case that Nyeri District was well - endowed with entrepreneurs and the high level of farm management in the area was noted as early as 1948.<sup>13</sup> There is however, no reason to think that Kakamega and many other districts are not equally well endowed now.

11. M. Cowan, loc. cit. p. 14

12. p. 56.

13. M. Cowan, loc. cit, p. 36.

One major favourable factor, which must be stressed, is that Nyeri was endowed with a relatively rich, intensive agriculture. This has had two effects. Given the small size of plots, cows had to be tethered, making the control of disease easier, particularly for farmers who were conscientiously spraying, and profits from cultivation could be used to pay for fencing, dairy equipment, and to purchase the grade animals themselves.

However the main points to notice about Table 8 is the relative recency of the expansion in grade cattle numbers, its speed, and its comprehensiveness. In 1955 only 1.5 per cent of cattle were grade animals. After an initial acceleration to 12 per cent in 1961, a major acceleration in the early 1960's took place, to 40 per cent in 1965. This has since continued, up to about 90 per cent, so that conversion to grade animals will soon be virtually complete.

A crucial factor in this was undoubtedly the disease situation. Despite early interest in and access to grade cattle, numbers were not likely to expand rapidly until this was under control. While progressive farmers (athomi) favoured compulsory dipping and stringent health measures, the mass of farmers, owning zebu cattle which are largely immune to F.C.F. and other tick-borne diseases, were less interested in dipping. Thus after Tetu and Thegenge locations in North Tetu Division were declared cattle cleansing areas in 1945, a year later the application of the cattle cleansing ordinance had to be abandoned.<sup>14</sup> According to Cowan, progressive farmers required the general acceptance of improved cattle for furthering the improvement of their own stock, and 'this acceptance was dependent upon the acquisition and survival of improved cattle by the wider range of households.'<sup>15</sup>

This supports the case already made for a comprehensive or frontal assault on livestock improvement in selected areas.

#### The dips programme: a radical proposal

The importance of dealing with the disease problem as a precondition of progress in other projects is clear from our discussion so far. Recognition of this importance is implied in the proportion of S.R.D.P. funds allocated

14. Cowan, loc. cit, pp. 38 - 9

15. p. 78.

in the SRDP areas to the dips programme. Under this programme the government provides 50 per cent of construction cost on condition that the other half comes from self - help. To some extent therefore the experimental content of the programme lies in the method used to elicit a self - help development effort. An indication of success in this direction is given in Table 15. In the case of Tetu Danish assistance was obtained in respect of 12 dips. Despite an earlier start in Tetu, the performance there is impressive: this no doubt reflects the much greater incentive to build and use dips when the majority of people in the area possess grade cattle. In contrast progress in Migori, in particular, has been relatively slow: in 1970, when the programme was launched, 16 dips were in process of being completed, but only 6 of these were operating in 1974. The response in Kapenguria and Vihiga has been quite encouraging in view of the small number of dips functioning prior to the programme (in Kakamega only one in 1972)

	Total number of dips	No. of dips operating	Dips complete but not working	Dips planned or being built
Tetu	44	41	1	2
Kapenguria	30	17	5	8
Vihiga	32	11	2	19
Migori	28	6	3	19

Table 15. Progress in self - help dip construction in four S.R.D.P. Areas

The main problems, however, have been in the effective maintenance of the dips after completion. As the table shows, in the three areas excluding Tetu 10 out of 34 completed dips were not functioning at all, usually because of lack of acaracides and only in one or two cases faulty maintenance. But in addition a large proportion of dips throughout Kenya are understrength, even if functioning. Thus even in Trans Nzoia, one of the 'clean' areas of Kenya the District Animal Husbandry Officer recently reported that due to understrength dips, in particular, tick - borne diseases had been the main problem during the year.<sup>16</sup> Over 50 per cent of dip samples analysed at Kabete, from all over Kenya, are said to be

16. District Animal Husbandry Officers' Conference, Nakuru, September, 1974.

understrength. Even this is likely to be a considerable underestimate, since it is reported in Tetu, for example, that the "doctoring" of samples by the dip caretaker is a widespread practice in Tetu and other parts of Kenya (with cost savings presumably pocketed by the employee). Thus even in Tetu, despite the numbers of dips operational, and conscientious dipping by stock - owners, 34 animals died of ECF in 1974, and 8 of anaplasmosis. In Vihiga owners of grade cows are said to be unable to rely on local dips because of understrength mixtures, and to be forced to use spray pumps. Apart from possible immediate losses due to disease outbreaks, the more serious long term danger is that the ticks develop increasing resistance to acaracides rendering the entire effort ineffective.

The same causes of this state of affairs are reported in all the areas: weak management committees and generally poor organization; lack of 'working capital', that is a shortage of ready funds with which to buy acaracides; and most frequently, in all areas, misuse of funds or materials by the committee or dip caretaker.

Apart from the question of incentive to build and maintain dips, there is the question of incentive to use dips that are operational. In this regard, also, there is a classic divergence between social and private benefit. If an individual owner decides not to dip his cattle because of the dipping charges, say, it will not only be himself who bears the possible consequences: the cattle of other owners in the proximity may be affected. As we have seen, if a majority of owners in an area do not dip, maintenance of grade cattle in the area may be impossible altogether. In Vihiga and Kapenguria grade cattle owners must purchase spray - pumps for this reason. This divergence between social and private benefit (caused by external diseconomies in this case) is reflected in requests by grade cattle - owners, as in Kapenguria, for the introduction of compulsory dipping, and by the disappearance of the problem (and the need to persuade people to dip) once most owners have grade cattle. External diseconomies are particularly great here because indigenous Zebu cattle are highly resistant to tick - borne disease and exotic and mixed cattle highly sensitive to it. As a result Zebu cattle owners have much less incentive to dip, though their activities may impose serious diseconomies on grade cattle owners.



There is, however, considerable evidence that dipping charges have a significant effect on the inclination to dip as well as on the proper maintenance of dips. The cost of acaracides is mentioned in Vihiga as a reason for not maintaining dips. In Migori it is said that 'where dips are complete, they are used only half way or sometimes not at all', especially because of these charges. In Kapenguria it was suggested that the use of dips might double if charges were abolished. A practical one - day experiment in free dipping at Bukuga village in Vihiga is said to have attracted a thousand cattle: whereas the average number of cattle using a dip weekly in this area is low, estimated at around 60, because of the small numbers of cattle. In Kongelai, where special incentives might be needed cattle are said to be dipped on not much more than a monthly basis, a frequency which is likely to be very ineffective.

Accordingly we recommend that throughout Kenya if the budget allows, or otherwise in selected areas as specified presently, dipping charges be abolished for a minimum transitional period of three years and that maintenance of the dips (only in respect of supply of acaracides) be taken over by the Veterinary Department. The budgetary costs of this service will be fairly substantial but not necessarily in relation to other development programmes or to the real costs of not instituting this change, since in the absence of this measure investments in a number of other proposed projects may be lost. Apart from dairy cattle, an immediate loss of investment exists in the form of misused dips: without drastic steps to ensure that the dips which have been built can be used, the labour and financial investment embodied in the dips are wasted. There are also signs in Migori, for example, where self - help dip - building was energetic in / <sup>the</sup> early stages, that as one would expect, failure to maintain the functioning of existing dips seriously undermines interest in further self - help efforts, implying a further loss of investment. It is also pointed out that there is considerable competition for self - help effort from other projects in health or education, and that incentives must be adequate if these are to be diverted to dip construction.

However the main case for this apparently drastic measure is that in the case of livestock development a massive "indivisibility" exists: livestock projects require interrelated investments in disease control, loans to farmers or artificial insemination for livestock improvement, and marketing facilities. Strictly speaking there are two indivisibilities, since partial efforts at disease - clearance may fail, and partial efforts at establishing the livestock activities themselves may fail, if disease is not first brought under control and other investments made. It was also mentioned in relation to Nyeri that widespread interest in bringing cattle under control only occurred as a result of a wide stratum of farmers obtaining access to grade cattle.

Free dipping need not imply a subsidy to one small section of the community at the expense of the rest. In most areas where this would be applied cattle are owned by a large proportion of the community anyway. And the outlay could be retrieved from the livestock owners in other ways in the same way as the cost of other "public goods" is frequently met. In Tetu, for instance, the incidence of tick - borne diseases is estimated to have been reduced by two - thirds since 1966: the extra income generated would much more than pay for the cost of dipping subsidies.

#### A strategy for livestock improvement in Kenya

The existence of the 'indivisibilities' identified above point to a policy of focussing livestock development in particular areas, rather than pursuing projects on a piecemeal basis in all districts simultaneously. Which areas should these be? Table 16 gives rough estimates of the percentage of grade cattle to total cattle numbers in all districts of Kenya for 1970. This data is plotted in Fig. 2, which shows the areas of concentration of grade cattle in Kenya. The degree of concentration in the former 'White Highlands' shows up clearly, but in addition intermediate areas also are indicated. An obvious strategy would be to consolidate the existing 'clean' areas and to extend them outwards in the most convenient directions. This would suggest (a) Bungoma, Kakamega, Nandi and Kericho in the West (with southern parts of Elgoyo Marakwet and Baringo), and (b) Meru, Embu and part of Machakos in Central Kenya.

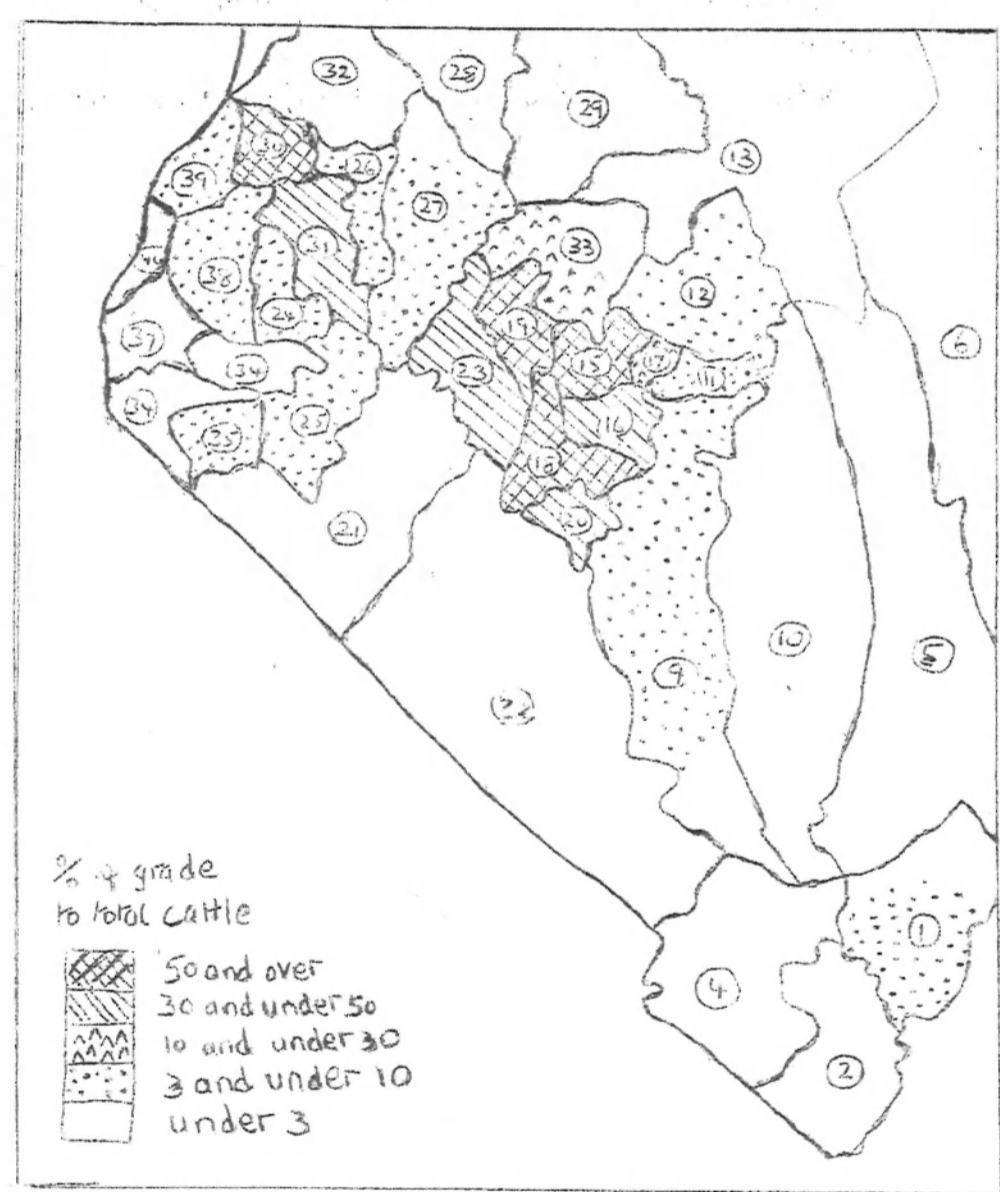
District	%	District	%	District	%
Kilifi (1)	9.1	Nyeri (15)	68.7	Uasin Gishu(31)	47.8
Kwale (2)	0.4	Murang'a (16)	45.1	West Pokot (32)	0.7
Lamu (3)	0	Kirinyaga(17)	16.7	Laikipia (33)	10.0
Taita (4)	2.5	Kiambu (18)	52.4	RIFT VALLEY PROVINCE	7.5
Tana R.(5)	0	Nyandarua(19)	100.0	S. Nyanza (34)	0.2
COAST PROVINCE	1.7	CENTRAL PROVINCE	60.1	Kisii (35)	8.3
Garissa(6)	0	NAIROBI (20)	41.2	Kisumu (36)	1.0
Wajir (7)	0	Narok (21)	0	Siaya (37)	0
Mandera(8)	0	Kajiado (22)	0.1	NYANZA PROV.	1.9
N.E. PROVINCE	0	Nakuru (23)	39.2	Kakamega (38)	6.5
Machakos (9)	4.2	Nandi (24)	9.1	Bungoma (39)	7.1
Kitui (10)	0	Kericho(25)	7.7	Busia (40)	0
Embu (11)	3.6	Elgeyo Marakwet(26)	3.7	WESTERN PROV.	5.8
Meru (12)	4.6	Baringo (27)	5.0	Total	
Isiolo (13)	0	Turkana (28)	0	KENYA	8.4
Marsabit (14)	0	Samburu (29)	0	9,080,000	
EASTERN PROV.	2.0	Trans Nzoia(30)	56.5		

Table 16: Estimated percentages of grade cattle by district, 1970.

(SOURCE: derived from Ministry of Agriculture files)

Fig. 2. Distribution of grade cattle in Kenya.

(Note: derived from Table 16. Numbers refer to districts in the table).



Much later extension into Kisumu, Kisii and South Nyanza could be considered. The map tends to confirm our suggestion that of the present S.R.D.P. areas Kwale and Migori should not be considered priority areas for dairy production, but that Kakamega should. This overall strategy would not of course exclude attempts at initiating "mini" clean areas in specific locations such as those discussed above, or major developments less directly affected by tick - borne disease in the ranchlands and other livestock areas. An appropriate strategy for improvement in the beef - producing areas is not considered here, but needs urgent attention.