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# Large Farm Sector Study Volume 3 Annexes

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Ward Ashcroft and Parkman Limited (East Africa)  
Agip House  
P.O. Box 41425  
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# Annex I

## Review of Group Farms Rehabilitation Project

# Introduction, Summary and Conclusions

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## 1.1 INTRODUCTION

The Group Farms Rehabilitation Project commenced on 26th March 1975, with the signing of a Development Credit Agreement between the Government of Kenya and the IDA. It was prepared initially by the Ministry of Agriculture with assistance from the IBRD Permanent Mission for East Africa and appraised by the IBRD in April-May 1974.

The objective of the project is to assist in the redevelopment of some 90 group-owned mixed farms and 36 coffee estates. It would provide financial assistance for short, medium and long-term expenditure on working capital, machinery and infrastructure. The provision of capital would be associated with improved management. On the mixed farms, a condition of joining would be the acceptance by the farm owners of a trained farm manager recruited and approved by the Agricultural Finance Corporation (AFC). He would subsequently be supervised by AFC through a system of visiting farm managers. Recruited coffee estates would be required either to sign an agreement (approved by AFC) with a management agency such as East African Acceptances or Estate Services, who would be responsible for making all financial and managerial decisions after consultation with the owners and AFC, or to employ a suitably qualified estate manager approved by AFC.

The project would extend over eight years. Recruitment of farms would be completed in four years, and assistance to the last lot of farms recruited would be withdrawn by the end of the eighth year.

Direction for the project would be provided by a Steering Committee comprising members from the Ministry of Agriculture, Ministry of Finance and the Agricultural Finance Corporation. AFC, however, would be responsible for implementation of the project. This would be done by a Large Farm Management Section created within the AFC as part of the project. Assistance in identification and selection of suitable farms would be given by the Land and Farm Management Division of the Ministry of Agriculture.

This review of progress is based on information collected by the consultants while carrying out a survey of farms between July and October 1976, the findings of consultant sociologist and a visit to each of the farms already recruited to the project. The visits were made in January 1977, when results from at least one season's efforts were expected to be available.

## 1.2 SUMMARY AND CONCLUSIONS

### 1.2.1 Farm Recruitment

Ten farms, four coffee estates and six mixed farms have so far joined the project (two mixed farms which applied were found to be unsuitable and have been rejected). If current negotiations are successful a further two coffee estates and five mixed farms may be incorporated before the end of the second year, bringing the total to 17 farms or 31 per cent of the target.

The primary reason for the lack of success in attracting farms to the project is a fundamental dislike or distrust of group enterprise on the part of the farm shareholders. Other contributing factors have been understaffing of the project and poor promotion. Neither the Ministry of Agriculture nor the AFC have met their obligations towards staffing the project. At no time since the project's inception has the establishment of staff reached the complement proposed in the project appraisal document prepared by IBRD in February 1975.

The lack of appeal of the project to group farm owners has resulted in farms being incorporated which would not strictly be regarded as eligible for the project. Two of the coffee estates, Gatatha Farmers Co., and Kiamba Kawainda Co. Ltd., cannot be regarded as genuinely in need of rehabilitation. The former is a wealthy company with considerable assets, managed by an able and experienced estate manager. Kiamba Kawainda had been under rehabilitation at the time of joining and yields were in the order of 1.3 tonnes of dried coffee per hectare. All of the coffee estates recruited have benefited from the project and results have largely been as anticipated.

The mixed farms recruited had accumulated considerable debts and in most instances joining the project represented the only alternative to eventual loss of the farm. Because of the debt burden it is unlikely that any of the six farms would meet the financial criteria for eligibility laid down in the project document, although initial plans and budgets prepared at the time of recruitment indicated that they would.

### 1.2.2 Farm Plans for the Mixed Farms

All the farm plans and budgets for the mixed farms require complete revision, for the following reasons:-

- (a) The land areas, particularly the potentially arable land which are available for group large-scale operations have been over-estimated on all but two farms, Mucharage Farmers' Co-operative and Progressive Farmers' Co-operative.
- (b) The crop and livestock projections are too optimistic. For instance, the milk yields assumed are at least one third above what could reasonably be expected.
- (c) Visiting Managers are now convinced that in the high altitude areas dairy enterprises should be replaced by sheep (this applies to four of the farms). Budgets have yet to be prepared for sheep enterprises.
- (d) On some of the high altitude farms, over-emphasis has been placed on pyrethrum, financially the most attractive crop, as a means of increasing gross revenues. At Kamwaura, for example, 140 hectares of pyrethrum were included in the farm plan, but in practice the maximum area is unlikely to exceed 80 hectares.

The combined effect of over-estimating the arable areas available and the yields has been an exaggerated projection of the revenue-earning potential of each of the six farms.

### 1.2.3 Farm Performance to Date

As described in more detail in Chapter 4, the actual performance of the farms during the 1976 season has not been encouraging. On the five farms with dairy herds milk yields were in the order of 800 - 1,000 kg per cow per year, significantly lower than the levels anticipated for at least three of the farms. Progress has been made on both Milima Mitatu and Kamwaura in clearing arable land of couch grass and in establishing pyrethrum. The benefits of this will be seen in the coming season. On the others, 20 hectares of light bush were cleared at the Mucharage Farmers' Co-operative and 12 hectares of grazing oats were planted. At Mucharage the maize crop suffered from hail damage and yields are expected to be well below the budgeted level. Little was achieved at the Progressive Farmers' Co-operative. Here, wheat yields were well below the budgeted level and the gross revenue is unlikely to meet operating costs for the season. At Mutarakwa Farmers' Co-operative, fencing and infrastructure has been improved while at Mugomo-ini Farmers' Co-operative there has been a complete failure of 140 hectares of wheat and barley due to poor rains; 20 hectares of newly planted pyrethrum were also lost due to drought.

The reasons for the poor overall performances are many, but the fact that too much of the Visiting Manager's time is being spent in travelling (because of the wide geographical distribution of recruited farms and the need to liaise closely with the Nairobi Office) and in meetings either to solve disputes between managers and members or to persuade farms to join the project, has probably contributed. Difficulty has also been experienced in controlling stocks and the use of the farm vehicle on some farms.

### 1.2.4 Farm Ownership Problems

The problem of ownership on farms recruited has not been resolved. Although lists of owners have been prepared, these are thought to be incomplete and additional owners continue to present themselves on some farms. No formal arrangements have been made to finalise or close the lists. It is therefore difficult to define who the beneficiaries will be or who will be liable to meet the financial obligations of repayment.

Non-resident owners may also pose a problem if or when they decide to take up residence on the farm. No agreement has been reached with these owners and there is the real possibility that they could decide to claim a subsistence plot at the expense of the large-scale operation. This is all the more likely because no additional benefits or dividends have been agreed upon in lieu of a subsistence plot. Legislation exists in the co-operative law to prevent this and limit the rights of non-resident members. It is not, however, invoked.

On the majority of farms, involvement of the owners has been minimal. Although provision has been made for farm rehabilitation committees to be established, these rarely meet and in most cases show little interest in the large scale area. Also, there is a marked unwillingness on the part of shareholders to provide labour on the group area.

### 1.2.5 Organisational Aspects

Three areas were neglected when organisational proposals were drawn up by the IBRD appraisal mission for the project. First, the need for legal advice during the recruitment stage was not considered, and no allowance was made for employing legal staff to assist with the project. Secondly, the need for land survey capability to prepare the farm physical plans and lay out subsistence plots was not anticipated and the early difficulty in obtaining survey teams caused delay in implementation (two survey teams have now been allocated specifically for this work). Lastly, the Co-operative

Department was not initially involved in the planning stage, although all six of the participating mixed farms are co-operative and the local Co-operative Officers have some responsibility for them. In practice the Co-operative Department has provided some of the checks in the present system by intervening when it was thought that the proposed levels of investment were too high. Since May 1976, however, the Co-operative Department has had a representative on the Loans Committee.

### 1.2.6 Conclusions

In conclusion, we do not believe that the objectives of the project or recruitment targets proposed for the group owned mixed farms are likely to be achieved. The primary reason is that (as described in Annex III) the project is in direct conflict with the aspirations of the groups of farm owners whom it is designed to help and only those who can be persuaded that they have no alternative to it will eventually join. We therefore recommend that an alternative approach be considered for these farms.

It should be noted, however, that the services provided within the project are urgently required by individually-owned farms, small partnerships and companies, whose primary aim is to operate a large-scale unit: a project of this type would probably be widely acceptable to them.

The attitude of shareholders in group owned coffee estates, however, differs from that of shareholders in mixed farms. In general they tend to look on their share as an investment rather than as a right to occupy and farm an individual holding. Few live on the estate and there is no widespread tendency to split the coffee plantation up. The present approach has had some success and is considered to be the most appropriate. It is recommended therefore that it be continued.

# 2

## Project Organisation and Staffing

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In order to implement and administer the project a Large Farm Management Section was to be built up within the AFC and four small district teams established within the Ministry of Agriculture.

The Large Farm Management Section in AFC was to have overall responsibility for project management and implementation. The section was to be headed by a Project Manager, who would be supported by a Deputy Project Manager, four experienced Senior Visiting Managers, two Trainee Managers, an Accountant, a Systems Consultant and supporting secretarial and clerical staff.

The four teams within the Ministry of Agriculture would each comprise three persons, an experienced Agricultural Officer, an Assistant Agricultural Officer and an Agricultural Assistant; they would review prospective borrowers and with them prepare initial farm plans and development proposals. The Ministry of Agriculture would also provide a Project Co-ordinator based at Headquarters, Nairobi, and a Regional Land and Farm Management Officer to be responsible for the selection of and training arrangements for farm managers. He would be based in Nakuru but liaise closely with AFC.

At no time since the start of the project have these staffing and organisational proposals been fully implemented. In the AFC a Project Manager was appointed when the project commenced. A Deputy Project Manager was also appointed but he has since resigned, and two Senior Visiting Managers have been employed since December 1975 and February 1976. They have recently been joined by two Trainee Visiting Managers who will eventually be allocated districts in which to work independently.

The Systems Consultant and Accountant are not considered by AFC to be necessary at this stage and have not yet been appointed. Clerical support for the project is, however, inadequate.

Four two-man teams were eventually established within the Ministry of Agriculture in September 1976, 15 months after the project had started and a Project Co-ordinator had been appointed. The Regional Land and Farm Management Officer was also appointed in September 1976.

The implementation of the project organisation and staffing proposals has at best been half-hearted and, although not a fundamental cause of the slow rate of recruitment of farms, has certainly been a contributing factor. Firstly, because the "rehabilitation" teams were not established at the onset within the Ministry of Agriculture, the main burden of recruitment and farm planning fell on a below-strength section within the AFC. To avoid wasting time, therefore, detailed plans could only be prepared after owners had agreed to participate in the project. There is little doubt that inability to advise farmers exactly as to what would be involved before gaining their agreement to participate impeded the rate of recruitment. Adequate staffing would have resulted in considerably more plans being prepared than farms actually recruited, but it would at least have made the task of

recruitment of farms easier, as owners would have known exactly what they were committing themselves to and would therefore have been less susceptible to the numerous rumours and suspicions which prevailed.

In addition to the problems resulting from not meeting the staffing proposals, the need for land survey units to prepare farm physical plans and lay out subsistence areas was not provided for in the project document. Consequently, delays have been experienced in the preparation and implementation of plans.

Another cause of difficulty is that no provision was made to recruit staff with legal training, to deal with the many legal issues concerning ownership and debt liability which require clarification before a farm can join.

# 3

## Farm Recruitment

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### 3.1 SELECTION CRITERIA

Eligibility for the project is subject to a number of conditions. The most important is that farms must be owned by a group of not less than 20 members. All members must be legally registered and the organisation structure should be such that all members have legal rights. Only co-operatives and companies are eligible, as in these organisations decisions are taken on the basis of a majority vote. Partnerships were excluded because of the requirement that all partners must concur in any decision before it can be legal.

Eligible farms should be "problem" farms generally regarded by both the AFC and the Ministry of Agriculture as those farms that either already have loan repayment difficulties or are heading rapidly towards this situation because of serious management, financial or social problems. (Section 2.06 Group Farm Supervised Credit Project: Ministry of Agriculture March 1974). Only those which could be expected to become financially viable would be considered; the ratio of land area to number of owners should be such that each resident owner could expect a subsistence plot of one hectare immediately, and an annual income from the group farmed area of at least 400 shillings by the eleventh year after joining the project. Clearly, although only problem farms are eligible, there is a limit to the degree of indebtedness or difficulty in which the farm is in, if it is to be eligible. To meet these latter conditions the need for precise data to prepare budgets becomes paramount.

A typical coffee estate would be one which was completely run down, with yields in the order of 200 kg of parchment per hectare.

### 3.2 RECRUITMENT PROCEDURE

It was anticipated that "problem" mixed farms would initially be identified and recruited by the small teams established under the project within the Land and Farm Management Division of the Ministry of Agriculture (see Chapter 2). These teams would identify suitable farms, ensuring that all shareholders were legally registered; prepare a preliminary plan and budget, in consultation with the farm members or committee, and submit these with a recommendation to the District Rehabilitation Committee (DRC). The DRC comprises the District Commissioner, the District Agricultural Officer, the District Co-operative Officer, the AFC Branch Manager, the District Land and Farm Management Officer and two farmers. This committee would in turn make recommendations to the Large Farm Management Section in the AFC. The AFC would modify the plans as they deemed necessary and prepare cash flows and loan financing schedules.

The coffee estates to be rehabilitated would be selected in a similar manner to the mixed farms, with the DRC making recommendations to AFC. An agreement to provide management, accounting and other services to the farm would be negotiated between the Government and a

management company (such as Estate Services or East African Acceptances) acceptable to the World Bank. The owners would then, in conjunction with the management company and AFC, agree to a farm development plan.

The procedures above have in practice not strictly been adhered to, particularly with regard to the mixed farms. Firstly, recruitment has not been a question of selecting a number of suitable farms from a surplus of applicants, but instead one of persuading farmers to join. Problem farms have been identified through discussion with members of the DRC and have then been visited by AFC staff in the company of officers from the Ministry of Agriculture, if available. At the commencement of the project, the preparation of preliminary plans and budgets was undertaken by the Ministry of Agriculture staff. These plans and budgets were made available to AFC after considerable delay, and were then found to be inadequate. As a result the complete responsibility for farm planning and the preparation of budgets and cash flow has been shouldered by the AFC and there it has remained. A system has therefore evolved without any of the usual checks or balances, such as where applications for credit are made by one organisation (e.g. the Ministry of Agriculture) and then appraised, modified or approved by another (e.g. AFC). At present the total responsibility lies with the AFC; this situation cannot be recommended. In this respect the original proposals for a management structure which were made by the Ministry of Agriculture in March 1974, were more satisfactory, although they lacked a clearly defined management structure. Lastly, the responsibility for dealing with legal problems such as registration of individual shareholders has also been left with the AFC.

### 3.3 RATE OF FARM RECRUITMENT

The recruitment of the 136 farms was to be phased over a four year period. The expected rate of participation during the first two years is given in Table 3.1.

Table 3.1 Expected Phasing of Recruitment of Farms for Rehabilitation, by District

Year	Uasin Gishu	Mixed Farms			Coffee Cumulative Total	Cumulative Total All farms
		Nakuru	Trans Nzoia	Cumulative Total		
1	7	4	3	14	9	23
2	10	6	6	36	9	54

Source: Appraisal of Group Farms Rehabilitation Project, IBRD 1975.

During the two years during which the Group Farm Rehabilitation Project has been in operation, recruitment has been slow. Four coffee estates and six mixed farms have been recruited to the project. Negotiations are currently being continued with a further two coffee estates and five mixed farms (budgets for these are approved) which could be incorporated at any time. If these negotiations are successful the maximum number of farms incorporated in the project by the end of the second year would be six coffee estates and eleven mixed farms, about 30 per cent of the target of 18 coffee estates and 36 mixed farms. There is no indication that this rate of recruitment will accelerate in the coming year.

Two of the four coffee estates, Gatatha Farmers' Company Ltd. and Kiamba Kawainda Company, cannot be regarded as genuine cases for rehabilitation and should not have been recruited by the project. Two of the six mixed farms, Milima Mitatu Co-operative Society and Progressive Farmers' Co-operative Society, had been under rehabilitation by the AFC prior to joining the current project. The net recruitment, therefore, of new farms requiring rehabilitation is six, a number which may be increased to thirteen by the end of the second year.

Of the factors contributing to the slow rate of recruitment, the most important is probably a fundamental suspicion and dislike of group enterprise on the part of shareholders, most of whom subscribed towards farm purchase with the belief that they would eventually have their own individual holding when the land purchase loan was repaid. Group enterprise was never regarded as any more than an interim measure. By the time the project was operative, group enterprise had been tried for up to ten years, in the majority of cases it had been shown to fail, and the shareholders' initial belief in individual holdings had been confirmed. It is unlikely that this obstacle will be overcome and the rate of recruitment improved.

Other factors have also influenced the rate of recruitment. Important amongst these is that promotion of the project has been poor. A leaflet setting out the objectives of the project and likely advantages in joining was distributed in late 1975. Little use, however, was made of it and during field work associated with the farm survey it was clear that few farms were even aware of the project or its objectives.

#### 4.1.1 Galana Farmers Co-operative Ltd

Instead of selecting farms from a list of applicants as expected, farms had to be approached individually and committees and members asked to commit themselves to the project before detailed plans or proposals could be made. Invariably most committees declined. They did not know what the project entailed for them other than that they were in effect being asked to relinquish control of the farm to an unknown manager, allow investment decisions to be taken on their behalf but with the knowledge that if the farm plan failed they, the owners, would have to accept the ultimate liability. With regard to mixed farms, therefore, it was mainly those in severe financial difficulty which were recruited, because these were the farms which could be persuaded that there was no other alternative. They joined with the attitude that it was not their decision to borrow, but Government's to lend. If all went well they would happily accept the dividends and more stable financial position. If not, they might well be unwilling to accept the financial consequences.

1976 has already exceeded the most budgeted for

#### 4.1.2 Galana Farmers Company Ltd (Windrush Estate)

Galana Farmers Company owned by 1,500 shareholders, currently grows around 120 hectares of coffee and cocoa is one of the largest coffee complexes in Kiambu District. Windrush Estate, for which assistance from the rehabilitation programme was negotiated, comprised about 140 hectares of coffee and was purchased in 1975.

Windrush was recruited in January 1976. The farm had a severe grass problem but, despite this, yields during the year of purchase were around 1,110 kg of parchment per hectare. Since the company already had a highly experienced and competent manager, there was no need to negotiate a management agreement with an agency for the farm.

Under the programme, the farm will receive financial assistance for capital investment in a drying plant, machinery, construction of a dam and irrigation equipment, amounting to over KShs 1.2 million. Some KShs 1.2 million per annum will also be made available for working capital.

This is a well-managed farm and will no doubt benefit from the financial assistance provided through the project. It is not, however, a farm for which the rehabilitation programme was designed. Given the quality of its present management, it is likely that the finances required could have been raised elsewhere. For instance, the company is hoping to purchase an adjoining estate and has property in Nairobi.

# 4

## The Farms Recruited

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### 4.1 COFFEE FARMS

#### 4.1.1 Gateno Farmers' Co-operative Ltd

This is a small farm of 23 hectares (21 hectares of which are coffee) owned by 72 shareholders. It joined the scheme in mid-June 1976 after negotiating a management agreement with the Brookebond Leibig Co. The farm was completely run down, yields had fallen to well below 200 kg parchment per hectare, and the coffee trees were overrun with weeds. The owners had not accumulated large arrears in loan repayment and at the time of joining half of one year's annual repayment (about KShs 8,000) was overdue. There was a desire to rehabilitate the farm on the part of the owners and in the short time since joining progress has been considerable. The managing agents' policy of keeping capital expenditure to a minimum and concentrating on husbandry aspects such as weeding and fertilising, is to be recommended. This farm is a genuine case for rehabilitation and, although located in an area marginally suited to coffee cultivation, is likely to succeed. Yields in 1976 have already exceeded the levels budgeted for.

#### 4.1.2 Gatatha Farmers' Company Ltd (Windrush Estate)

Gatatha Farmers' Company owned by 1,500 shareholders, currently grows around 320 hectares of coffee and hence is one of the largest coffee complexes in Kiambu District. Windrush Estate, for which assistance from the rehabilitation programme was negotiated, comprises about 148 hectares of coffee and was purchased in 1975.

Windrush was recruited in January 1976; the farm had a couch grass problem but, despite this, yields during the year of purchase were around 1,110 kg of parchment per hectare. Since the company already had a highly experienced and competent manager, there was no need to negotiate a management agreement with an agency for the farm.

Under the programme, the farm will receive financial assistance for capital investment in a drying plant, machinery, construction of a dam and irrigation equipment, amounting to over KShs 3.5 million. Some KShs 1.2 million per annum will also be made available for working capital.

This is a well-managed farm and will no doubt benefit from the financial assistance provided through the project. It is not, however, a farm for which the rehabilitation programme was designed. Given the quality of its present management, it is likely that the finance required could have been raised elsewhere; for instance, the company is hoping to purchase an adjoining estate and has property in Nairobi.

#### 4.1.3 Punda Milia Farmers' Co-operative

Punda Milia was recruited to the project in April 1975. It comprises 2,275 hectares, of which 73 hectares are planted to coffee. The remainder is an old sisal plantation which is being divided into subsistence plots of around 1.2 hectares for each of the 1,800 shareholders. Under the project assistance will be given to the coffee area only. Management is provided through an agency, Estate Services Ltd.

The coffee is well maintained and obviously had not been too badly run down prior to joining. In the season before joining the coffee yield was 820 kg of parchment per hectare and during the first season under rehabilitation will again average around 800 kg per hectare. Under the project the farm will receive financial assistance to construct a dam, and to purchase agricultural machinery and irrigation equipment; these items amounting to approximately KShs 1.1 million. Working capital is expected to total almost KShs 0.9 million and will be made available annually. The project will therefore provide considerable financial and management assistance.

Inadequate rainfall is the primary factor limiting yields and the investment in a dam and more irrigation equipment will remove this constraint and should enable yields to be almost doubled. With regard to the budget the dam cost may work out to be considerably higher than the amount estimated.

#### 4.1.4 Kiamba Kawainda Company (Karakuta Estate)

Karakuta Estate, a farm of 203 hectares, has approximately 100 hectares of coffee and was purchased at the end of 1975 by 3,000 shareholders. It joined the rehabilitation scheme in April 1976. Prior to its purchase by the present owners it had been managed by an agent (on the directive of the AFC) for a period of about 3½ years. With the change of ownership, it was incorporated in the present rehabilitation programme.

Under the project, continued assistance is given with working capital and management, and additional funds will be made available for capital expenditure on a coffee factory, dam construction, agricultural machinery and irrigation equipment. In total about KShs 1.3 million will be provided for fixed capital investment and KShs 1.4 million annually for working capital.

The yield in the year prior to joining had been 1,300 kg of parchment per hectare and in 1976 rose to about 1,700 kg. Given that the farm had been under rehabilitation for at least three years before recruitment and that yields were considerably higher than the 200 kg anticipated in the project document, it can barely be regarded as a candidate for rehabilitation.

### 4.2 MIXED FARMS

#### 4.2.1 Milima Mitatu Co-operative Society Ltd. Molo

This 131 hectare farm was purchased in 1964 for KShs 150,000. Originally, the society had 150 shareholders, who worked on the farm. Many left and by 1973 only 26, who had nowhere else to go, remained. In May 1972 the AFC decided to foreclose in order to recoup KShs 140,000 of outstanding debts. The decision was reversed and instead the farm was placed under the direction of a management committee comprising the DC, the AFC Branch Manager, Co-operative and Land and Farm Management Officers and two members of the Co-operative. A Manager was appointed and a farm plan based on dairy and pyrethrum prepared. AFC rescheduled the original KShs 140,000 outstanding debt and advanced in addition KShs 48,000 for purchase of 35 Friesian/Ayrshire cross cows and for provision of water. KShs 40,000 were made available for working capital.

At the time of joining the project (18th April, 1976) it was estimated that the farm comprised 85 hectares of potentially arable land, 16 hectares of rough grazing and 30 hectares of unusable land. Some 36 hectares of the arable land were already taken up by subsistence plots and 7 hectares had been planted to pyrethrum. Livestock numbered around 85, of which 35 were cows in milk.

The proposed plan was to increase the pyrethrum area to 36 hectares and to maintain the dairy herd at around 50 cows and followers. The plan is optimistic and is based on inaccurate estimates of potentially arable land. The actual area taken up by individual holdings is probably more than the 36 hectares estimated and hence the area available for commercial group enterprises is less than anticipated. During the first year of the project an estimated 11 hectares of pyrethrum had been established and 9 hectares of grazing oats grown. During 1976, 1,800 kg of dried pyrethrum were delivered to the Pyrethrum Board, bringing in about KShs 11,700. About 47,100 kg of milk had been delivered to KCC and about 6,570 kg used for calf feeding and home consumption. Given this total milk production and the herd of 58 mature cows (more than planned for) throughout the year (on average 29 in milk at any one time) the average yield per cow per annum was 913 kg of milk.

The plan is optimistic first in terms of the land available for large-scale farming and secondly in terms of the performance of the crop and livestock enterprises. It is unlikely that the pyrethrum area can be increased to 36 hectares or that an average yield of 823 kg of dried pyrethrum per hectare can be achieved. The performance of the dairy herd has not reached the level anticipated. The projected yield per cow per annum in the first year was 1,800 kg, giving a gross revenue from milk of around 54,000 shillings.

A new tractor, trailer and plough were purchased at the beginning of 1976, with the object of meeting the farm requirement and carrying out at least 500 hours contracting annually, bringing in KShs 22,000 in year 1 and KShs 44,000 thereafter. The earnings from contracting have not met expectations, with only KShs 4,000 - 5,000 worth of work being carried out.

Total gross revenue during 1976 is likely to be in the order of KShs 52,000 and for the first year of joining the project is likely to be considerably less than the expected KShs 118,000. The original plan, therefore, requires updating in the light of the smaller area of arable land available for large-scale farming and of the likely performance of the crop and livestock enterprises. The Visiting Manager is now satisfied that returns from dairying are likely to be low and is considering selling off the dairy animals and replacing them with a sheep enterprise. This is likely to be less demanding on management. Budgets have not yet been prepared for the sheep enterprise.

Other non-technical problems exist on the farm. Difficulty is being encountered in moving members to areas demarcated for subsistence and resident members are continuing to request subsistence plots: four members were settled this year, bringing the total number of resident members to 30. The rights to residence of the remaining members have not been agreed or established. If they still have such rights it could well upset any plan that is proposed. In addition, petty disturbances frequently occur through members deliberately allowing their stock to graze the oats on the large-scale farming area.

This is topographically a difficult farm and, given the limited area of land available for large-scale operations and the present level of indebtedness, it is unlikely that this farm would meet the financial criteria for eligibility stated in the project document. However, the impact of the project can be seen in some well-established pyrethrum and some nine hectares of land cleared of couch grass through planting grazing oats.

#### 4.2.2 Progressive Farmers' Co-operative Society

This comprises 1,840 hectares and is owned by 134 members of mixed tribes. Its management had been supervised (and a manager installed) by AFC for 3 years prior to joining the project. Approximately 1,010 hectares are potentially arable and of this area, 320 hectares have been allocated for subsistence plots. The remaining 690 hectares of arable land and 804 hectares of rough grazing are available for large-scale group farming.

Before joining the project (March 1975) the cropping pattern included 482 hectares of wheat and barley, 28 hectares of maize, 30 hectares of grass ley and 965 hectares of rough grazing. The proposed plan aimed at establishing a constant cropping pattern by the third year of the project comprising 388 hectares of wheat and barley, 110 hectares of grass ley, 20 hectares of maize and 10 hectares of sunflower. 962 hectares would remain as permanent grazing. The dairy herd would be increased to 350 cows and approximately 500 followers. The beef herd of 112 Boran breeding cows currently on the farm is ignored in the plan and presumably is to be phased out.

During the 1976 season, 502 hectares of wheat, 80 hectares of maize and 8 hectares of grazing oats were grown. The dairy herd had 181 mature (Ayrshire x Channel Island) cows, 30 2-3 year old heifers and 277 other followers. The farm also carried a Boran beef herd of 112 breeding cows and 209 followers. In all, some 570 livestock units were being carried. The wheat had been harvested at the time of the current review and had yielded a total of 8,560 bags (one bag holds 90 kg) or 17 bags per hectare, well below the budgeted yield of 25 per hectare. Maize shelling had not yet been completed and a yield estimate could not be made.

During the farm visit, a check was made on total milk yields and on the proportion sold to KCC. Approximately 175,000 kg were produced, giving a yield per cow per year of around 960 kg. Of the total, approximately 55-60 per cent was sold to KCC. Total milk sales will therefore be in the order of KShs 78,000, some KShs 400,000 less than the amount budgeted for. Of the 142 calves born during 1976, 49 died, a mortality rate of 35 per cent. This latter figure may well be inflated by slaughter of unwanted bull calves. The proportion of heifer calves reared, however, was not established. In the beef herd, 91 calves were born in 1976, giving a calving percentage of about 80; of these calves, 9 died giving a mortality rate of 10 per cent.

At the time of joining the project, substantial arrears had been built up with AFC. Since joining, the debt burden has been considerably increased by the purchase of over KShs 0.5 million's worth of farm machinery. Despite new machinery and supervised management, the farm has not done well; approximately KShs 1.2 million have been spent on operating costs and it is unlikely that the gross revenue earned will be sufficient to meet these, let alone meet interest or debt repayments due for the year.

The Progressive Farmers' Co-operative is a farm of considerable potential. Unfortunately, through indifferent management, a considerable debt burden has been built up. With this burden, it is unlikely to meet the project's financial criteria for eligibility. The current plan and budget are out of date. A new plan should be prepared, incorporating less optimistic yield assumptions (for instance, it is unlikely that wheat yields will average more than 20 bags per hectare or that milk yields will exceed 1,600 kg per cow per annum over the next few years).

#### 4.2.3 Mucharage Farmers' Co-operative Society

This farm comprises 412 hectares, of which 280 are potentially arable. A proportion of this, between 50 and 100 hectares, required clearing of light bush, 114 hectares are vlei, 7 hectares are rough grazing and 11 hectares are taken up by buildings, roads, etc. The Society has 175 registered

members, 90 of whom are resident on the farm and have subsistence plots which in total amount to about 90 hectares. The Society joined the project in April 1976. Prior to this, the farm had been supervised by AFC and in the season before joining 81 hectares of maize and 8 hectares of sunflower were planted on the large-scale farming area. The farm also carried a dairy herd of about 60 cows and followers.

In the proposed plan, 105 hectares of light bush are to be cleared over a two to three year period (44 hectares in year 1), giving 201 hectares of arable land for large-scale farming operations. The eventual cropping pattern, which will be stabilised in the fifth year, will include 83 hectares of grass ley, 8 hectares of maize and up to 30 hectares of sunflower. The dairy herd would be built up to 97 cows and followers by the sixth year.

During the 1976 season, the first in the project, 93 hectares of maize were planted and 20 hectares of light bush cleared. Of the latter, 12 hectares were planted to grazing oats. Although not quite meeting the target set in the plan, some progress was made.

With regard to yields the plan is again considered to be optimistic; maize yields are projected to rise from 35 bags per hectare achieved in the season prior to joining to 60 bags in the year of joining, and milk yields to rise to 2,000 kg per cow per year by the second year of the project. In the Consultants' view it would be unwise to budget on more than 50 bags of maize per hectare or yields per cow of more than 1,600 kg per annum, a period of at least three years being allowed to build up to this. Milk sales will, however, be significantly less than gross production after allowance is made for calf feeding and the free issue of milk to farm labour. Mucharage was visited in September and milk yields for 1976 were not estimated. The yield for 1975, however was very low, less than 600 kg per cow per year. Because of hail damage, the maize yield for 1976 is not expected to exceed 40 bags per hectare.

Unlike many of the other farms the debt burden on joining was not high, only a modest guaranteed Minimum Return programme (GMR) arrears was outstanding. The milk and maize yields, however, are likely to be significantly less than those anticipated in the budget (i.e. milk sales are likely to be per cent of the amount budgeted and maize yields only 83 per cent) and in consequence the total gross revenue at maturity reduced by some KShs 140,000.

Lastly, Mucharage has an additional 85 non-resident members with whom no agreement has been reached that they will remain non-resident, nor has compensation been allowed for to induce them to do so. Their return to the farm could upset the most carefully prepared plans. It has been suggested by the AFC Project Manager that resident members should pay a rent for their plots. This rent could be used as an additional dividend for non-resident members. Consideration should be given to applying this suggestion.

#### 4.2.4 Mutarakwa Farmers' Co-operative Society

Mutarakwa is a 648 hectare farm with 185 shareholder members. In the original plan (now out of date) it was estimated that 294 hectares were taken up by members' plots and 147 hectares of the remainder were potentially arable. In addition, there were 195 hectares of rough grazing and 12 hectares taken up by roads and buildings or unusable land. Before joining the project the large-scale group farming area had 19 hectares of pyrethrum and 319 hectares of grazing, on which there were some 485 head of cattle. The plan anticipated increasing the pyrethrum area to 121 hectares, maintaining 6 hectares of grass leys and growing 16 hectares of fodder oats annually. The dairy herd was to be built up to 78 cows and followers. The plan was expected to raise gross revenue from an estimated KShs 79,000 per annum before joining to over KShs 600,000 by the fifth year after joining.

Since the plan was prepared it has been established that 380 hectares are taken up by members' plots and that 117 hectares of potential arable and 80 hectares of rough grazing remain for large-scale group operations. In addition, there are approximately 24 hectares of timber plantation. A considerable proportion of this, however, has been sold to offset debts.

During the 1976 season the farm had approximately 14 hectares of pyrethrum and over 30 hectares of oats, about 20 of which were harvested for grain and 10 used for grazing. It is planned to extend the pyrethrum area to 55 hectares and use the remaining arable land for harvest and grazing oats. Clearly the farm will not generate the income anticipated in the budget, and its financial status is questionable.

During 1976, 16,676 kg of milk were sold to KCC, approximately half the anticipated amount. Assuming a further 14,000 kg were retained for calf feeding and domestic use, the yield from the 40 mature cows on the farm was in the order of 800 kg per cow per annum. Dairying is no longer regarded as a profitable enterprise and although partial budgets have yet to be prepared, the Senior Visiting Manager is considering replacing the dairy herd with a sheep flock of 200 breeding ewes. Pyrethrum yields were not discussed in detail on the farm, but sales were low and the revenue realised was considerably less than the KShs 93,000 expected. Topographically this is a difficult farm, and pyrethrum, barley, oats and sheep would appear to be the most suitable enterprises.

#### 4.2.5 Kamwaura Farmers' Co-operative Society

The farm comprises 855 hectares and is owned by 130 shareholders, 54 of whom are resident on the farm. Their subsistence plots currently take up about 120 hectares. The present plan indicates that in addition to the subsistence area, there are 453 hectares of potentially arable land, 141 hectares of rough grazing and 180 hectares of unusable land taken up by roads, buildings, swamp, forest etc. (this breakdown is inaccurate, because on this basis the total land area is about 894 hectares, rather than 855 hectares).

Kamwaura Farmers' Co-operative joined the project in 1976. The farm plan indicates that in the first year some 185 hectares of oats would be grown and 22 hectares of pyrethrum established. The pyrethrum area would be extended to 140 hectares by year 6, barley and oats would each take up about 46 hectares and 20 hectares of potatoes would be grown. Two livestock enterprises, a beef herd of 120 cows and a sheep enterprise with 400 breeding ewes, would also be developed over this period. Of the estimated KShs 1.2 million gross revenue at maturity, KShs 0.75 million would be derived from sales of pyrethrum.

An up to date map of the farm is not available, and field sizes and hence the areas of crop and of potentially arable land can only be guessed at. The Visiting Manager now estimates the potentially arable land available for group operations to be in the order of 200-240 hectares. Much of this had a severe couch grass problem and the first season's operations have been aimed at eradicating couch through cultivation and the planting of oats. In 1976, approximately 50 hectares of harvest oats and 16 hectares of grazing oats were planted. About 40 hectares of pyrethrum have also been established. Approximately 40 hectares of the oat crop have been harvested, giving a good yield of around 25 bags per hectare. The pyrethrum looks good but it is too early to estimate yield.

Although the original plan and budget have not yet been revised, the future cropping pattern will probably include 80 hectares of pyrethrum, 50 hectares of barley and up to 100 hectares of harvest or grazing oats and fodder crops. A sheep enterprise of 2,000 breeding ewes will probably be the sole livestock enterprise. This plan seems quite realistic but will have significantly less revenue-generating potential than the original.

Considerable progress has certainly been made on the farm during the first season. It is important, however, that a map with accurate field areas is produced as soon as possible, in order that a farm plan and budget can be prepared. Kamwaura has had the problem of non-resident members requesting plots, and debts of KShs 50,000 which were undisclosed at the time of joining have recently been presented. The financial viability is therefore in doubt and will not be known until a revised plan is prepared.

#### 4.2.6 Mugomo-ini Farmers' Co-operativy Society

The farm comprises about 840 hectares and is owned by 202 registered shareholders, all of whom are resident. It joined the project in November 1975, when its budget was approved. In the farm plan it was estimated that there were 648 hectares of potentially arable land, which would be equally divided between the owners' subsistence plots and the large-scale group operations. At maturity the group operations would include 120 hectares of wheat, 120 hectares of grass ley, 44 hectares of pyrethrum and 20 hectares of fodder. The dairy herd was to be built up from 40 to 181 cows and followers.

The plan will require considerable revision. The members' plots currently take up over 400 hectares and there are no more than 180 hectares of arable land remaining for group operations. During the 1976 season, the 80 hectares of wheat and 60 hectares of barley grown were planted at the latter end of the planting season and a complete failure of both crops has occurred. 40 hectares of pyrethrum were established during the year but only 20 hectares of this survived. The dairy herd currently has 25 mature cows, 11 heifers and other followers. The total milk produced in 1976 was approximately 20,000 kg or 800 kg per cow per annum. Mortality of stock was extremely high, the overall figure being in the order of 30 per cent. No explanation for such a high rate was available. 1976 has been a disastrous year for the co-operative and will have served only to increase the farm's debt load, which was already high, and to disillusion the shareholders with regard to the benefits from rehabilitation. Given the reduced area of arable land available for large-scale group operations and more realistic (i.e. less optimistic) assumptions on yields it is unlikely that the financial criteria for eligibility will be met.

Annex II

The Farm Survey

# 1

## Summary

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A detailed survey of some 88 large farms, all but four of them mixed farms was completed, the broad objectives being to identify the main problems and constraints and to establish the present levels of performance. The survey would thus indicate where physical potential was being underutilised, provide an analysis of the present situation and a basis upon which the incremental benefits to a further phase of the rehabilitation programme could be estimated.

The survey was carried out during a three month period which fell in mid-season between planting and harvest. Farm records were not well kept but were used as a source of data wherever available. Where records were not available invoices or returns from the supplying and purchasing agents (KFA and Kenya Seed Company and KCC) were used as a source of information; in some instances these agencies themselves were visited. Where no records or alternative source of data were available the word and memory of the farmer had to be relied upon. Despite these limitations the Consultants believe that the data collected represent a fair picture of the present state of large mixed farms.

Although farms were either whole, partly subdivided or completely divided results were analysed in two basic groups; large-scale operations and small-scale operations on smallholdings or subsistence plots.

The results showed a general underutilisation of resources, as indicated by the low intensity of the farming systems and poor yields. Even on the better farms yields were considerably below what could be achieved. Dairy enterprises were particularly poor, milk yields being low, calving intervals long and mortality high; all reflect a poor understanding of dairy husbandry.

The over-riding constraint, however, was the lack of skilled farm management. Capital and credit are also limiting factors but on most farms where the management was good, access to credit did not pose a serious constraint.

Regression analyses were carried out on the results obtained from the large-scale operations to examine the relationship between the size of the farm and indicators of management efficiency such as intensity of use of cultivable land, gross output and net returns. Although no strong general relationship was established the analyses did indicate an inverse trend suggesting that productivity in the large scale units did increase with decreasing size. The conclusion drawn was that where small groups or partnerships wish to divide a large unit into few smaller parts it should not be discouraged.

Analysis of data on the smallholdings and subsistence plots indicated that performance on these holdings was no worse than on the large units. Overall the intensity of use of cultivable land was higher and average maize yields (by far the most important crop grown) were similar to the mean for all the large farms surveyed. Although the farm gross output per hectare was not calculated because of limitations in the data available for livestock, it is expected that it would be of similar order to the mean for the better large units. It is concluded, therefore, that providing subdivision is carried out on a planned and controlled basis, there would be no economic disadvantage.

# 2

## Objectives and Methodology of Detailed Farm Survey

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### 2.1 OBJECTIVES

The main objectives of the farm management survey were to identify the major problems and constraints within the Sector and to establish the present levels of performance in order that the extent to which resources were being underutilised could be assessed and an analysis made of the present situation. To meet these broad objectives, attention in the survey was given to the following:-

(a) Indicators of management efficiency

Yields and gross output from the individual crop and livestock enterprises and the whole farm gross output.

Levels of inputs.

Technical standards, such as calving intervals and livestock mortalities.

Intensity of land use, in relation to land capability.

Net returns from different enterprises.

Efficiency of use of labour and machinery.

Other aspects such as management experience and training and the maintenance and use of farm records.

(b) Farm ownership and organisation

The type of ownership.

The structure of the decision-making process and the type of management in relation to farm ownership.

The degree of subdivision.

The number of owners/shareholders.

(c) Finance and credit

The financial and credit status of the farm.

Access to credit in relation to the farm organisation.

The level of annual loan repayments and the degree of indebtedness.

The relative importance of short, medium and long term loans in the farm systems.

Sources of credit.

(d) Social aspects and co-operation

Problems associated with production on group farms and the causes of dissension among members.  
The level of co-operation between members.  
The mechanisms involved in the group marketing of agricultural products.  
The existence and importance of machinery syndicates.

(e) Other information

The level of investment in, and condition of fixed assets (buildings, roads, etc.).  
The availability of farm services (water, electricity).  
The use made of the agricultural extension service and the soil conservation unit.

## 2.2 METHODOLOGY

### 2.2.1 The Population Sampled

It was agreed that the emphasis in the detailed survey should be on the large 'mixed' farms; single enterprise (tea, coffee, sisal, sugar cane, etc.) estates and plantations have therefore not been included. The number of 'mixed' farms and hence the size of the population sampled and studied in detail is approximately 1,800.

### 2.2.2 The Sample Frame

The large farm population occurs in 21 districts scattered throughout the country. In view of the time available and the distances involved between the large farm areas, it was decided to confine the frame to those districts where the large farm population is concentrated. The districts surveyed were Nakuru, Uasin Gishu, Trans Nzoia and Kericho in Rift Valley Province which between them contain some 1,460 farms out of the total of approximately 1,800 'mixed' farms i.e. 81 per cent of the total, and 149 ranches (approximately 30 per cent of the total number of ranches). These districts cover some 83 per cent of the total area of cereals in the large farm sector, 91 per cent of the pyrethrum area, 55 per cent of leys and fodder crops and 34 per cent of uncultivated meadows and pastures. In spite of the omission of the outlying farms from the frame it is considered that these four districts adequately cover the range of farm types encountered and that very little advantage would be gained by spreading the frame over a wider area.

The frame itself was compiled from farm lists provided by the District Agricultural Officers. These lists are between 2 and 3 years old, but were up-dated where necessary before the sample was selected. Although a few farms had been 'double counted' on some divisional lists, the lists are otherwise sufficiently accurate.

### 2.2.3 The Sample Unit

The unit was defined as a farm over 20 hectares in size. This lower limit has been taken purely for convenience as it is the minimum 'large farm' size as defined by Government statistical publications. Most farms in the sector, however, are well above 20 hectares (the sample mean 'mixed' farm size was 525 hectares).

In the case of large farms which have been unofficially subdivided into separate production units, the data supplied by the individual farmers concerned have for comparative purposes been aggregated to give an estimate covering the area of the original large farm, which forms the unit being sampled. Because many of the questions were concerned both with subdivided units and subsistence plots as well as the commercial farm area, the number of individuals questioned was considerably more than the 88 farms in the sample and is estimated to exceed 300 persons.

## 2.2.4 The Sampling Procedure

Mixed farms and ranches clearly constitute different systems which can be separated for study and analysis. Even within the mixed farm group, however, the population is heterogeneous in terms of system, organisation and ownership. It was decided therefore to stratify the frame, first on the basis of the farm system practised. The five systems identified are described below.

### System 1

Wheat/Maize/Dairy. This system is found largely in Ecological Zone III where soils are not limiting, at intermediate altitudes of 2,000 metres to 2,300 metres. Much of Uasin Gishu and both sides of the rift in Nakuru are typical of this system. Wheat is the dominant arable crop but some maize and barley are grown.

### System 2

Maize/Dairy (Wheat). A similar system to the previous one, found in areas of similar ecological potential, possibly at slightly lower altitudes with a higher rainfall. Maize is the dominant arable crop but wheat and barley are also grown. Changes in farm ownership pattern since the mid-1960s have contributed to the expansion of this system and it is found in some areas (Kipkelion Division) which on purely ecological grounds would be considered more suitable for other systems. The whole central Trans Nzoia, the Kipkelion Division of Kericho and the Turbo Division of Uasin Gishu are typical of this system.

### System 3

High altitude - High Rainfall. Largely related to Zone II at altitudes in excess of 2,300 metres, the system often embodies intensive land use with a wide mix of crops and livestock. Pyrethrum is typical of this system, with wheat and barley as the principal grain crops. Livestock enterprises include dairy, intensive beef production and sheep for fat lamb and wool. Parts of Molo and Bahati Divisions of Nakuru District and of Kipkelion Division of Kericho District are the main areas of this system.

### System 4

Extensive Livestock Production. Associated principally with Zone IV, usually found at altitudes below 2,000 metres with rainfall below 750 mm. The system is largely devoted to production of beef from improved indigenous and from indigenous exotic stock. A limited number of ranches also produce some milk in addition to beef. The rift floor from Nakuru south is largely of this system, with individual ranches occurring in other areas.

### System 5

Mainly Mixed Farming with Plantation Crops. These are usually mixed farms with a proportion of plantation crops such as coffee, tea, wattle and sisal. In the survey area they are relatively small in number and in total area. The system is found throughout Rift Valley Province, in a variety of ecological situations best suited to the individual plantation crop grown. In the System 5 farms discussed in this chapter, there are also a few pure plantations.

Within each stratum, five main ownership types occur, individual, partnership, co-operative, company and miscellaneous ownership (e.g. ADC and SFT farms). The third factor taken into account was the management performance (as defined by the extension officers).

Because of the relatively small sampling fraction (4.8 per cent of mixed farms were sampled) in relation to the variability of the sample units within the population, it was decided that a selected sample was necessary. This was based on the proportion of farms in the five systems and the five ownership types and three performance ratings (good, average and poor) found within the whole frame (information on the entire population was not available). It was considered that this method would be more likely to achieve the desired objective of obtaining information from all the important farm systems and organisation structures than the more conventional method of random selection where a number of important groups might be 'missed'.

Although the analyses of data in Chapter 3 need not (and were not intended to be) statistically valid, the advantages to be gained from a formal random sampling procedure are outweighed by the disadvantages from the possible omission of important farm types that would have inevitably occurred in a sample of the size undertaken.

### 2.3 THE COMPOSITION OF THE SAMPLE

The farms to be surveyed were selected with the assistance of the local Agricultural Officers. The composition of the sample aimed at representing the relative importance of the various farming systems, types of ownership and range of management performance found in each of the four main large scale mixed farming districts. It was based on an initial review of the overall situation (described in Progress Report No. 1) carried out during the first six weeks of the study.

Overall, 88 farms were visited, 28 in the Nakuru and Uasin Gishu districts, 24 in Trans Nzoia and 8 in Kericho. The distribution of the sample is given in Tables 2.1, 2.2 and 2.3, and is shown in Figure 2.1.

Table 2.1 Distribution of the Sample of Farms by Farming System, Type of Ownership and Performance

Ownership	Number of Farms										Total
	Individual		Partnership		Co-op		Company		Other		
System	G	AP	G	AP	G	AP	G	AP	G	AP	
1. Wheat/Dairy (Maize)	8	7	4	4	-	3	-	5	1	1	33
2. Maize/Dairy (Wheat)	5	4	2	14	-	5	-	9	1	-	40
3. High Altitude and High Rainfall	1	-	-	1	1	1	1	3	1	-	9
4. Extensive Livestock	-	-	-	-	-	1	-	3	-	-	4
5. Mixed Farming with Plantation Crops	1	-	-	-	-	1	-	-	-	-	2
Sub Total	15	11	6	19	1	11	1	20	3	1	88
Total	26		25		12		21		4		88

Notes: G = good management performance

A/P = average and poor management performance

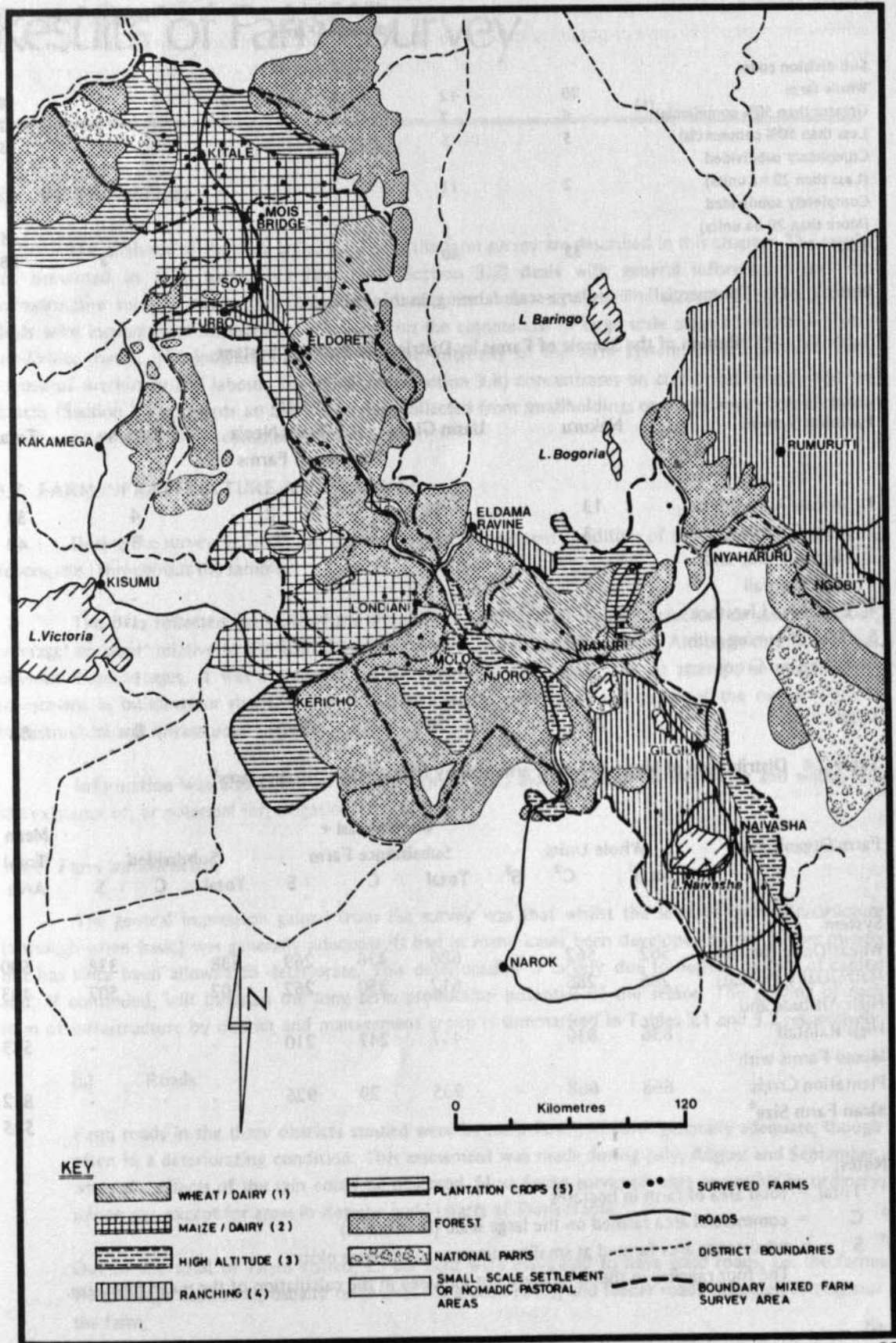
The sample was spread across four districts in a proportion approximating to the total number of farms found in each area. The distribution of the sample by district is shown in Table 2.3.

### 2.4 MEAN FARM SIZE

As shown in Table 2.4, the mean farm size of the 84 mixed farms in the sample was 525 hectares, and of the four ranches 13,129 hectares. The wheat farms of system 1 has a mean size (590 hectares) greater than system 2 maize farms (443 hectares). The mean farm size of the sample compares with the mean farm size calculated from a total of 1,460 farms in the four districts of 506 hectares ('mixed' farms only). The sizes of 'mixed' farms sampled ranged between 80 and 1,795 hectares.

Figure 2.1

Land use : Farming systems and surveyed farms



**Table 2.2 Distribution of the Sample of Farms by Farming System and Extent of Subdivision**

Farm System	Wheat/Dairy (Maize)	Maize/Dairy (Wheat)	District			Total
			High Altitude and High Rainfall Number of Farms	Extensive Livestock	Mixed Farming with Plantation Crops	
Sub-division code						38
Whole farm	20	12	3	2	1	17
Greater than 50% commercial <sup>(1)</sup>	6	7	3	1	-	15
Less than 50% commercial	5	5	3	1	1	
Completely subdivided (Less than 20 ha units)	2	11	-	-	-	13
Completely subdivided (More than 20 ha units)	-	5	-	-	-	5
<b>Total</b>	<b>33</b>	<b>40</b>	<b>9</b>	<b>4</b>	<b>2</b>	<b>88</b>

Note: (1) 'Commercial' means large-scale farming, in this instance.

**Table 2.3 Distribution of the Sample of Farms by District and Farming System**

Farming System	District				Total
	Nakuru	Uasin Gishu	Trans Nzoia	Kericho	
1. Wheat/Dairy (Maize)	13	14	2	4	33
2. Maize/Dairy (Wheat)	3	12	22	3	40
3. High Altitude and High Rainfall	8	1	-	-	9
4. Extensive Livestock	4	-	-	-	4
5. Mixed Farming with Plantation Crops	-	1	-	1	2
<b>Total</b>	<b>28</b>	<b>28</b>	<b>24</b>	<b>8</b>	<b>88</b>

**Table 2.4 Distribution of Mean 'Mixed' Farm Size by Farming System (hectares)**

Farm Organisation	Whole Units			Commercial + Subsistence Farm			Subdivided			Mean Total Area
	Total <sup>1</sup>	C <sup>2</sup>	S <sup>3</sup>	Total	C	S	Total	C	S	
System										
Wheat/Dairy (Maize)	562	562	-	686	436	269	338	-	338	590
Maize/Dairy (Wheat)	286	286	-	612	350	262	502	-	502	443
High Altitude and High Rainfall	836	836	-	457	247	210	-	-	-	583
Mixed Farms with Plantation Crops	668	668	-	955	29	926	-	-	-	812
<b>Mean Farm Size<sup>4</sup></b>										<b>525</b>

**Notes:**

<sup>1</sup> Total = total area of farm in hectares

<sup>2</sup> C = commercial area farmed on the large scale (in hectares)

<sup>3</sup> S = subsistence area farmed as smallholdings or subsistence plots

<sup>4</sup> The four ranches in the sample are not included in the calculation of the mean farm size.

# 3

## Results of Farm Survey

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### 3.1 INTRODUCTION

The analyses of the data collected during the farm survey are described in this chapter. The results are presented in four parts. The first part (Section 3.2) deals with general information on farm infrastructure such as roads, buildings, fences, water and other services. The second (Sections 3.3-3.7) deals with indicators of management efficiency on the commercial or large scale areas of whole or partly subdivided farms. The indicators analysed include: intensity of the farm system, yields, and efficiency of use of machinery and labour. The third part (Section 3.8) concentrates on credit and finance and the fourth (Section 3.9) presents an analysis of data collected from smallholdings or subsistence plots on farms which were either partly or completely subdivided.

### 3.2 FARM INFRASTRUCTURE AND SERVICES

During the survey, information was recorded on the present condition of the farm buildings, roads, fences, etc., throughout the sample.

The data reflected the view of the enumerator, who graded the infrastructure or asset as 'good', 'average' or 'poor' relative to the level encountered throughout the large farms. Although this method has obvious disadvantages, it was considered, in the time available, impractical to attempt to quantify the investment in buildings or roads, but that the data would provide an indication of the overall state of infrastructure and infrastructural needs.

Information was also collected on the farm services available, such as electricity and water, and the existence of, or potential for, irrigation.

#### 3.2.1 Farm Infrastructure

The general impression gained from the survey was that whilst the level of farm infrastructure (although often basic) was generally adequate, it had in many cases been developed by the former owners but has since been allowed to deteriorate. This deterioration is largely due to neglect or lack of capital and, if continued, will threaten the long term production potential of the sector. The grading of each item of infrastructure by district and management group is summarised in Tables 3.1 and 3.2 respectively.

##### (a) Roads

Farm roads in the three districts studied were by most farm standards generally adequate, though often in a deteriorating condition. This assessment was made during July, August and September, when the effects of the rain could be observed. Most farms surveyed were accessible by ordinary saloon car, except for areas in Kericho and in parts of Trans Nzoia.

Out of the total of farms visited, 25 per cent were estimated to have good roads, i.e. the farms were always accessible, usually on murrain or graded roads, and feeder roads extended throughout the farm.

Table 3.1 Quality of Infrastructure and Services by District (percentages of sample)

Infrastructure		Nakuru	Uasin Gishu	Trans Nzoia	Kericho	All Districts
Roads	Good	21	36	13	38	25
	Average	47	39	54	38	45
	Poor	32	25	33	25	30
Fences	Good	32	46	29	50	36
	Average	43	25	17	-	29
	Poor	25	29	54	50	35
Buildings	Good	43	43	25	63	40
	Average	39	21	42	-	30
	Poor	18	36	33	37	30
Irrigation	Existing	4	4	17	-	7
	Potential	25	46	46	13	36
Farm services (not qualified)	Electricity	36	32	33	25	33
	Water	89	79	71	50	77
	Telephone	57	29	4	25	30

Table 3.2 Level of Infrastructure and Services by Management Performance (Numbers of Farms)

	Management	Good	Average or Poor	Subdivided	All Farms	All Farms (%)
Roads	Good	13	17	2	22	25
	Average	13	23	4	40	45
	Poor	-	18	8	26	30
Fences	Good	22	7	3	32	36
	Average	3	19	3	25	29
	Poor	1	22	8	31	35
Buildings	Good	21	12	2	35	40
	Average	3	23	1	27	30
	Poor	2	13	11	26	30
Irrigation	Existing	3	1	-	4	7
	Potential	11	13	5	29	36
Farm Services (not qualified)	Electricity	17	12	-	29	33
	Water <sup>1</sup>	23	35	9	67	77
	Telephone	16	9	-	25	30
Total Number of Farms in Category		26	48	14	88	100

Note: <sup>1</sup> The proportions refer to farms with adequate water supplies.

Forty five per cent of the farms were assessed as average and 30 per cent as poor. In the case of the latter group, this implied that the farms were inaccessible to vehicles other than those with four-wheel drive, and that only unmaintained tracks existed on the farm itself. In some cases a previously adequate farm road system had been allowed to deteriorate and erosion had made the roads impassable.

The variation in roads between districts is shown in Table 3.1, which indicates a low proportion of good roads in Trans Nzoia. A more useful comparison is that of the quality of roads related to management groups and subdivided farms (Table 3.2) where, for example, almost all well managed farms had good or average roads and the majority of subdivided farms had poor roads. In some areas, access to subdivided farms was particularly difficult.

### (b) Fences

On about 36 per cent of the farms surveyed fences were in good condition. As expected farms in the good management group were adequately fenced and the fences were generally well maintained. 35 per cent of the farms were assessed as poorly fenced. In most instances this meant no more than a badly maintained perimeter fence, internal fencing being non-existent.

### (c) Buildings

The number and quality of buildings varied greatly between management groups, though little variation was observed between districts.

A number of farms classified as having poor buildings in fact had none at all. This was particularly true in the case of subdivided farms, but also occurred on some of those individually owned. On mixed dairy farms, simple open-structured cow sheds were common, some had concrete floors, others not. On-farm crop storage is not normally a problem as most farmers sell to the Maize and Produce Board or other bodies within two months of harvest. Farms described as average or good would normally have some form of storage facility, with capacity for most of the crop during this period.

Some 75 per cent of large farms classified as being in the average and poor management group and subdivided farms will require a building improvement and maintenance programme to run concurrently with other more direct forms of investment.

## 3.2.2 Farm Services

Tables 3.1 and 3.2 give the number of farms with electricity (either mains or generator) those with adequate water supplies (for both domestic purposes and for cattle) and the proportion of farms in the sample which had a telephone installed.

### (a) Electricity

One third of the sample farms were supplied with electricity. Although clearly an advantage, electricity is not a primary requirement of efficient large scale farming operations, as 9 out of the 26 well managed sample farms had no electricity. Significantly, no subdivided farm had the use of electricity, although they had in a number of cases been connected previously. In some farms the absence of electricity (in all types of farms) was due to a minor fault in the generator which had not been repaired, again lending weight to a general impression of deteriorating assets.

### (b) Water

Although the majority of farms had adequate water supplies, a number of respondents repeatedly stressed that lack of water was one of their major problems. This was particularly true when the farm contained a sizeable cattle herd and where lack of finance prevented investment in a reservoir or borehole. On certain farms, therefore, water development may be necessary before increases in production can be considered.

### (c) Telephone

This is not an essential service and was present on only 30 per cent of the sample farms. There was, however, a wide variation in usage over the area studied. Thus, almost 60 per cent of the sample farms in Nakuru district possessed a telephone, compared to only 4 per cent in Trans Nzoia.

### 3.2.3 Irrigation

No large scale irrigation is practised on the farms surveyed, although some 7 farms (about 8 per cent of the total) cultivated a small area of crops (usually vegetables) under irrigation. A further 36 farms (41 per cent of the total) had potential for limited irrigation, but the number of farmers intending to invest in the necessary equipment was very few. In general, irrigation is not likely to play an important part in the large farm sector. As the average farm size tends to decrease, however, intensification through irrigation of high value crops may become more widely applicable.

## 3.3 FARM MANAGEMENT AND INDICATORS OF EFFICIENCY

### 3.3.1 Farm Management Assessment

In an initial appraisal of large mixed farms in Rift Valley Province farms were grouped into three categories of management; good, average and poor. This initial grouping was used in selecting the sample of farms for detailed survey, particularly to ensure that the farms selected would represent the great variation which exists in the level of management. This assessment was based solely on the subjective opinion of the District Agricultural and Land and Farm Management Officers and of the Extension Officers in the various divisions. The criteria used included the intensity of the farming system, utilisation of recommended techniques and general impressions gained from visits to farms. Farms which were already completely subdivided were generally regarded by the Extension Officers as falling into the group of poor farms. This is not necessarily true in every instance and some of these farms could be regarded as having average management overall. However, in both the initial assessment of management by the Officers of the Ministry of Agriculture and the Consultants' assessment made after completion of the farm analyses, farms which are completely subdivided are grouped separately. The assessments therefore refer to the farms or parts of farms which are organised on a large scale commercial basis. The Consultants' assessment was made by the team member who had carried out the interview and was based on a comprehensive range of criteria, which included intensity of the farming system, performance in terms of yields, efficiency in use of resources such as machinery and labour, use of recommended practices and the general impression created. The assessments are summarised in Tables 3.3 and 3.4.

Table 3.3 Ministry of Agriculture Staff's Assessment of Management in Farms Selected for Detailed Survey

District	Assessment <sup>1</sup>			Subdivided <sup>2</sup> Farms
	Good	Average	Poor	
Trans Nzoia	9	8	4	3
Kericho	2	2	4	-
Nakuru	11	7	9	1
Uasin Gishu	10	6	3	9
All Districts	32	23	20	13

Notes:

<sup>1</sup> Large scale part of the farm only

<sup>2</sup> Completely subdivided farms with no large scale or commercial area.

### 3.3.2 Experience and Training

Nineteen Managers, or 25 per cent, had received at least one year of formal training. Of these, 14 (a high proportion) were assessed as good managers. However, of the 14 remaining good managers, four had attended short courses at farmers' training centres and ten had received no formal training at all. This would indicate that either formal training may not be essential, or that the present facilities (mainly

the Large Farm Management Centres) provide inadequate training. The latter is probably the case and effort should be made to improve them. It is emphasised, however, that selection of the individual to undergo training is as important as the training itself.

The number of years of experience as manager or assistant manager for managers in the sample of farms ranged between one and twelve years, with an average between four and five years. The twenty eight good managers had an average of 7 years of experience.

**Table 3.4 Consultants' Assessment of Management of Farms Selected for Detailed Survey**

District	Assessment <sup>1</sup>			Subdivided <sup>2</sup> Farms
	Good	Average	Poor	
Trans Nzoia	7	7	7	3
Kericho	2	1	5	-
Nakuru	11	8	8	1
Uasin Gishu	8	6	5	9
All Districts	28	22	25	13

**Notes:**

<sup>1</sup> Large scale part of the farm only.

<sup>2</sup> Completely subdivided farms with no large scale commercial area.

**3.3.3 Farm Record Keeping**

The quality and quantity of records kept was generally poor. As can be expected, however, it was better on farms where the manager was hired than on farms managed by the owner. A frequent failing in record keeping was that the system was rarely designed to aid management and in most instances records were not used in making management decisions. A persistently recurring example of this was found in dairy herds. On many farms daily milk yields were recorded for each cow, but only in a few instances were these daily yields summed at weekly intervals or at the end of the lactation. On a small proportion of farms, fuel and oil usage and repair costs were recorded. Usually, however, they were recorded in total, and could not be attributed to any specific machine and were hence of limited value.

A section of the survey questionnaire was allocated to collecting information on the type of farm records kept. In analysing this information, the recording system on each farm visited was graded into three groups; no records, basic records and detailed records. Basic records implied no more than information on all sales and purchases, mainly K.F.A. and K.C.C., being available in at least one or two files supported by a basic labour muster roll. In other words, receipts, invoices and statements were at least filed and available for use if required. Records were described as detailed where a deliberate attempt had been made to set up a formal system where information on yields and inputs such as seeds, fertiliser, chemicals, fuel and oil, labour, machinery was recorded. The incidence of record keeping is shown in Table 3.5.

**Table 3.5 The incidence of Record Keeping on Farms Visited**

Records	Crops			Dairy/Livestock			Financial		
	Nil	Basic	Detailed	Nil	Basic	Detailed	Nil	Basic	Detailed
Nos. of Farms	24	26	19	15	18	27	23	29	23
Percentage of Total	35	37	28	36	26	38	31	38	31

### 3.4 INDICATORS OF MANAGEMENT EFFICIENCY

#### 3.4.1 Crops

##### (a) Yields

The information collected on crop yields was obtained from detailed farm records, delivery notes to K.F.A. or Kenya Seed Company or simply from the word of the farmer where no records or definite proof were available. The memory of the farmer had to be relied upon mainly on farms where all or part of the crop was sold through unofficial channels to private dealers. The majority of sales were, however, substantiated by records or delivery notes to K.F.A. or the Kenya Seed Company etc., and hence the information obtained is considered to be a reliable indicator of yield levels during the 1975 season. It should be noted, however, that data refer to one year only and may not be representative of the yield obtained in an 'average' year. An attempt was made to determine whether the year in question was an average year or whether yields were higher or lower than those normally achieved. In Uasin Gishu the response to this query was that yields were lower than usual but in the Trans Nzoia and other districts it appeared that yields were at the normal level expected. Historical information on crop yields was only available on a very few farms and was thus of little value in determining whether 1975 was a normal season.

Yield data have been analysed primarily by farming system and by two management groups. The results from good farms are analysed separately whilst the average and poor farm results are bulked together. Within the farming system and management grouping, data on farms which are completely whole and data on the commercial area of farms which are partly subdivided are also analysed separately. The results of the analysis of yield data are given in Table 3.6.

The most complete yield data were available for maize and wheat. Results for sunflower and beans were confined to farm System 2, and barley and pyrethrum mainly to System 3. As would be expected, the variation in results was considerably higher in the average and poor group of farms than in the good. In the good farms the standard deviation from the mean varied between 15-25 per cent of the mean, whilst with the average and poor farms it ranged between 25 and 35 per cent of the mean. Although yields on the whole farms frequently exceeded yields on the commercial area of partly subdivided farms, the results on the latter were too few to be significant.

##### Maize (Yields):

Amongst the good farms, the average yield in farm System 2 was 4,539 kg or 50.4 bags per hectare, considerably higher than in Systems 1 or 3. This is as expected and demonstrates that the areas where System 2 is practised are generally better suited to maize production. The mean yield on average and poor farms in System 2 was 3,708 kg (41.2 bags), again higher than the good Systems 1 and 3 farms.

The yields on the good farms in System 2 are strongly influenced by yields in the Trans Nzoia, where occasionally up to 8,000 kg per hectare are recorded. Therefore, yields in good System 2 farms, although higher than the others, fall far short of the potential yields achievable. It is worth noting that the average maize yield on ADC farms during the 1975 season was 4,997 kg per hectare.

Table 3.6 Average Crop Yields (kgs/ha)

Crops and Farm system	Good Management			Average and Poor Management		
	Whole Farms	Partly <sup>1</sup> Subdivided Farms	All <sup>1</sup> Farms	Whole Farms	Partly <sup>1</sup> Subdivided Farms	All <sup>1</sup> Farms
<b>Maize:</b>						
System 1	3,321	3,942	3,393	n.a.	n.a.	3,078
System 2	4,905	3,807	4,539	3,897	3,528	3,708
System 3	2,250	-	2,250	n.a.	n.a.	-
<b>Wheat:</b>						
System 1	2,304	1,836	2,232	1,422	936	1,206
System 2	1,026	-	1,026	n.a.	n.a.	1,395 <sup>1</sup>
System 3	1,980	1,746	1,890	n.a.	n.a.	1,530
<b>Barley:</b>						
System 1	n.a.	n.a.	n.a.	n.a.	n.a.	1,800
System 3	n.a.	n.a.	2,700			2,880 <sup>2</sup>
<b>Sunflower:</b>						
System 2	848	384	664	n.a.	n.a.	664
<b>Beans:</b>						
System 2	n.a.	n.a.	1,332	n.a.	n.a.	288
<b>Pyrethrum:</b>						
System 3			665			372

Notes:

<sup>1</sup> Large scale area only.

<sup>2</sup> Only one result available.

n.a. Not available.

Wheat (Yields):

Wheat yields were highest on the good System 1 farms, where the mean of all the results obtained was 2,232 kg or 24.8 bags per hectare. This is higher than the Ministry of Agriculture's estimates of average yields in Nakuru, Uasin Gishu, Trans Nzoia or Kericho Districts. Three farms in Njoro, however, achieved yields of over 2,880 kg (32 bags) per hectare. Wheat yields recorded on System 2 farms were generally very low, considerably less than yields on either Systems 1 or 3 farms.

Barley (Yields)

Barley yields were recorded on System 3 farms. Results, however, were few and hence a less reliable indicator than yields for maize or wheat. The average yield on good farms was 2,700 kg per hectare. Only one result was available for the average and poor farms and should therefore be discarded.

Beans (Yields)

Yields of beans were available on four of the farms surveyed, all of them in Trans Nzoia. On two farms they were intercropped with maize and the yields were extremely variable. The mean on good farms was 1,332 kg per hectare, which is approximately the average yield expected from pure stands. Only one result was available for the average and poor farms.

## Pyrethrum (Yields)

Pyrethrum yields were available on System 3 farms. The average yield on good farms was 665 kg of dried flowers per hectare and 372 kg on average and poor farms. On all farms the plants were over three years old. Nevertheless, yields on the good farms were around the expected average.

### (b) Levels of Inputs: Variable Costs

The data obtained on direct production costs are less reliable than that obtained on yields. Whereas the major proportion of crops sold was channelled through statutory marketing boards or their official agents, inputs such as fertilisers and agro-chemicals were purchased from numerous sources and because of poor record keeping were not easily allocated between the different enterprises. The allocation of unskilled casual labour between different enterprises was also difficult. In most cases, therefore, the interviewer had to accept levels of input stated by the respondent and then cross-check with invoices or records available for the whole farm. Despite these limitations some general conclusions can be drawn:-

- Seed rates used at planting are usually at the recommended levels.
- Hybrid maize seed was used on all farms growing maize. Although a major proportion of wheat farmers purchased certified seed from Kenya Seed Company, some preferred to use their own seed.
- The amounts and types of fertiliser applied varied considerably. There was a general tendency to apply less than the recommended levels and on most farms top dressing of maize with nitrogen, a recommended practice, was ignored.
- The recommended methods of pest control (stem borer) in maize are usually carried out.
- Seed bed preparation for grain crops is fairly standard throughout, comprising three operations, one ploughing and two disc harrowings or two ploughings and one disc harrowing. In many instances, however, land preparation was late.

An analysis of the data collected on levels of inputs or direct costs is given in Table 3.7.

### Maize:

The items regarded as direct costs and summarised in Table 3.7 included seed, fertiliser, herbicides, insecticides and casual labour for weeding and harvesting. Tractor, machinery and transport costs have not been included, nor have gunneys or G.M.R. insurance. For the purpose of this analysis mechanisation costs are regarded as fixed (overhead) costs and the produce price used is ex-farm gate and net of the cost of gunneys.

Amongst the good farms the mean levels of costs for System land 2 is KSh. 800 and KSh. 998 per hectare. The higher level in System 2 probably reflects higher yields and hence increased casual labour costs during harvest. Other inputs are at a similar level. In System 1 both the good and poor farm cost levels are of the same order whilst in System 2 the average and poor direct cost levels are lower, reflecting a difference in yield of some 830 kg per hectare.

Comparing these levels with variable cost estimates prepared for Trans Nzoia by the Ministry of Agriculture, they are considerably lower at KSh, 990 than the KSh. 1,300 estimated. The latter, however, does not include mechanisation, gunneys and G.M.R. insurance, and hence is directly comparable. The difference is mainly accounted for by the fertiliser applied being well below the levels recommended. The average fertiliser cost on farms surveyed was KSh. 305 per hectare whilst the cost of applying the recommended levels was in the order of KSh. 700. Casual labour costs were slightly higher on the farms surveyed.

Table 3.7 Mean Direct or Variable Costs (K.Sh./ha)

Crop and Farm System	Good			Average and Poor		
	Whole Farms	Partly Subdivided	Total	Whole Farms	Partly Subdivided	Total
<b>Maize:</b>						
System 1	914	608	880	1,062	797	885
System 2	978	1,033	998	977	850	910
System 3	n.a.	n.a.	698	n.a.	n.a.	n.a.
<b>Wheat:</b>						
System 1	664	610	654	644	589	619
System 2	684	n.a.	684	681	n.a.	681
System 3	639	779	695	n.a.	n.a.	1,030
<b>Barley:</b>						
System 1	n.a.	n.a.	n.a.	616	608	612
System 3	n.a.	n.a.	708	n.a.	667	667 <sup>1</sup>
<b>Sunflower:</b>						
System 2	349	n.a.	349	278	335	312
<b>Beans:</b>						
System 2	313	n.a.	313	374	n.a.	374
<b>Pyrethrum:</b>						
System 3	1,670	n.a.	1,670	n.a.	750	750 <sup>1</sup>

**Notes:**

<sup>1</sup> One result only

n.a. Not available

**Wheat:**

The variable costs for wheat, summarised in Table 3.7, include only seed, fertiliser, herbicides and casual labour. Mechanisation, gunneys and G.M.R. insurance have been excluded. The means for each group vary between K.Sh.640 and K.Sh.695 per hectare, if the means of two results for System 3 average and poor farms are excluded. The results indicate that the costs are lower than if the recommended levels of these three inputs (seed, fertiliser and herbicides) were used, i.e. K.Sh.740 per hectare. The difference again can be accounted for in lower levels of fertiliser use than are recommended.

**Barley:**

Considerably fewer results were obtained for barley than for wheat and maize. The costs summarised, however, include only seed, fertiliser and herbicides. They are of a similar order to those for wheat and to comparable estimates using recommended levels of inputs. The latter probably reflects the supervision of Kenya Breweries, for whom most of the barley is grown on contract.

**Sunflower:**

The data collected on variable costs of sunflower production contained considerably more variation than for maize, wheat or barley. The variations were almost entirely dependent upon the amounts of fertiliser used. This varied from nil to 125 kg of compound fertiliser (at approximately KSh. 140 per 50 kg) per hectare.

**Beans:**

Only two results were available for beans and hence cannot be regarded as a reliable indicator of the level of input seed. In most cases seed and labour were the only inputs.

**Pyrethrum:**

The input levels and cost data for pyrethrum were available for only a few farms. The data collected referred only to crops of over three years of age and hence were mainly associated with the use of labour for picking, cutting back, weeding and drying. Fertiliser was not applied on any of the farms surveyed nor were chemicals used for weed or pest control.

**(c) Crop Gross Margins**

Crop gross margins have been calculated using the data on gross output and variable costs given in Tables 3.6 and 3.7. The gross margins are shown in Table 3.8 and indicate the relative profitability of the crops. It should be noted, however, that the variable costs for maize include harvesting as this was in almost every case carried out by hand using casual labour. Harvesting of wheat and barley was mechanised on every farm and either the farm's own combine harvester or a hired contractor was used. The charge for the latter varied between K.Sh.125 and K.Sh.175 per hectare. For the gross margins of the small grains and maize to be directly comparable, a harvesting charge of approximately K.Sh.150 per hectare should be deducted from wheat and barley.

**Table 3.8 Crop Gross Margins (K.Sh./ha)**

Crop and Farm System	Whole Farms	Good		Total	Whole Farms	Average and Poor	
		Partly Subdivided	Total			Partly Subdivided	Total
<b>Maize:</b>							
System 1	1,392	1,659 <sup>1</sup>	1,445	1,457	1,281	1,340	
System 2	2,643	1,605 <sup>1</sup>	2,297	1,690	1,600	1,645	
<b>Wheat:</b>							
System 1	1,906	1,392 <sup>1</sup>	1,860	822	813	818	
System 3	1,522	1,190	1,356	n.a.	n.a.	690	
<b>Barley:</b>							
System 3	1,732	n.a.	1,732	n.a.	n.a.	925 <sup>2</sup>	
<b>Sunflower:</b>							
System 2	849	270	618	736	359	547	
<b>Beans:</b>							
System 2	n.a.	1,912 <sup>2</sup>	1,912 <sup>2</sup>	16 <sup>2</sup>	n.a.	16 <sup>2</sup>	
<b>Pyrethrum:</b>							
System 3	2,536	n.a.	2,539	2	n.a.	1,230	

**Notes:**

<sup>1</sup> Two results only

<sup>2</sup> One result only n.a. not available

Table 3.8 demonstrates the importance of growing crops in the areas to which they are agronomically best suited. Maize gross margins on System 2 farms are higher than either wheat or barley (in Systems 1, 2 and 3) and are only exceeded by pyrethrum on good System 3 farms. Wheat and barley gross margins, however, on Systems 1 and 3 farms (good management) are higher than maize gross margins on the System 1 areas or where maize is grown as the minor crop with wheat.

Sunflower does not compete with the three grain crops. No value, however, has been attached to the sunflower heads which, after threshing, are crushed and used as cattle feeds.

Only two results were available for beans; neither can be regarded as giving a reliable indication of their profitability.

Pyrethrum is clearly a high value, labour intensive crop ideally suited to the higher altitude areas and because of the difficulties of securing supplies of labour to small scale or co-operative farming.

### 3.4.2 Dairy Herds

The performance of dairy herds is less subject to year-to-year variation than yields of crops providing that there has been no widespread outbreak of disease such as foot-and-mouth. As there was no indication of abnormally high incidences of disease during 1975 the data obtained can be regarded as representative of a fairly normal year. The herds surveyed in all but one instance comprised mainly exotic breeds or exotic crosses.

Milk yield data were collected from daily milk records maintained on the farm, K.C.C. monthly returns of milk and cream sales at the local K.C.C. depot and in a few cases the farmers' estimates of monthly sales during the wet and dry seasons. Where production records were not kept and sales data alone were available, estimates of domestic consumption and quantity used in calf feeding were made and added to sales to give the total production during the year (1975). This was then related to the number of mature cows (dry and in milk) and the yield in terms of kg of milk per cow per year calculated. The results of this analysis are given in Table 3.9. The data have been analysed in the same systems and management groups as for crops. There is no major difference, however, between results from the various farming systems; the main difference demonstrated is between the good and average and poor groups of farms. The mean yields from good farms was 1,296 kg per cow per year (285 gallons per cow per year) and 802 kg per cow per year (176 gallons per cow per year) from the average and poor farms. These yields are extraordinarily low, given the considerable genetic potential of the cows. Milk yields have been recorded on a number of farms by the Livestock Recording Centre (Naivasha). The average yields recorded for farms in similar areas to those in the survey sample were 1,910 kg per cow per year.

Table 3.9 Mean Milk Yields From Farms Surveyed (kg/cow/year)<sup>1</sup>

Farm Systems	Good			Average and Poor		
	Whole Farms	Partly Subdivided Farms	All Farms	Whole Farms	Partly Subdivided Farms	All Farms
System 1	1,279	1,263	1,276	904	778	845
System 2	1,285	n.a.	1,279	854	665	771
System 3	1,410	n.a.	1,410	904	n.a.	904
Mean of all Farms			1,296			802
Standard Deviation			(393)			(323)

**Note:**

<sup>1</sup> Yields from cows in commercial farms only.

(a) Calving Interval

Records of calving interval were kept on only a few farms surveyed. On the others, a crude estimate had to be made by relating the number of calves born in one year to the number of mature cows. Analysis of results for good farms indicated a calving interval of approximately

20 months whilst for the average and poor farms it was 24 months. In both groups the interval was extremely long and an important contributor to the low yields obtained.

(b) Mortalities

Stock mortality was extremely high, particularly in young stock. The mean levels of mortality have been estimated for young and mature stock in good, and average and poor farms. The result is shown in Table 3.10.

Table 3.10 Mortality in Livestock

	Mortality (per cent)	
	Good Farms	Average and Poor Farms
Calves (0-1 yr)	14.5	20.0
Mature stock	4.8	11.3

(c) Gross Margins

Gross margins per cow have been calculated and are given in Table 3.11. Gross output has been taken as the value of milk sales, the value of milk used for domestic purposes and value of sales of cull cows, calves and surplus heifers. Variable costs included all purchased feeds, the value of homegrown cereals, dip chemicals, veterinary bills and medicines and purchased minerals and mineral licks. Where fodder crops such as Napier or Calambas grass or grass leys were grown an annual charge covering establishment and maintenance was estimated and included in the variable costs.

Table 3.11 Gross Margins per Dairy Cow (K.Sh./cow)

Farming System	Good			Average and Poor		
	Whole Farms	Partly Subdivided Farms	Total Farms	Whole Farms	Partly Subdivided Farms	Total Farms
System 1	613	750	640	n.a.	229	279
System 2	470	547	489	361	343	353
System 3			964			
Mean of all farms			599			345

The gross margins per cow are low. On the good farms the mean was almost K.Sh.600 per cow and on the average and poor farms K.Sh.345. Given a carrying capacity of one mature cow per hectare on grass leys (arable land) and hence a gross margin of approximately K.Sh.600 per hectare, dairying does not compete in terms of profitability with arable crops. Although grass leys should have an important share in a cropping pattern, the farm survey indicated that on the majority of farms, grass leys were not being used to provide a break from cereal cropping. On many farms part of the arable area was cropped continuously and the original grass leys were allowed to revert to predominantly local species. A rotation was not being practised and none of the benefits from a grass ley break were being realised. In effect, a part of the farm was being devoted to a less profitable enterprise.

Although grass leys are an essential part of the cropping patterns in that they break from continuous arable cropping, with the present level of management in dairy herds they should be kept to the minimum necessary.

Management of dairy herds and dairy husbandry is perhaps the weakest part of the mixed farming systems. Milk yields are low due to poor feeding and long calving intervals. Production is distinctly seasonal, with yields dropping by two thirds during the dry months. On the majority of farms no attempt is made to conserve fodder for this four month period.

Bad husbandry is also reflected in the high levels of mortality, particularly in young stock. On most farms herd sizes remain static despite a small proportion of culls and few calves and heifers sold, the natural increase in most cases being offset by high mortality.

### 3.4.3 Whole Farm Analysis

The information collected on the individual enterprises on each farm has been combined to present a picture of the intensity of the farming system and total output from operations on the farm. Six parameters relating to the whole farm have been estimated. They are:-

- Intensity of use of cultivable land
- Livestock stocking intensity
- Gross output per hectare
- Gross margin per hectare
- Gross output per cultivable hectare
- Gross margin per cultivable hectare

#### (a) Intensity of Use of Cultivable Land

Information on the area of each farm which could be cultivated was available from the survey. The data collected on present land use, particularly the cropped area, was then compared with the potentially cultivable area to give an indication of the intensity with which cultivable land was currently being used. Temporary grass leys and fodder crops were included with the cropped areas except where grass had been established for longer than three years. The results of the analysis of intensity of use of cultivable land are summarised in Table 3.12.

Table 3.12 Intensity of Use of Cultivable Land<sup>1</sup>

Farming System	Good Farms (% Intensity)	Average and Poor Farms (% Intensity)
System 1	74	77
System 2	53	45
System 3	78	79

Note: <sup>1</sup> Land which is potentially cultivable and refers to whole farms or the large scale portion of partly subdivided farms.

Table 3.12 indicates that there is little difference in intensity of cultivation on Systems 1 and 3 farms; nor is there any marked difference in intensity of cultivation between the good and average and poor farms within these systems. The intensity of cultivation in System 2 farms is considerably lower (by 20 per cent) and there is a significant difference between good and average and poor farms. It is possible that this results from maize being a more labour demanding crop (weeding and harvest) than wheat. Managers frequently stated that they had difficulty in hiring, organising and controlling labour and their reaction may be one of reducing their maize area. In some instances managers were changing to wheat because of these difficulties.

(b) Stocking Intensity

An estimate of stocking intensity has been made on those farms for which data are available by comparing the stock actually carried on the farm with the estimated carrying capacity. The factors used to convert various types and ages of stock to Livestock Units and the estimated carrying capacities of natural grazing, grass leys, fodder crops and crop residues are given in Appendix A. The results of the analysis of stocking intensities are summarised in Table 3.13.

Table 3.13 Mean Stocking Intensities<sup>1</sup> on Farms Surveyed

Farm Systems	Good Farms			Average and Poor Farms		
	Whole Farm	Partly Subdivided Farms	Total	Whole Farms	Partly Subdivided Farms	Total
System 1	108	100	102	96	184	131
System 2	110	n.a.	110	113	124	119
System 3	n.a.	108	108	n.a.	n.a.	n.a.
System 4	n.a.	144	144	n.a.	n.a.	n.a.
System 5	37	n.a.	137	179	n.a.	179

Note: <sup>1</sup> Index Used =  $\frac{\text{Actual Stocking (LU)} \times 100}{\text{Estimated Carrying Capacity (LU)}}$

On the good farms, stocking rates were reasonably well adjusted to the grazing and fodder available. The values were close to the optimal on the majority of farms (Systems 1, 2 and 3). On the poor and average farms there was extreme variation in stocking intensities, with gross understocking and gross overstocking. Although the means indicate overstocking, the standard deviation from the mean was as high as 60 per cent of the mean value. There was therefore very poor adjustment of stock carried to carrying capacity which is not wholly reflected in the mean figure.

(c) Gross Output per Hectare

The total gross output from all of the enterprises on each farm have been summed to give a gross output for the farm. This has then been related to the farm area to give a farm gross output per hectare. The mean gross output per hectare for each group of farms is given in Table 3.14.

Table 3.14 Mean Gross Output (K.Sh. per Hectare)

Farming System	Good			Average and Poor		
	Whole Farms	Partly Subdivided	Total	Whole Farms	Partly Subdivided	Total
System 1	1,326	752	1,211	587	302	468
System 2	1,115	949	1,073	654	529	588
System 3	<sup>1</sup>	<sup>1</sup>	988	<sup>1</sup>	<sup>1</sup>	571
Mean for all farms			1,096			546

Note: <sup>1</sup> The number of results are too few to warrant separating into whole or partly subdivided farms.

Table 3.14 shows that differences in gross output per hectare between systems is slight. The lower intensity of use of cultivable land in System 2 farms is compensated for by the higher gross output per hectare from maize.

(d) Gross Output per Cultivated Hectare

A small number of the farms surveyed had a high proportion of uncultivable land, which meant the estimate of gross output per hectare was of little value except when the farm was being compared with farms with a similar proportion of uncultivable land. The gross output has therefore been compared with the area of cultivable land. The results of this analysis are given in Table 3.15.

Table 3.15 Mean Gross Outputs per Cultivable Hectare (K.Sh. per cultivable hectare)

Farming Systems	Whole Farms	Good Farms			Average and Poor Farms		
		Partly Subdivided Farms	Total	Whole Farms	Partly Subdivided Farms	Total	
System 1	1,709	1,176	1,612	1,280	1,300	1,287	
System 2	1,603	1,076	1,472	1,017	935	980	
System 3	1	1	1,991	1	1	953	
Mean for all farms			1,629			1,075	

Note: <sup>1</sup> The number of farms are too few to warrant separating into whole or partly subdivided.

(e) Gross Margin per Hectare

Enterprise gross margins have been combined to give a total gross margin for each farm. This again has been related to the total area and the cultivable area of the farm to give a gross margin per hectare. The results of these analyses are summarised in Table 3.16. Given the variation within the data (standard deviation around 35 per cent) the differences between the mean values for each system are of little importance. The major difference demonstrated is between the good and average and poor farms.

Table 3.16 Mean Levels of Gross Margin per Hectare and Gross Margin per Cultivable Hectare

Farming Systems	Whole Farms	Good			Whole Farms	Average and Poor	
		Partly Subdivided	Total	Partly Subdivided		Total	
<b>GM per Hectare (K.Sh.)</b>							
System 1	934	517	873	1	1	332	
System 2	779	554	723	332	381	357	
System 3	1	1	666	1	1	283	
Mean for all farms			788			330	
<b>GM per Cultivated Hectare (K.Sh.)</b>							
System 1	1,255	786	1,177	1	1	740	
System 2	1,128	630	1,004	553	600	574	
System 3	1	1	197	1	1	296	
Mean for all farms			1,139			614	

Note: <sup>1</sup> The number of farms are too few to warrant separating into whole or partly subdivided farms.

### 3.5 USE OF MACHINERY

A considerable amount of data was collected on the complement of machines and use of machinery contractors on the farms visited. The aspects covered included the numbers, age and type of each machine (tractors included), costs of oil, fuel and repairs, costs of contracting services used and machinery maintenance and servicing facilities on the farm. These data have been analysed in terms of the total investment in machinery on the farm and the annual machinery costs (including depreciation, fuel, oil, insurance, repairs and contractors' services). The latter has been related to gross output from the farm to give an indicator of efficiency of use. The analyses have been carried out for the two management groups, good and average and poor farms and by farming system.

In estimating the total investment in machinery, current prices were used and the value written down according to the age of the machines. Similarly, for depreciation charges, the current prices were used and an annual cost estimated using an assumed life for each machine. The assumptions and costs used are given in Appendix B.

#### 3.5.1 System 1 - Wheat/Dairy Farms

##### (a) Capital Investment in Machinery

The investment in machinery on System 1 farms shows considerable variation throughout the sample. It encompasses the extreme range from farms possessing no machinery whatsoever, which rely entirely on contractors, to fully mechanised farms employing farm equipment only. Most farms in the sample, however, use their own equipment for basic operations and contractors' services for operations requiring more specialised or high cost equipment (e.g. spraying and combining).

The average capital value of the machinery investment is shown in Table 3.17. On good farms it was estimated to be 368,000 shillings, equivalent to 690 shillings per hectare. These farms relied on their own farm machinery for most operations. The investment per cultivated hectare was equivalent to 1,225 shillings.

Table 3.17 Average Numbers of Tractors and Capital Value of Machinery (System 1)

Standard	Good			Average and Poor		
	Whole Farm	Partly Subdivided	Total	Whole Farm	Partly Subdivided	Total
No. tractors per farm	4.6	1.5	4.1	2.9	1.7	2.3
Cultivated area per tractor ha <sup>1</sup>	87	201	104	74	86	80
Value of machinery Sh.	386,470	269,130	368,420	119,160	103,488	111,325
Value of machinery per hectare Sh.	628	1,033	690	238	215	227
Value of machinery per cultivated hectare Sh.	1,104	1,804	1,225	692	729	711

Note: <sup>1</sup> Excludes farms with no tractors.

By contrast, the average and poor farms had an average investment per farm of only 111,000 shillings (about one third of the level of investment in the good group). As expected, the level of investment varied considerably. Three of the 18 farms within this group had no machinery at all. The average investment was equivalent to 227 shillings per farm hectare and 711 shillings per cultivated hectare. Although none of the farms had an investment above the average level of the

good group, a few average and poor farms matched the well managed farms in terms of investment per cultivated hectare. The gross output from sales of crop and livestock produce, however, remained poor.

The services of contractors are frequently available and it is therefore difficult to determine an optimum level of machinery investment incorporating a mix of 'own farm' and contractors' services. From the experience of the sample of farms there does, however, appear to be an economic maximum/minimum range in which farms can vary their level to suit individual needs. Judging from the investment in machinery in the good group, a value for machinery of about 900 shillings per farm hectare and 1,200 shillings per cultivated hectare would appear to be the preferred maximum level at current yields and prices.

At the other end of the scale, it would appear that at least some investment in machinery is desirable, if only to reduce the rigidities of a system based entirely on hired equipment. Unfortunately, there is insufficient information on gross output from farms relying on contractors' services to evaluate this aspect objectively.

Most of the farmers interviewed owned at least some of their own machinery, though the level of investment during the early years of a farm's operation appeared to be geared to capital availability rather than being based on a detailed examination of the financial implications. On the poorer managed farms, capital is obviously a limiting factor and the low level of investment would support this. As a general principle, farms in this category should not be encouraged to immobilize scarce working capital in machinery, and in most cases they appear to be following this course. It is possible, however, that the average investment figures taken by themselves obscure certain features of the poor farms. Whilst investment in overall terms is low (and probably correctly so) it is often due to the purchase of a few pieces of expensive new equipment and very little else, whereas a more appropriate course of action would be to select a wider range of second-hand equipment. Other farms attempted to rely mainly on obsolescent basic equipment, yet purchased new crop sprayers which would be only rarely used.

#### (b) Annual Machinery Costs

The average annual machinery costs (depreciation, operating, maintenance and contracting services) are given in Table 3.18.

Table 3.18 Average Annual Machinery Costs per Hectare and Gross Output per 1000/- Machinery Costs

	Good			Average and Poor		
	Whole Farms	Partly Subdivided Farms	Total	Whole Farms	Partly Subdivided Farms	Total
Total annual costs (K.Sh.)	219,630	102,001	198,245	86,880	120,789	101,010
Cost per ha (K.Sh.)	359	251	339	272	240	263
Cost per cultivated ha (K.Sh.)	675	771	692	861	850	856
Farm gross output per 1000/- machinery cost (K.Sh.)	3,511	3,164	3,448	2,667	2,024	2,453
Crop gross output per 1000/- machinery cost (K.Sh.)	2,941	2,395	2,842	2,307	1,745	2,082

On the good farms, the annual machinery costs averaged 339 shillings per hectare and 692 shillings per cultivated hectare. Except in the case of one farm which had recently purchased a range of

new equipment and another where a large wheat area allowed considerable economies of scale, costs varied between 460 shillings and 880 shillings per cultivated hectare. The average cost of 692 shillings per cultivated hectare compares with the estimated cost of contractor charges to complete all operations of between 800–900 shillings per hectare.

The machinery costs on average and poor farms were at a lower level, averaging 263 shillings per farm hectare. When calculated in terms of the cultivated area, however, costs were generally higher than on the good farms and averaged 856 shillings per hectare (i.e. an increase of 25 per cent). This difference in costs appears to be due to a number of factors.

Firstly, this group, whilst maintaining a low investment per cultivated hectare and hence incurring low depreciation charges, tends to have higher tractor running costs (both fuel and repairs) than in the case of the well managed farms. Secondly, greater reliance is placed on the services of contractors: in some cases the manager had attempted to perform farm operations with unreliable machinery, fell behind with the work and then brought in contractors. One farm had a machinery cost of some 1,150 shillings per hectare, compared to the estimated 800-900 shillings per hectare required for contractors alone. In others, the level of investment and hence the depreciation costs were above those justified by the area of arable land involved. Over-mechanised farms were found in all ownership types although they form a minority of the poorly-managed group.

#### (c) Machinery Costs and Farm Gross Output

Machinery costs alone cannot be directly interpreted as being at an economic level unless they are discussed within the context of the whole farm system and particularly in relation to use of labour and to overall farm output. In this analysis, the gross output from the farm's arable enterprises was compared with the cost of machinery and used as an indicator of management efficiency, the reason being that a dairy or beef herd on a mixed farm can make a considerable contribution to the farm gross output, whilst at the same time receiving very little direct benefit from the investment in machinery. This is particularly important as only a minority of farms regularly sow leys as part of the arable rotation.

The good farms achieved an average gross output of approximately 3,450 shillings per 1,000 shillings of machinery cost, and an output from arable enterprises of 2,840 shillings per 1,000 shillings of machinery cost. The most efficient producers were achieving a gross out of machinery cost ratio of over 4:1. The average and poor farms typified by high costs and low output, had a much lower ratio. In these, gross output per 1,000 shillings of machinery cost was 2,450 shillings, and crop output 2,100 shillings. In two poorly managed farms, gross output had declined to almost 1,000 shillings per cultivated hectare, and in one case was substantially below.

#### (d) Service Facilities

Access to on-farm service facilities is shown in Table 3.19.

Table 3.19 Availability of Service and Repair Facilities

	Good			Average and Poor		
	Whole Farms	Partly Subdivided	Total	Whole Farms	Partly Subdivided	Total
Service repairs (%)	100	100	100	78	78	78
Minor repairs (%)	100	100	100	56	44	50
Major repairs (%)	45	50	46	11	22	17

All farms in the good group carried out minor repairs on the farm and about half of the farms had facilities for major machinery repairs and overhaul. The average/poor management group were less well equipped. About a quarter had no provision even for a routine tractor services and only half of the farms carried out minor repairs. 17 per cent attempted major repairs.

### 3.5.2 System 2 - Maize/Dairy (Wheat) Farms

#### (a) Capital Investment in Machinery

The pattern of machinery investment on the maize/dairy (wheat) farms indicates that farms in the good management group are investing considerably more in machinery than the average and poor, by a factor of about 3:1.

Machinery investment levels are summarised in Table 3.20. Good farms averaged 712 shillings per hectare and 2,288 shillings per cultivated hectare. Average and poor farms had invested 226 shillings per hectare and 745 shillings per cultivated hectare. There was, however, considerable variation in the latter, which was probably accounted for by the extent to which use was made of contractors.

Table 3.20 Average Numbers of Tractors and Capital Value of Machinery (System 2)

	Good			Average and Poor		
	Whole Farms	Partly Subdivided	Total	Whole Farms	Partly Subdivided	Total
Tractors per farm	2.2	2.0	2.2	1.0	2.0	1.6
Cultivated area per tractor (ha)	40	122	61	36	48	42
Value of machinery (K.Sh.)	178,000	94,340	155,580	18,990	168,110	84,230
Value of machinery per ha (K.Sh.)	873	227	712	135	343	226
Value of machinery per cultivated ha (K.Sh.)	2,875	527	2,288	500	1,061	745

Within the good farms, there appears to be a considerable difference in machinery investment and annual machinery costs (Table 3.22) between the whole farms and the commercial areas of partly subdivided farms. In the latter, both are lower. This may be of no importance as only two farms in this group could supply information. Given the variation in the data this is clearly too few to have any significance.

Comparing the investment in machinery on the maize/dairy farms with the wheat/dairy farms, it can be seen that the capital investment in machinery is at a similar level. When compared on the basis of the farm's cultivated area, maize farms had a higher level of investment in the good management group and the cultivated area per tractor was little more than half that found on the dairy/wheat farms. A possible explanation is that the optimal maize planting season is more restricted and that maize farms have generally a smaller area under cultivation, giving less opportunity to spread costs.

#### (b) Annual Machinery Costs

The average cost of machinery in the good farms was 216 shillings per hectare and 699 shillings per cultivated hectare. The average and poor farms were again relatively high cost producers (particularly the group farms) with an average of 147 shillings per farm hectare and 1,050 shillings per cultivated hectare. The reasons are probably similar to those discussed for the wheat/dairy

farms. In addition, a considerable variation in the proportion of cultivated land on each farm occurred between farms in the sample. About three quarters of the sample farms have less than 20 per cent of the farm area cultivated. The remainder varied between 21 and 50 per cent. Because most farms within this System are also relatively small, as discussed in the previous section, large and costly items of machinery may not be as effectively utilised as on wheat/dairy farms.

(c) Annual Machinery Costs and Farm Gross Output

The gross output from arable and livestock enterprises per 1000 shillings of machinery was 3,450 shillings within the good group of farms and 2,450 shillings in the average and poor. (See Table 3.21). This efficiency indicator shows considerable variation between farms, particularly where the dairy enterprise is a more important contributor to the farm income than maize. For all farms, however, the gross output per 1000 shillings of machinery was higher than on the wheat/dairy farms.

Table 3.21 Average Annual Machinery Costs per Hectare and Gross Output per 1000/- Machinery Cost

Standard	Whole Farms	Good	Total	Average and Poor		
		Partly Subdivided		Whole Farms	Partly Subdivided	Total
Total Farm (Sh)	70,040	83,220	73,810	19,870	72,550	35,680
Costs per ha (Sh)	234	171	216	122	205	147
Cost per cultivated ha (Sh)	832	365	699	805	1,622	1,050
Farm gross output per 1000/- machinery cost	5,453	6,153	5,570	4,580	2,203	3,788
Crop gross output per 1000/- machinery cost	3,046	3,205	3,091	2,394	1,404	2,097

The crop gross output per 1000 shillings machinery costs was 3,091 shillings and 2,097 shillings for good and average and poor farms respectively. These are similar to System 1 farms (Table 3.19), the maize farms' higher machinery costs being compensated for by higher gross output from maize.

(d) Service Facilities

An analysis of machinery service facilities is given in Table 3.22. In general, maize/dairy farms are less well served than wheat/dairy farms, only 13 per cent of the good farms having major repair facilities. In the average and poor farms over 40 per cent of the sample had no service facilities at all. The smaller size of these farms may be a contributory factor in this case.

Table 3.22 System 2 - Machinery Repair and Servicing Facilities on the Farm

Facility	Whole Farms	Good	Total	Average and Poor		
		Partly Subdivided		Whole Farms	Partly Subdivided	Total
Basic service %	100	100	100	70	63	67
Minor repairs %	100	100	100	60	50	56
Major repairs %	-	50 <sup>1</sup>	13	10	13	11

Note: <sup>1</sup> Only two farms in this group.

### 3.5.3 System 3 - High Altitude High Rainfall Farms

#### (a) Capital Investment in Machinery

Only seven System 3 farms (i.e. high altitude high rainfall farms, usually growing wheat as a main crop with pyrethrum, beef and sheep as subsidiary enterprises) provided complete data on machinery investment and costs. Whole and partly subdivided farms have therefore not been analysed separately.

Of the farms studied, investment in machinery was at a similar level to the farms in System 1, and averaged 630 shillings per hectare and 1,240 shillings per cultivated hectare. The farms in the average and poor group had machinery investments of about half this level (see Table 3.23).

Table 3.23 System 3 - Average Number of Tractors and Capital Value of Machinery

	Good	Average and Poor
Tractors per farm	3.5	2.0
Cultivated area per tractor (ha)	82	112
Value of machinery (Sh)	510,110	147,400
Value of machinery per ha (Sh)	630	384
Value of machinery per cultivated ha (Sh)	1,243	597

#### (b) Annual Machinery Costs

The annual machinery costs are generally lower than in Systems 1 and 2 farms. On good farms the costs were 280 shillings per farm hectare and 580 shillings per cultivated hectare. On the average and poor farms they were 250 shillings and 470 shillings per farm hectare and per cultivated hectare respectively. The difference between the two management groups was opposite in trend to the other two systems, where the better managed farms kept machinery costs below those on the poorly managed farms. The sample, however, is small, and it is unlikely that the difference is of any significance.

#### (b) Annual Machinery

#### (c) Annual Machinery Costs and Farm Gross Output

The gross output on good farms was 4350 shillings per 1000/- of machinery cost (this lies between the level achieved on Systems 1 and 2). In the average and poor management group it was 3,880 shillings. The most efficient producers in this System were achieving an output/machinery cost ratio of 5:1. Machinery costs in relation to farm gross output are given in Table 3.24.

Table 3.24 System 3 - Average Annual Machinery Costs and Output per 1000/- Machinery Cost

	Good	Average and Poor
Farm total annual machinery cost (Sh)	191,450	113,930
Cost per ha (Sh)	281	250
Cost per cultivated ha (Sh)	583	465
Farm gross output per 1000/- machinery cost	4,354	3,879
Crop gross output per 1000/- machinery cost	NA	NA

(d) Service Facilities - System 3

The availability of service facilities on the farms are shown in Table 3.25 and are comparable to those found in the other Systems.

Table 3.25 System 3 - Machinery Repair or Servicing Facilities on the Farm

Facility	Good	Average and Poor
Basic service only %	100	66
Minor repairs %	100	66
Major repairs %	50	33

### 3.6 LABOUR

#### 3.6.1 General

The study and analysis of labour use on farms in the sector has been confined to a comparison of the overall level of labour use and cost on the three main systems studied. The efficiency of labour use has been compared by calculating gross output in relation to labour costs alone, and also to labour and machinery costs. No attempt has been made to allocate labour costs to individual enterprises, nor have profiles of labour use been derived from the information supplied.

#### 3.6.2 Analysis of Labour Use

On the majority of farms studied within farming Systems 1, 2 and 3 approximately three-quarters of the annual wages expenditure is taken up by permanent employees (see Table 3.26). An exception to this occurred in the good System 2 farms. This probably reflects greater reliance on casual labourers for maize weeding and harvesting.

The costs of labour on the good farms for Systems 1, 2 and 3 were 139, 202 and 199 shillings per farm hectare. Costs in the average and poor were generally lower in all Systems. This difference is to be expected and is probably due to generally lower levels of inputs on these farms.

The farm gross output has been related to 1000 shillings labour costs. The mechanised wheat farms in Systems 1 and 3 were the most efficient farms in this respect. In the good group the input/output ratio was 1:10. The average and poor farms had a gross farm output of 9,200 shillings and 6,300 shillings per 1000 shillings of labour costs in Systems 1 and 3 respectively.

On the maize/dairy farms (System 2), which rely more heavily on labour for weed control and harvesting, a generally lower input/output ratio was achieved despite the higher gross output. The well managed farms in this System gave a gross output of 5,900 shillings per 1000 shillings of labour and the average and poor farms 5,450 shillings.

A thorough examination of labour would require comment on seasonality of labour use, allocation of labour between various enterprises, present wage levels and supply of labour in and adjacent to the large farm sector. These aspects were not covered in detail during the farm survey and only general impressions were obtained. It was clear, however, that some of the larger farms were, wherever technically possible, attempting to substitute machinery for labour. This policy included the expansion of the wheat area at the expense of maize and the use of herbicides instead of hand labour on maize farms. Some large farms in the high altitude zone have now abandoned the growing of pyrethrum, mainly due to the problems

of organising large gangs of labour and also because of the difficulty of obtaining an adequate and reliable supply. On most farms, milking was performed entirely by hand, some farmers, however, expressed the intention to change to machine milking, again indicating a trend towards mechanisation.

Table 3.26 Labour Costs; Gross Output per 1000/- Labour and per 1000/- Labour and Machinery

	Good			Average and Poor		
	Whole Farm	Partly Subdivided	Total	Whole Farm	Partly Subdivided	Total
<b>System 1</b>						
Permanent Labour as percentage of total labour (%)	73	70	73	72	88	77
Labour cost per ha (Sh)	142	105	139	83	33	68
Gross output per 1000/- labour (Sh)	10,382	5,868	10,006	10,140	6,278	9,174
Gross output per 1000/- labour and machinery (Sh)	2,584	1,747	2,500	2,036	-	2,036
<b>System 2</b>						
Permanent labour as percentage of total labour cost (%)	71	34	64	74	84	79
Labour cost per ha (Sh)	153	306	202	126	116	121
Farm gross output per 1000/- of labour cost (Sh)	6,299	4,465	5,932	5,932	5,568	5,451
Farm gross output per 1000/- of labour and machinery (Sh)	3,108	2,587	3,004	2,134	1,635	1,990
<b>System 3</b>						
Permanent labour as percentage of total labour cost (%)			88			60
Labour cost per ha (Sh)			199			170
Farm gross output per 1000/- of labour cost (Sh)			10,053			6,292
Farm gross output per 1000/- of labour and machinery			3,255			2,371

### 3.7 FARM GROSS OUTPUT COMPARED TO LABOUR AND MACHINERY COSTS

The efficiency of the three major farming Systems in terms of gross output and combined labour and machinery use was examined (see Table 3.26).

The most efficient users of labour and machinery appeared to be System 3 farms, which gave a gross output per 1000 shillings of labour and machinery of 3,250 shillings. On the well managed farms in System 2 (maize/dairy) the gross output was 3,000 shillings and on System 1 farms (wheat/dairy) it was 2,500 shillings.

In the case of the average and poor group the average farm gross output per 1000 shillings of labour and machinery was similar throughout the three systems, varying between 1,990 and 2,370 shillings.

### 3.8 CREDIT AND FINANCE

The lack of capital is generally regarded as one of the primary factors contributing to the decline of the large scale farm sector. The financial status and degree of indebtedness was therefore investigated on the farms surveyed. In particular an attempt was made to determine the following:-

- the amounts borrowed for land purchase
- the amounts borrowed for land development and purchase of assets
- the amounts borrowed for short term crop loans (GMR)
- the loan agency and terms of the loan
- arrears in repayments for each type of loan

Although owners were sensitive to explicit financial questions, in most instances full co-operation was given. Exceptions did occur, however, on subdivided farms where individuals were reluctant to speak about affairs that affected the group as a whole. Nevertheless the response to questions on financial matters was better than had been anticipated.

The data presented cannot necessarily be taken as complete or as a global picture of indebtedness throughout the large farm sector. Nevertheless, it would appear that in the past 18 months there has been a marked improvement in the arrears situation in the large farm sector.

#### 3.8.1 Land Purchase

Of the total farms surveyed, 64 farms supplied information on land purchase. This analysis concentrated on determining the proportion of farms in the sample which had fully paid for the farms, those which were ahead of their loan repayment schedule, those which were up-to-date and the proportion of farms with land purchase loan arrears.

The data given in Table 3.27 illustrate the situation for 3 farm groups; the good management group, the average and poor group and for all subdivided farms.

Table 3.27 Status of Farms Regarding Land Purchase Loans (per cent)

Group	Paid in full	Ahead of payments	Up-to-date	In arrears	Total
Good Management Group	29	24	35	2	100
Average/Poor Management Group	21	6	44	29	100
Subdivided Farms	54	nil	31	15	100
All Farms	30	9	39	22	100

Note: Loans from commercial banks were not included.

Almost all the farms (98 per cent) classified as having good management had been paid for in full or were purchased by means of a loan, whose payments were either up-to-date or ahead of schedule; thus only two per cent of this group had loan arrears. In the average/poor management groups, 21 per cent of the farms had been paid in full (as compared to 29 per cent in the good management group) and 50 per cent were either up-to-date or ahead of payments. In this class 29 per cent of the farms had loan arrears, more than in any other of the three groups.

Of the 14 subdivided farms in the sample, two (15 per cent) had land loan arrears and 4 (31 per cent) were up-to-date on repayments. Significantly, over half of the farms had already paid off their loan commitments and owned the land outright. In the case of subdivided farms this pattern is of course well established and is carried out by shareholders/partners in an attempt to reduce group commitments and also with a view to obtaining acceptance of their subdivided status.

The amounts involved in land loan arrears were not large, and based on information supplied by farms, they averaged slightly over K.Sh. 10,000 per farm, the maximum repayment outstanding amounting to K.Sh. 24,000.

Of the farms which had taken out long-term loans, usually for 20-25 year terms, annual repayment commitments were not high by the standard of, for example, GMR repayments. The average repayment level in the sample was K.Sh. 14,300 per farm. It varied from a few thousand shillings a year to K.Sh. 52,000. Farms which had been purchased using short term (2-3 year) loans were excluded from the calculations of this mean.

### 3.8.2 Loans for Purchase of Assets and Development Loans

Loans for the purchase of a farm's movable assets such as livestock and machinery are sometimes covered in the overall long term purchase loan agreed between the buyer and the lending agency. In other instances a separate medium-term development loan is taken out, perhaps several years after the purchase of the land, to finance new machinery or livestock. A third type of medium term development loan may also be provided to carry out conservation or drainage works.

For the purpose of the analysis all medium-term loans have been treated together. An attempt has been made to establish the proportion of farms in the sample which in 1976 still had medium term loan commitments, the average level of annual repayments, the number of farms which were in arrears and the average amount in arrears.

Of the total of 88 farms, about one quarter failed to provide information on whether or not they had any medium-term loan commitments. Of the remainder, 61 per cent had either never taken out a medium-term loan or had repaid an earlier loan (Table 3.28). The 39 per cent of farmers with current loans faced an annual repayment schedule of K.Sh. 21,070 per farm. The loan period varied throughout the sample from between 3 to 15 years (5, 10 and 15 year periods were the most commonly reported).

Table 3.28 Numbers of Farms with Medium term Loans

Item	No loan	Current loan	Total farms	Loan arrears
Number of farms	39	25	64	5
Per cent of farms	61	39	100	8

Of the farms which had current medium-term loans, 20 per cent reported that they were behind in their repayments, although the amount involved was small, averaging K.Sh. 7,000 on the two farms which detailed their arrears. As a proportion of the whole sample which provided information, only 8 per cent of farms had medium term loan arrears. Because of the relatively small proportion of farms with medium term loans no breakdown by district or management performance was attempted.

### 3.8.3 Short Term Credit

The availability of institutional short term credit is important to the operation of the majority of farms. 38 farms or 61 per cent of the farms in the sample which provided information, had received loans in 1976, mainly for seed, fertiliser and for financing mechanical cultivations.

The main agency providing short term credit was the AFC, who administered the credit through the Guaranteed Minimum Return Scheme (GMR). This is provided (according to certain loan conditions) at a rate of approximately K.Sh. 865 per hectare mainly for wheat and maize enterprises above a minimum area of 6 hectares. In only two of the farms surveyed did respondents state that their main source was either a commercial bank or their local supplier of agricultural goods. It is thought, however, that the

survey may have underestimated the role of these sources, particularly the commercial banks, which through the medium of overdrafts, also play a part. No information was obtained on non-institutional forms of short term credit.

The overall level of short term loan indebtedness was considerable. Of the 38 farms which had taken out a loan in 1976, ten (26 per cent) had GMR loan arrears from 1975 or previous years. A further 6 per cent had repaid more of their previous loan. Table 3.29 shows the loan position of farms with short term credit in 1976 and the breakdown in terms of the two main management classes and for completely subdivided farms.

Table 3.29 Number of Farms with Short Term Loan in 1976 and Previous Repayments

Farm Type and Management Class	Loan 1976	Repaid Fully	Previous Loan	
			Part Repaid	Nil Repaid
Whole farm 'good'	13	13	-	-
Group farm 'good'	2	2	-	-
Whole farm 'average/poor'	10	7	3	1
Group farm 'average/poor'	11	5	5	-
Subdivided farms	2	1	1	-
<b>Total</b>	<b>38</b>	<b>28</b>	<b>9</b>	<b>1</b>

Twenty four farms (39 per cent of those giving information) received no short term credit in 1976. These farms are considered in terms of those with loan arrears and those without loan arrears (see Table 3.30). In the former, ten reported having loan arrears dating back from 1970 to the present time and were probably prevented from receiving short term credit in 1976 on account of their indebtedness, although GMR arrears do not automatically exclude farms from the scheme. With regard to the latter, 14 farms had no loan arrears in 1976 and no short term loan arrears. Of these farms, 5 were subdivided, and were probably excluded on this account. There was no obvious explanation why the remaining nine farms with no arrears had not received a GMR loan. It is likely that short term inputs were obtained on bank overdrafts, suppliers' credit or personal funds.

Table 3.30 Number of Farms with no Short Credit in 1976

Farm Type and Management Class	No Loan 1976	Previous Loan			No Loan 1976 No Arrears
		Repaid Fully	Part Repaid	Nil Repaid	
Whole Farm 'good'	-	-	-	-	1
Group Farm 'good'	-	-	-	-	1
Whole farm 'average/poor'	1	-	1	-	5
Group Farm 'average/poor'	4	-	2	2	2
Subdivided Farm	5	-	4	1	5
<b>Total</b>	<b>10</b>	<b>-</b>	<b>7</b>	<b>3</b>	<b>14</b>

The GMR loan may in absolute amount be less than the credit extended for land purchase, but because it is repaid within 12 months, annual GMR premiums represent the most important loan commitment the farmer has to service. The average amount loaned to the farms receiving GMR in 1976 was K.Sh. 119,600. A number of respondents claimed that GMR was insufficient for their needs; the GMR loan, however, is not intended to cover all the production costs associated with the eligible arable enterprises.

The amount of short term loan arrears was substantial. Based on the information supplied by those farms which had fallen behind on their repayment schedule, the average amount owing was K.Sh.54,700 per

farm. The current level of indebtedness indicates that GMR may in the past have been disbursed without due consideration to the farms' credit rating. Although loan arrears attract an annual interest charge of 10 per cent per annum, no attempt was made to differentiate between the proportion of principle and interest outstanding, nor to record the number of years the repayments were overdue.

One important observation which has arisen from the survey is that the GMR scheme operates both with a commendable degree of flexibility and allows decisions regarding advance of claims to be delegated and taken at a local level. It was particularly apparent that where loans were still overdue in 1976 this did not necessarily prevent new loans being negotiated, if it was considered that there was a reasonable chance that one more injection of credit would enable the farmer to pay off the accumulated debts.

In many instances, unofficially subdivided farms were receiving GMR, although it was well known that the total amount would be split between members upon receipt. Clearly it is preferable that loans should reach such farmers by official means designed to cater for their needs, rather than by bending the rules.

### 3.9 SMALLHOLDINGS AND SUBSISTENCE PLOTS

Of the farms surveyed, 44 were either partly or completely subdivided into smallholdings or subsistence plots of less than 20 hectares. Within the subdivided farms three categories have been defined:-

- Category B: those with a minor proportion (less than 50 per cent of the total farm land) subdivided.
- Category C: those with a major proportion of the farm subdivided.
- Category D: completely subdivided farms.

The farms are distributed between the five farming systems identified with the major proportion (about 80 per cent) in either System 1 or System 2. Data were obtained from 39 of the 44 farms with subdivided areas; on each of these, between 5 and 10 plot holders were interviewed. In all over 200 smallholders supplied information. In all cases the word and memory of the respondents had to be relied upon.

An analysis by farming system has not been carried out, data being analysed within the categories above and for all holdings in total. The response to questions on livestock was poor and has not been analysed despite the fact that livestock make a significant contribution to farm gross output. The results are summarised in Table 3.31.

Table 3.31 Analysis of Smallholding or Subsistence Plot Data

Parameter	Category			Total Farms
	B	C	D	
Total number of farms	17	15	13	45
Number of farms supplying information	13	13	13	39
Plot size (hectares)	1.8	4.2	10.8	6.0
Arable area/family (hectares)	1.6	1.5	4.9	2.4
Intensity of land use (per cent)	86	77	67	77
Maize yield (kg per hectare)	3,618	3,618	3,825	3,645
Proportion of crop sold (per cent)	31	46	68	48
				53

### 3.9.1 Plot Size

The farm size in the total sample ranged between 0.5 hectare and 19 hectares. The mean for all farms was 6.0 hectares; for categories B, C and D individually the average size was 1.8, 4.2 and 10.8 hectares respectively. This follows the trend expected, the greater the proportion of the farm subdivided, the larger the individual holding.

### 3.9.2 Arable Area per Plot

The mean family arable area in B and C categories is similar, 1.6 hectares. In D category it is considerably larger, 4.9 hectares. The mean for all farms was 2.4 hectares.

### 3.9.3 Intensity of Use of Cultivable Land

The intensity of use follows the expected trend, the smaller the plot size the higher the intensity of use. An overall intensity of 77 per cent was indicated; this is comparable with intensities on good large System 1 farms.

### 3.9.4 Yield of Maize

The maize yields are of a similar order for each category of subdivision. Overall an average yield of 3,645 kg per hectare was indicated. This is of a similar order to the average yield on large scale maize farms (3,681 kg per hectare). It is higher than the average yield of all System 1 large scale growers and lower than the average yield obtained by large scale growers in System 2. It should be noted, however, that although hybrid seed was used in almost all cases, fertiliser was applied on less than 50 per cent of the farms. Furthermore, the small scale growers involved have limited access to services or facilities available to smallholders in conventional settlement schemes or even traditional small scale areas.

There were not enough data obtained on yields of other crops to allow analysis.

### 3.9.5 Proportion of Crop Sold

An attempt was also made to determine whether maize from the small plots was sold and, if so, what proportion. Overall a proportion of about 48 per cent of the total production being sold was indicated; the proportion sold decreased as plot sizes became smaller.

### 3.9.6 Use of Machinery on Subdivided Farms

Partly subdivided farms usually had access to machinery from the large scale commercial area. Of the 13 completely subdivided farms, 12 provided information on their use of and access to machinery. Six had no machinery at all and relied entirely on contractors. A few of the remaining had pooled their resources to purchase a group tractor. The precise mechanism whereby individual farmers were allowed access to this group tractor was not investigated in detail. Casual observation indicated that it worked tolerably well in some cases, though badly in others. It would seem essential, however, that a competent full-time tractor driver should be employed and that farmers are charged a rate to cover fuel, repairs and depreciation. In some instances, only the cost of fuel was charged, with consequent complications arising when major repairs were required. A single example of this situation was observed on a subdivided farm in Uasin Gishu where a 3 year old tractor remained unrepaired and unutilised for a whole season, due to a dispute over financial responsibilities. Successful mechanisation of subdivided farms also occurred where one or two members owned a significantly larger share (and hence area of land) than others. The individuals concerned possessed their own tractors, which were used to cultivate their own unit and were then contracted out to the smaller shareholders.

Farmers who relied entirely upon contractors sometimes complained of difficulties in obtaining contractors on time. In the case of one subdivided wheat farm visited, the farmers stated that they followed a deliberate policy of late planting (with a reduction in potential yield) to ensure that a combine harvester would be available when the crop matured.

# The Influence of Size on Commercial Farm Operations

## 4.1 INTRODUCTION

The data collected have been examined to determine whether there is any clear relationship between the size of the commercial large scale farms and the levels of production from crops and dairy cows. The relationships investigated were:

- (a) Farm size and intensity of use of arable land.
- (b) The number of dairy cows and yield per cow per annum.
- (c) Farm size and gross output per hectare.
- (d) Farm size and gross output per dairy cow.
- (e) Farm size and gross output per arable hectare.
- (f) Farm size and gross output per hectare.

The farms were analysed in two broad groups 'good' and 'average and poor' farms. Within these groups Systems 1 and 2 were pooled and System 2 results analysed separately. A total of 39 regression relationships were run.

## 4.2 RESULTS OF ANALYSIS

The results of the 39 analyses are summarised in Appendix C. Eight pairs of variables were found to have a close relationship at 0.01-0.05 levels of significance. The regression coefficient, intercept, coefficients and level of significance are given in Table 4.1. Of the remaining 31 results which were not significant 23 gave negative correlation coefficients and six positive.

### 4.2.1 Analysis of Intensity of Use by Farm Size

#### (a) Good Farms

The analysis for all good farms (Systems 1, 2, 3) showed that there was a positive significant relationship between the size of the farm and the intensity of use (Figure 4.1), when large commercial farms of over 1,500 ha were included. If these farms are excluded the relationship is weak but not significant. Subsequent analysis of the various systems (Systems 1, 2 and 3) showed that within the subdivisions of good farms there were no other significant relationships.

#### (b) Average and Poor Farms

There was no significant overall relationship between the size of average and poor farms and their intensity of use. There was, however, a significant negative relationship for System 2 farms, indicating that the intensity of use peaked at the size of the farm increased (Figure 4.1).

# 4

## The Influence of Size on Commercial Farm Operations

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### 4.1 INTRODUCTION

The data collected have been examined to determine whether there is any close relationship between the size of the commercial large scale areas and the levels of production from crops and dairy cows. The relationships investigated were:-

- Farm size and intensity of use of cultivable land.
- The number of dairy cows and yield per cow per annum.
- Farm size and gross output per hectare.
- Farm size and gross output per cultivable hectare.
- Farm size and gross margin per cultivable hectare.
- Farm size and gross margin per hectare.

The farms were analysed in two basic groups; 'good' and 'average and poor' farms. Within these groups Systems 1 and 3 were pooled and System 2 results analysed separately. A total of 39 regression analyses were carried out.

### 4.2 RESULTS OF ANALYSES

The results of the 39 analyses are summarised in Appendix C. Eight pairs of variants were found to have a close relationship at 0.01-0.05 levels of significance. The regression equations, correlation coefficients and level of significance are given in Table 4.1. Of the remaining 31 results which were not significant 25 gave negative correlation coefficients and six positive.

#### 4.2.1 Analysis of Intensity of Use by Farm Size

##### (a) Good Farms

The analysis for all good farms (Systems 1, 2, 3) showed that there was a possible significant relationship between the size of the farms and the intensity of use (Figure 4.1), when three exceptional farms of over 1,000 ha were included. If these farms are excluded, the relationship is negative but not significant. Subsequent analysis of the various separate Systems 1, 2 and 3 showed that within the subdivisions of good farms there were no other significant relationships.

##### (b) Average and Poor Farms

There was no significant overall relationship between the size of average and poor farms and their intensity of use. There was, however, a significant negative relationship for System 2 farms, indicating that the intensity of use declined as the size of the farm increased (Figure 4.1).

**Table 4.1 Significant Results from Regression Analysis**

1. **Farm Size (x) by Intensity of Use of Cultivable Area**
  - Good Farms**
  - All Systems<sup>1</sup>  $y = 58.65 + 0.02x$  (n = 25; r = 0.41; P = 0.05)
  - Average and Poor Farms**
  - System 2<sup>2</sup>  $y = 82.8 - 0.24x$  (n = 8; r = -0.76; P = 0.02)
  
2. **Farm Size (x) by Production (y)**
  - Good Farms**
  - Gross output/ha by Farm Size
  - All Systems  $y = 1407 - 0.52x$  (n = 24; r = -0.44; P = 0.05)
  - Gross Margin/ha by Farm Size
  - System 2  $y = 1063 - 1.05x$  (n = 8; r = -0.63; P = 0.05)
  - Gross Output/Cultivated ha by Farm Size
  - System 2  $y = 2203 - 2.26x$  (n = 8; r = 0.75; P = 0.02)
  - Gross Margin/Cultivated ha
  - System 2  $y = 1545 - 1.67x$  (n = 8; r = -0.75; P = 0.02)
  - Average and Poor Farms**
  - Gross Output/Cultivated ha by Farm Size
  - System 2  $y = 571 + 1.14x$  (n = 13; r = 0.55; P = 0.05)
  - Gross Margin/Cultivated ha by Farm Size
  - System 2  $y = 193 + 1.11x$  (n = 12; r = 0.79; P = 0.01)

**Notes:** <sup>1</sup> Including farms over 1,000 ha  
<sup>2</sup> Whole farms only.

#### 4.2.2 Analysis of Parameters Concerned with Dairy Production

The analyses of dairy production involved assessing the effects of the size of each farm herd on the yield per cow (in kg per cow per annum).

##### (a) Good Farms

No significant regressions were obtained between the herd size and the yield of milk per cow for the Good Farms.

##### (b) Average and Poor Farms

No significant regressions were obtained between the herd size and the yield of milk per cow on these farms.

#### 4.2.3 Analysis of Farm Production by Farm Size

Four parameters have been used to assess farm production: Gross Output per hectare (GO/ha); Gross Margin per hectare (GM/ha); Gross Output per cultivable hectare (GO/Cul ha) and Gross Margin per cultivable hectare (GM/Cul ha).

##### (a) Good Farms

All Systems Analysis: - Only one overall regression was significant, between farm size and GO/ha (Figure 4.2). In this regression it was found that the GO/ha of farms significantly decreased when the farm size increased.

Figure 4.1 Overall relationship between farm size and intensity of use

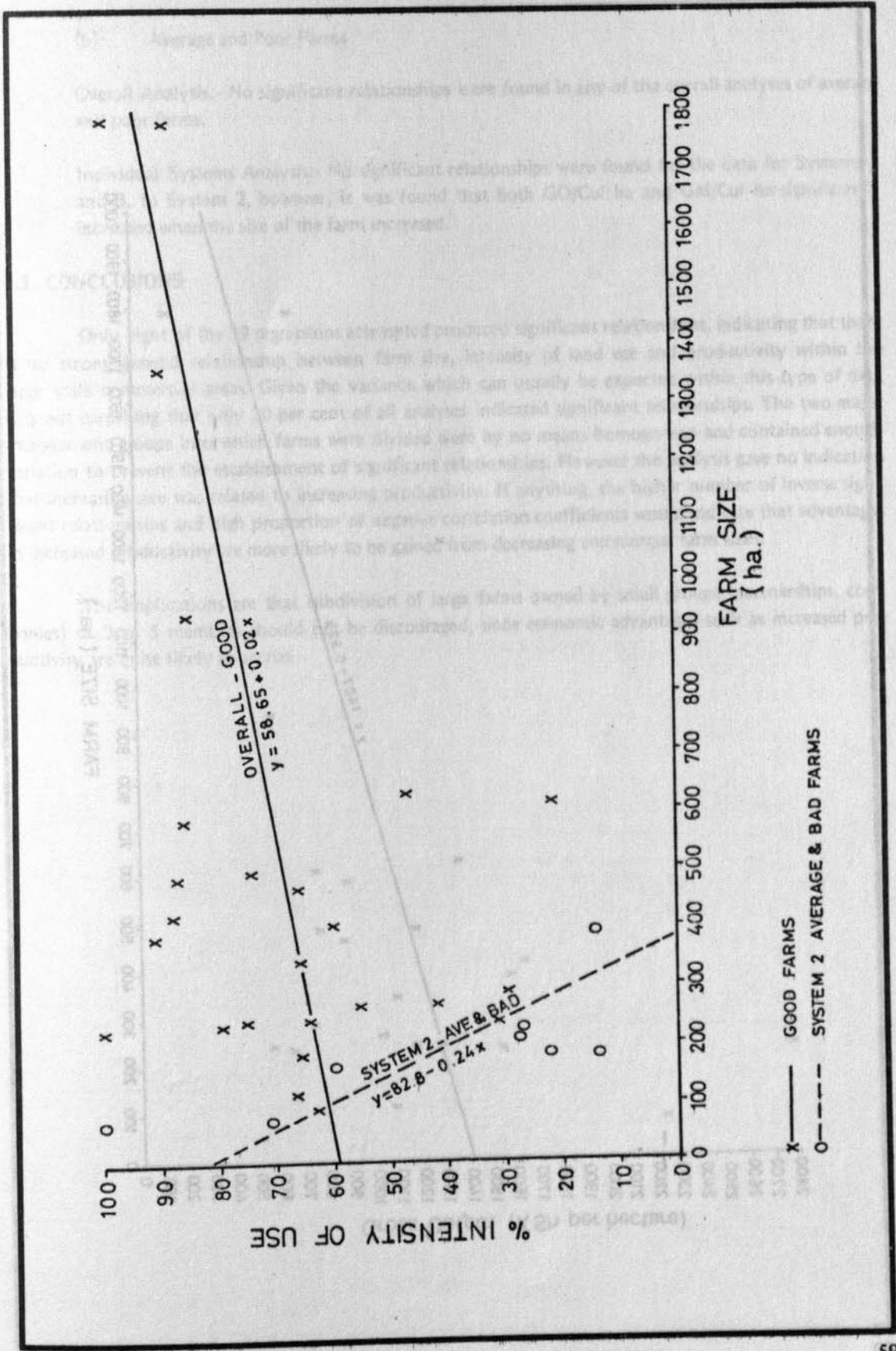
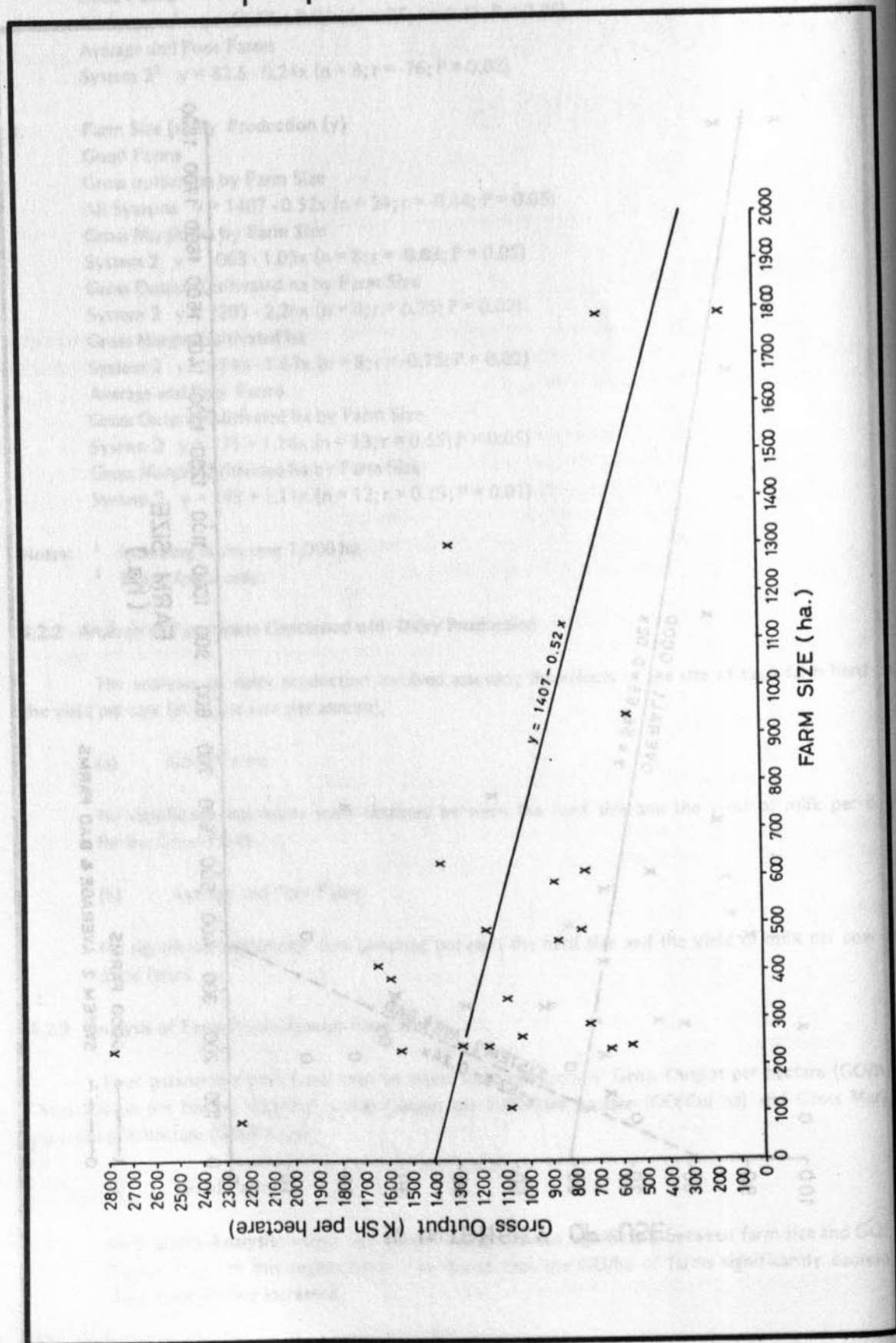


Figure 4.2 Overall good farms : Farm size and gross output per hectare



Individual Systems Analyses:- No significant relationships were found for Systems 1 and 3, but for System 2 significant regressions were obtained between farm size and GM/ha, GO/Cul ha and GM/Cul ha. In all three regressions the productivity of the farms was found to decline when farm size increased (Figure 4.3).

(b) Average and Poor Farms

Overall Analysis:- No significant relationships were found in any of the overall analyses of average and poor farms.

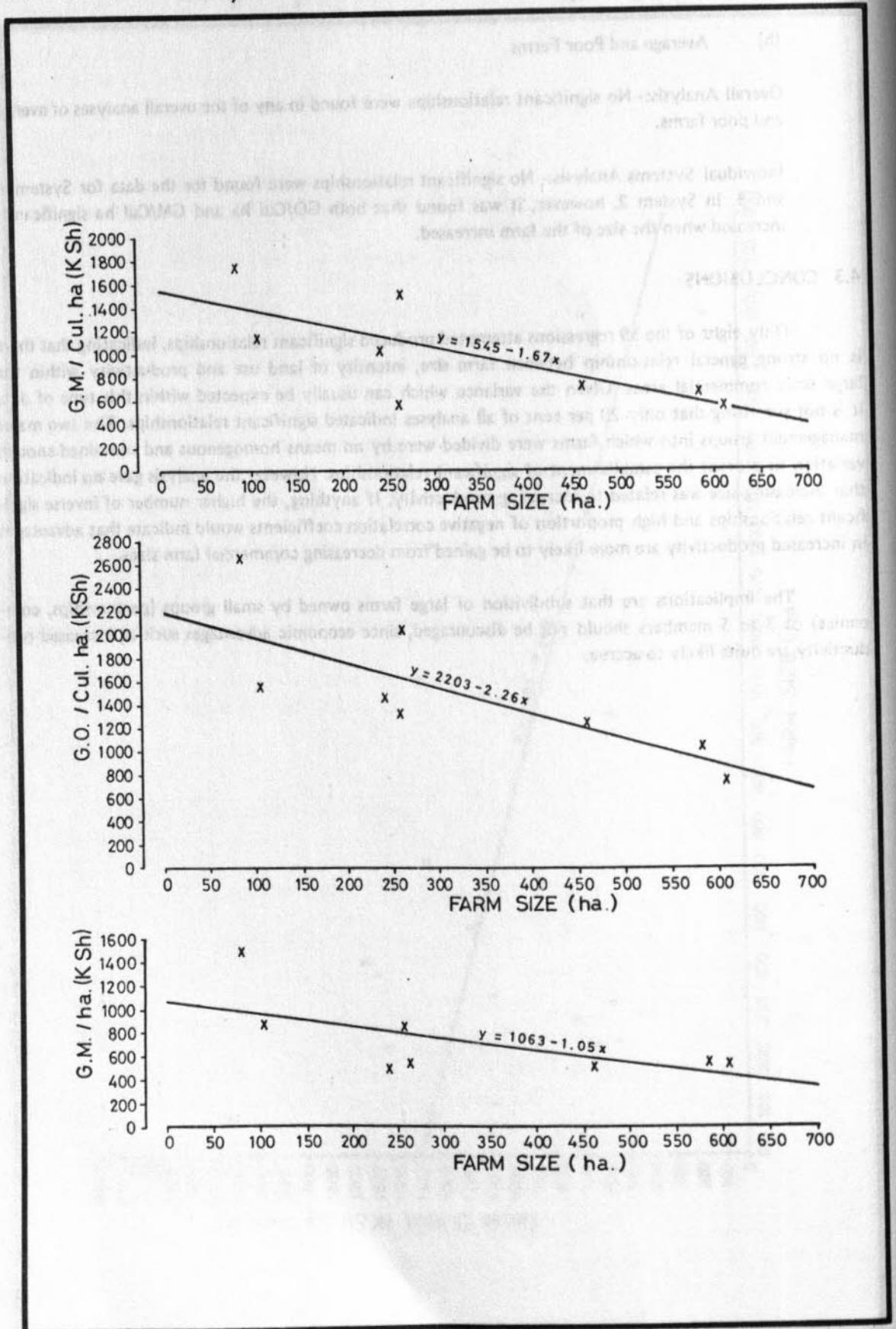
Individual Systems Analysis:- No significant relationships were found for the data for Systems 1 and 3. In System 2, however, it was found that both GO/Cul ha and GM/Cul ha significantly increased when the size of the farm increased.

### 4.3 CONCLUSIONS

Only eight of the 39 regressions attempted produced significant relationships, indicating that there is no strong general relationship between farm size, intensity of land use and productivity within the large scale commercial areas. Given the variance which can usually be expected within this type of data it is not surprising that only 20 per cent of all analyses indicated significant relationships. The two major management groups into which farms were divided were by no means homogenous and contained enough variation to prevent the establishment of significant relationships. However, the analysis gave no indication that increasing size was related to increasing productivity. If anything, the higher number of inverse significant relationships and high proportion of negative correlation coefficients would indicate that advantages in increased productivity are more likely to be gained from decreasing commercial farm sizes.

The implications are that subdivision of large farms owned by small groups (partnerships, companies) of 3 to 5 members should not be discouraged, since economic advantages such as increased productivity are quite likely to accrue.

Figure 4.3  
Good farms : System 2



# Appendices

# A

## Livestock Technical Coefficients

### A.1 Livestock carrying capacities (hectares per LSU)

	ha/LSU	
Farm System 1	Rangeland and Natural Grazing	2.0
	Leys (Rhodes and Temperate Grasses)	1.0
	Forage (Napier, Sudan, Columbus)	0.3
	Irrigated (Fodders and Lucerne)	0.2
	Crop Residues	3.0
Farm System 2	Rangeland and Natural Grazing	2.0
	Leys (Rhodes and Nandi Setaria)	0.9
	Forage	0.3
	Irrigated (Fodders and Lucerne)	0.2
	Crop Residues (mainly maize stover)	2.0
Farm System 3	Rangeland and Natural Grazing	3.0
	Leys (Rhodes Grass)	1.2
	Forage	0.4
	Crop Residues	1.2
	Vleis	1.2
Farm System 4	Rangeland and Natural Grazing	5.0
	Leys (Rhodes Grass)	2.0
	Crop Residues	3.0

Note: Based on average D.M. intake of 13 kg/lsu/day and allows for maintenance plus 4 kg milk or 0.5 kg l.w. gain per day.

### A.2 Value for Livestock Units

#### 1. CATTLE

(a) All exotic beef and dairy breeds except Jerseys.	1.25
Mature bulls	1.00
Mature cows	0.75
Bulls, steers and heifers (1-3 years old)	0.50
Calves (6-12 months)	0.25
Suckling calves (less than 6 months)	0.25

(b) Borans and Jerseys.	1.00
Mature bulls	0.80
Mature cows	0.60
Bulls, steers and heifers (1-3 years old)	0.40
Calves (6-12 months old)	0.40
Suckling calves (less than 6 months)	0.20

**2. SHEEP AND GOATS**

(a) Exotic breeds.	0.20
Rams and ewes	0.10
Others (except lambs at foot)	0.10
Lamb at foot	0.05

(b) Indigenous sheep (including Dorper) and goats.	0.10
Rams and ewes	0.05
Others (except lambs at foot)	0.05
Lamb at foot	0.02

# B

## Assumptions Used in Machinery Cost Calculations

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The capital value of farm machinery and the machinery depreciation element of farm machinery costs were calculated using average current 1976 prices (ex-Nakuru), written-off over the appropriate number of years. The initial purchase price, the value of machinery (over its economic working life) and the fixed cost or depreciation factor are given in Table B.1. These prices are approximate and in most cases represent an average price based on the range of alternative pieces of equipment offered by the various manufacturers.

The annual cost of farm machinery was calculated based on the purchase price (depreciated over a given number of years using the 'straight line method'), the annual expenditure on fuel and oil, maintenance and repair charges and miscellaneous costs such as insurance and tax. The cost of drivers and mechanics was not allocated to the cost of mechanisation and is considered under labour costs. Interest was not charged on capital expenditure.

To arrive at the overall farm mechanisation cost, the expenditure incurred on the hiring of contractors services was added, and in the few cases where surveyed farms themselves undertook part-time contracting, the income was deducted before arriving at the total farm machinery cost.

Table B.1 Written down Value/Shs. per Year

Item	Purchase Price 1976 Shs.	Economic Life (Yrs)	Years								Fixed Cost per Year Shs.			
			1	2	3	4	5	6	7	8				
Tractor 45-47 hp	65,700	8	66,700	58,400	50,000	41,700	33,400	25,000	16,700	8,300	-	-	8,300	
Tractor 62-68 hp	82,400	8	82,400	72,100	61,800	51,500	41,200	30,900	20,600	10,300	-	-	10,300	
Tractor 72-79 hp	93,800	8	93,800	82,100	70,400	58,600	46,900	35,200	23,500	11,700	-	-	11,700	
Tractor 90 hp +	118,300	8	118,300	103,500	88,700	73,900	69,200	44,400	29,600	14,800	-	-	14,800	
Disc plough 2 furrow	7,740	12	7,700	7,100	6,500	5,800	5,200	4,500	3,900	3,200	2,600	1,900	1,300	600
Disc plough 3/4 furrow	9,400	12	9,400	8,600	7,800	7,100	6,700	5,500	4,700	3,900	3,100	2,400	1,600	800
Disc plough 5 furrow	15,000	12	15,000	13,800	12,500	11,300	10,000	8,800	7,500	6,300	5,000	3,800	2,500	1,300
Disc board plough 3 F.	13,210	12	13,200	12,100	11,000	9,900	8,800	7,700	6,600	5,500	4,400	3,300	2,200	1,100
Disc harrow (18 disc)	14,500	12	14,500	13,300	12,100	10,900	9,700	8,500	7,300	6,000	4,800	3,600	2,400	1,200
Trailer harrow	30,450	12	30,500	27,900	25,400	22,800	20,800	17,800	15,200	12,700	10,200	7,600	5,100	2,500
Ridging body	2,000	12	2,000	1,800	1,600	1,500	1,300	1,200	1,000	800	100	500	300	200
Cultivator	5,300	12	5,300	4,900	4,400	4,300	3,500	3,100	2,600	2,200	1,800	1,300	900	400
Tool bar	4,395	12	4,400	4,000	3,700	3,300	2,900	2,600	2,200	1,800	1,500	1,100	700	400
Seed Drill	36,060	9	36,100	32,100	28,000	24,000	20,000	16,000	12,000	8,000	4,000	-	-	4,000
Maize planter	10,170	11	10,200	9,200	8,300	7,400	6,500	5,609	4,600	3,700	2,800	1,900	900	900
Fertiliser spreader	3,800	9	3,800	3,400	2,900	2,500	2,100	1,700	1,300	800	400	-	-	400
Rotavator	14,900	8	14,900	13,000	11,200	9,300	7,500	5,600	3,700	1,000	-	-	-	1,900

Table B.1 Written down Value/Shs per Year (Continued)

Item	Purchase Price 1976	Economic Life	Years												Fixed cost per Year Shs.
			1	2	3	4	5	6	7	8	9	10	11	12	
Mower (rotary)	13,210	11	13,200	12,000	10,800	9,600	8,400	7,200	6,000	4,800	3,600	2,410	1,200	-	1,200
Mower (reciprocation)	6,000	11	6,000	5,500	4,900	4,400	3,800	-3,300	2,700	2,200	1,600	1,100	500	-	500
Combine harvester	263,000	12	263,000	241,100	219,100	219,200	197,300	153,400	131,500	109,600	87,700	65,800	43,802	21,900	21,900
Trailer 5 ton	19,710	12	19,700	18,100	16,400	14,000	13,100	11,500	9,900	8,200	6,600	4,900	3,300	1,600	1,600
Trailer 3½ ton	12,940	12	12,900	11,900	10,800	9,700	8,600	7,600	6,500	5,400	4,300	3,200	2,200	1,100	1,100
Maize shelter (manual)	2,700	12	2,700	2,500	2,300	2,000	1,800	1,600	1,400	1,100	900	700	500	200	200
Maize shelter (motor)	5,910	12	5,900	5,400	4,900	4,400	3,900	3,500	3,000	2,500	2,000	1,500	1,000	500	500
Baler	53,200	12	53,200	48,800	44,300	39,900	35,500	31,000	26,600	22,200	17,700	13,300	8,900	4,400	4,400
Sprayer	11,800	9	11,800	10,500	9,200	7,900	6,600	5,200	3,900	2,600	1,300	-	-	-	1,300

Economic Life of Machine/Equipment

1. Tractors: Based on 'Agricultural Mechanisation' booklet, Agricultural Extension Services, Kitale.
2. Other Equipment/Machines: Based on 'Profitable Farm Mechanisation' C. Culpin.

# C

## Results of Regression Analysis

Table C.1 Results of Regression Analyses

Analysis and Farm Group	Correlation Coefficient r	Significant Probability P
<b>1. Intensity of Use (y) by Farm Size (x)</b>		
<b>Good Farms:</b>		
All systems		
(a) Including farms > 1,000 ha	+0.41	0.05
(b) Excluding farms > 1,000 ha	-neg	NS
Systems 1 and 3		
(a) Including farms > 1,000 ha	-neg	NS
(b) Excluding farms > 1,000 ha	-neg	NS
Systems 2		
	-neg	NS
<b>Average and Poor Farms:</b>		
Systems 1 and 3		
	-neg	NS
Systems 2		
(a) All farms	-neg	NS
(b) Completely whole farms only	-0.76	0.02
<b>2. Number of Dairy Cows (x) by Dairy Production Parameters (Y)</b>		
<b>Good Farms:</b>		
Number of Cows by Yield/Cow		
All Systems	+ve	NS
Systems 1 and 3	+ve	NS
System 2	-neg	NS
<b>Average and Poor Farms:</b>		
Number of Cows by Yield/Cow		
All Systems	-neg	NS
Systems 1 and 3	-neg	NS
System 2	-neg	NS

Table C.1 Results of Regression Analyses (Continued)

Analysis and Farm Group	Correlation Coefficient r	Significant Probability P
<b>3. Farm Size (x) by Parameters of Production (y)</b>		
<b>Good Farm:</b>		
<b>Farm Size by Gross Output/ha</b>		
All systems	0.44	0.05
Systems 1 and 3	-neg	NS
System 2	-neg	NS
<b>Farm Size by Gross Margin/ha</b>		
All systems	-neg	NS
Systems 1 and 3	-neg	NS
System 2	-0.63	0.05
<b>Farm Size by Gross Output/cul ha</b>		
All systems	-neg	NS
Systems 1 and 3	-neg	NS
System 2	-0.75	0.02
<b>Farm Size by Gross Margin/Cul ha</b>		
All systems	-neg	NS
Systems 1 and 3	-neg	NS
System 2	-0.75	0.02
<b>Average and Poor Farms:</b>		
<b>Farm Size by Gross Output/ha</b>		
All systems	-neg	NS
Systems 1 and 3	-neg	NS
System 2	+ve	NS
<b>Farm Size by Gross Margin/ha</b>		
All systems	-neg	NS
Systems 1 and 3	-neg	NS
System 2	+ve	NS
<b>Farm Size by Gross Output/Cul ha</b>		
All systems	+ve	NS
Systems 1 and 3	+ve	NS
System 2	+0.55	0.05
<b>Farm System by Gross Margin/Cul ha</b>		
All systems	-neg	NS
System 1 and 3	-neg	NS
System 2	+0.79	0.01

NS = Not significant at 0.01-0.05 level of probability

-neg = Negative correlation coefficient or inverse relationship if any

+re = Positive correlation coefficient

# Annex III

## Social Aspects

# 1

## Historical Background

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### 1.1 THE CHANGE OF LAND OWNERSHIP

During the colonial period a large area of high potential land in the Kenya highlands was scheduled for European ownership only. Formerly it was utilised for grazing by Masai pastoralists and was taken by pioneer settlers (mainly British) arriving after two World Wars. By Independence this expanse of high quality land was occupied by a few thousand settlers whilst the traditional tribal areas could barely meet the need for land by the agricultural tribes. The past policies of land ownership had been unfair. They had engendered feelings of intense deprivation and culminated in a deep-felt need to own and acquire land. People, particularly the Kikuyu, regarded the eventual ownership of these former Scheduled Areas as an essential and natural outcome of Independence.

Although the confederacy of tribes first brought together as a nation in the colonial period has remained firmly and positively intact, a strong sense of local identity still persists. Tribal origins continue to influence social interchange and to define to some extent the geographic rights to former European farming areas. Thus, for example, those Kikuyu groups and individuals who have taken up farms in the Eldoret and Kitale areas (the North West part of the former Scheduled Areas, bounded mainly by Kalenjin and Abaluhya people) regard themselves as pioneers far distant from their native province, while being regarded as intruders by tribes from adjacent and neighbouring localities. This undercurrent of antipathy has occasionally surfaced in the past as open confrontation, but as the rate of change of ownership has diminished, an integrative social process has ensued. In the short term, intermittent hostilities may still occur, particularly if any hint of tribal favouritism is not shown to be clearly untrue. However, this problem more often than not will continue to be outweighed and submerged in the introspective welter of internal farm operation problems.

Although Independence came to Kenya in the wider sense as part of an overwhelming global trend, it was influenced locally by the trauma of the Mau Mau emergency, and the demand of the burgeoning Kikuyu tribe for equal right to land. Although still an extremely complicated and sensitive issue, many of the people of this tribe tended to feel that because of the emergency, the Kikuyu alone of all tribal groups had earned, and were justified in seeking and obtaining, a major share of the European-vacated farming lands. This issue of alleged disproportionate land ownership is one that without very careful consideration could cause dissent in the future, particularly if, when all the land has been transferred to African hands, there are still some landless.

With money for land purchase available from British and other sources, the most critical problem facing Kenya was the orderly transfer of ownership of land from the European settlers to the Kenyan Africans. The popularly demanded pace of transfer, however, easily outstripped the capacity of smallholder settlement schemes and other technical agency controls.

## 1.2 GROUP OWNERSHIP

As a guiding principle, the maintenance of the inherited farms as large-scale farming units was posed as both economically valid and essential. To achieve this and to satisfy the demand for land of a majority of people whose small financial resources prohibited purchasing entire farms, the concept of group purchase and ownership was widely publicised. As this was the only means to land ownership for the majority of people, apart from the oversubscribed settlement schemes, a great variety of groups were quickly formed. While a degree of group spontaneity was sometimes involved, almost all groups began with a small nucleus of farmer innovators, businessmen and community leaders who saw themselves as group farm leaders or were spurred by a narrower tribal desire to obtain a majority holding in a district or retain the foothold in another, already established by farm labourer groups. These primary initiators then canvassed amongst friends and relatives and even wider tribal groupings for members and their financial contributions. In the event, this latter limitation was generally sound, for a multi-tribal composition simply added another stress to the mounting succession of group problems.

Generally, groups with poorer and less educated leaders or initiators formed cooperative societies under Government guidance, with unlimited membership but equitable shareholdings, while businessmen and those with more cognisance of personal gain formed companies or partnerships. Very often, labourers on a farm would call in friends from outside to help raise the necessary deposit for loan eligibility. These particular groupings, starting as they did with the expectations of following in their former employers' footsteps, have in general failed most badly.

## 1.3 MULTIPLE MEMBERSHIP

The desire for land had been stifled for so long that once the formation of groups for farm purchase had begun, it accelerated to an extent that was unlikely to be reversed. Groups were allowed to buy farms irrespective of their capability to manage and maintain the asset, or whether the number of members could be realistically supported by the farm. Inevitably the situation arose where members of societies and companies with a large number of members had shareholdings which were so small in any one farm that some people joined as many different groups as possible in an effort to maximise total land holdings. In this respect, membership of a group has always been seen by an individual in terms of the right to a piece of land equivalent to the value of his contribution or shareholding. This has led to what could be regarded as the ultimate in fragmentation of individual holdings.

## 1.4 LOANS AND LAND PURCHASE

When it came to purchasing a farm, the cattle-owning Kalenjin were at some advantage over the other tribes. They found that by selling a few head of cattle each, a relatively small group would have more than sufficient money for a land purchase loan deposit and very often enough to purchase a farm outright. This, and the later repayment of farm development loans has had a considerable effect in strengthening traditional attitudes towards livestock. In converse, the agricultural Kikuyu, for example, needed to form much larger groups; they seldom purchased a farm outright and were generally satisfied with a smaller land entitlement than the Kalenjin, with their greater requirement for grazing areas. Most groups, however, almost unanimously felt a need to own their farms outright and where they could, concentrated resources and effort to this end.

## 1.5 SETTLING ON THE FARM

Once the purchase was complete the members of the farm moved in, and here again there were differences broadly dependent on group type and tribal origin. Unless the farm was large, all

members, particularly of cooperative societies, rarely exercised their residential rights. Some had already settled or would later settle on other more favourable farms where they had purchased membership. Sometimes residents were not actual members but were relatives of the more well-to-do members of the farm. Many initial members paid only a portion of the required share contribution, regarding this as a down payment or insurance against the time when they might require full membership if a farm proved profitable. Most people in this category had alternative work or business interests, but many of the lower echelons of urban and other workers settled their families on a plot which would provide a basic living while they retained their jobs to bring in some extra money.

The Kikuyu and other agricultural tribes, with some initial exceptions, would probably have preferred to subdivide their farms immediately, but were restrained from doing so for various reasons, from the size of membership compared with farm areas, to large land purchase debts and development and operating loans being tied to group enterprise. Individual members were rarely allocated more than 2-3 hectares, and most often 0.4-1.0 hectares, the balance being used for the group enterprise. With many groups, plot size often coincided with an individual's entitlement should the whole farm be divided amongst all members, the group farmed area being equivalent to the non-resident members' share. Overall, the pattern was that of members being allocated plots which accounted for up to half the original farm with the balance being farmed as a distinct and separate unit through an elected committee or directors. Thus even at the beginning of the change in ownership, a subdivision of sorts ensued where the bulk of the resident members were settled on individual plots and kept physically separate from the large-scale enterprise.

The cattle-owing Kalenjin were generally far less formal and organised than the agricultural tribes, and when they took over the farm, built their houses at random rather than being allocated a specific area. Unless the farm was immediately subdivided, as was possible if purchase was outright and loan repayment need not be considered, each member generally took up a few acres of arable land and, except for minor and intermittent group cropping enterprises the rest of the farm was used as grazing land.

Only a very few groups, whose members already had an adequate area of land or whose committee was strong enough to stand between the members and a desire for residence, treated the farm not as land to be physically settled but as a potential income-earning asset. In many such cases the land was generally marginal for cropping and the level of education or sophistication of the committee and core membership was of a higher level than the norm.

In the space of a very few years the changeover of land ownership was largely effected and African groups and individuals found themselves in possession of a land asset they had desired for a generation. Although socially essential, the change had been impractically abrupt, for the new African owners were generally lacking in the variety of management skills, or the established formal group social ties and bonds indispensable for effective large farm operation. In many cases, therefore, the result has been failure, an accumulation of debts and an underutilisation of resources throughout the sector.

# 2

## The Failure of Group Enterprise

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### 2.1 THE NEW SOCIETIES

The formation of groups for the purchase of land and attempts to operate large farm enterprises cooperatively has been a major influence on changing social patterns in post-Independence Kenya. Although generally possessing tribal homogeneity, members of larger groups, with few exceptions, had little previous experience of working together as a group. The few exceptions were those who had worked under the organising influence of a European employer, or lived within the context of the traditional restraints supplied by the chief and headman system in the reserves. Suddenly, this was replaced by ostensible equality, with those who saw themselves as leaders lacking a traditionally recognised mode, being forced to manufacture new and makeshift influences and subterfuges in order to gain elective support. (The social territories of new relationships had to be identified, and rash promises of financial or land area gains were made, or unsubstantiated accusations of inability or corruption).

In effect, a host of new micro-societies was formed out of economic expediency, and although the managing mechanism of supposedly freely elected committees was interposed, these have proved more often than not to be unsuitable and ineffective in the face of all the pressures which ensued while a new order was established and the new society began to stabilise. The sorting-out process of the very real and complicated minutiae of new group social problems was also aggravated by the need to at the same time understand and master the equally complex technical problems of managing a large-scale farming enterprise. Except for those groups who have been long subdivided and settled, these new farm social units can still be considered to be in a state of unfinished, unstable and dynamic social evolution.

At the same time as these new societies were occupied with the process of developing working relationships or fragmenting under stress, the incidence of family coherence began to decline. In opposition to the old, close-knit tribal family units, large numbers of men settled their wives and children on their entitled subsistence plot, and then leaving the farm, went out to find work and money to pay for their growing material requirements. This anti-family aspect may have considerable influence in the future on the discipline and attitudes of subsequent generations and on the moral attitudes of the multitude of lonely men who are resigned to rarely seeing their wives and children. Low unskilled worker salaries and the poor standard of cheap urban accommodation combine with small individual plot entitlements and group enterprise failures to be mutually exacerbating. A possible solution which might be easily achieved is a larger size of smallholding; even then, some men by preference will go out to work and earn.

The combination of social instability and an often increasingly divisive family life (particularly for the ambitious Kikuyu) along with the general economic failure of group farm enterprises, has had an effect opposite to the original formative intention. In the beginning, members had been dissuaded from immediately dividing up the farm and pursuing their traditional smallholder farming.

However, after the years of petty social turmoil and the consistent losses of the large-scale farming enterprise, the owners' original belief in the virtue of individualism of activity and land ownership have been confirmed and reinforced more strongly than ever.

## 2.2 LEADERSHIP AND DISSENT

Each group farm required an elected Committee (Co-operative Societies) or Directors (Companies) for its technical and social management. From the beginning, the central problem has been the requirement for too many leaders against the availability of too few. Most group leaders lacked experience or training and found themselves in the control of considerable financial assets, and which they were often quick to utilise and reluctant to relinquish. In converse, members could not see how a show of hands really elevated a man from the common rut to instant leadership, nor did they have sufficient understanding of this imposed democratic process to be prepared to leave the committee to handle the details of farm direction and overall management. Not content to merely settle policy decisions, most members believed that they had (and have) the right to be involved in the decision-making process all the time.

Elections, whenever they were held, were invariably followed by disenchantment for various reasons, and opportunistic members formed groups to propose or oppose committee decisions, with an eye to their own promotion. Out of all the virtues and balances supposed to be provided by the committee system, members most readily grasped the idea of its relative impermanence and their ability to bring about annual replacement. Thus a majority of groups have experienced numerous changes in all their executive positions, and as a result continuity in policy and management has suffered.

In some instances companies paid no heed at all to the entire process and members have been kept subdued by socially and economically superior Directors, or by the sop of an adequately-sized individual plot. Equally, some co-operative societies, because of their large size and the disparate or non-resident nature of their members, have had more consistent governance. Both of these, however, lacking the checks of potential elective disbarment, have rarely resulted in economic advantage to the group, but more often in individual executive gains.

Consequently, only a few group farms were adequately led, and partly as a result of the inevitable member-versus-committee confrontation, executives generally cultivated an aura of secrecy which, as well as providing a sort of mystical power base, prevented members from sabotaging committee decisions before they could be implemented. Communications between members and their executives were thus (and still are) almost non-existent and a member rarely knew or was informed about decisions concerning the group enterprise or farm until these had been carried out. Perhaps for this reason alone members either had little compunction about voting out a committee or became more and more uninterested and increasingly against the group enterprise as the farm went economically downhill. Secrecy was also an inevitable breeding ground for suspicion by members of committee malpractices and ineptitude.

Thus the leaders did not lead, but tended to direct. Most often they operated in an atmosphere of closed meetings and secrecy; and generally they relished the social status, petty financial benefits (such as setting themselves allowances of k.Shs 10 to K.Shs 15 per day) and the larger potential for individual gain posed by the group financial assets. Not all committees or directors are dishonest by any means, but only a very few are competent and secure. In opposition, members would often not be either led or directed, as they felt a sense of ownership which was irked by committee control. Members also tended to utilise the mechanism of committee replacement to the full, and, out of resentment and uninterest engendered by lack of communication and involvement, have increasingly begun to oppose and even sabotage the group enterprise.

### 2.3 MULTIPLE INTERESTS

Perhaps spurred by a realisation of the economic decline of large-scale farms, and the knowledge of their inability to successfully manage certain types of enterprises, almost every actual or potential group leader wherever possible has branched out into at least one alternative business, sometimes illegally using farm assets as a platform. The temptation must be great to 'borrow' farm finance for business enterprises where quick and adequate returns are possible, and management within the realms of natural ability and understanding. These business interests, which range from butcheries to taxi services (or even membership of the executive of another farm, which naturally raises suspicions of conflict of interest,) are generally profitable. As a result the potentially most active and able leaders and entrepreneurs have little time or interest to devote to actual group farm management, which in turn accelerates its economic decline. This situation most commonly occurs with large Kikuyu societies and companies where individual plot holdings are small, and potential returns to the individual even from a well-run farm are low (so that alternative income is essential). The tribal aptitude of the Kikuyu for business and commerce has also contributed.

For a man of industry and ambition, the above is almost inevitable, for one of the main problems with group farms is that unless a man has an individual plot large enough to engage his energies full time there is little other outlet except to complain or make mischief. Rarely will the group farm enterprise absorb more than a small portion of the potential member workforce's time, and most resident members of group farms, unless these are totally subdivided into plots where a good living is assured, are considerably under-employed if they do not have alternative employment interests.

### 2.4 GROUP WORK

Despite the fact of group under-employment, the anomaly has arisen that after initial experiments with member workers, almost all group farms that are still functioning employ a majority of non-members. The main factors causing this phenomena are the members' feelings of ownership and the often low rates of pay. A member is generally unwilling to take orders from another member, a committee man or particularly a non-member manager, if the work does not suit him or he disagrees with a decision. So much trouble generally ensues, with arguments and refusals to work at a particular job on a particular day, that members refuse to work and committees refuse to employ them. This is aggravated by the question of payment, for members are not prepared to wait until a crop is harvested, and demand regular money equivalent to the current wage rates. This situation is not exceptional and is more or less unavoidable. (Group work is poor in both attendance and quality even in the imposed and structured socialistic system of Ujamaa in Tanzania).

### 2.5 DISSENT, THEFT AND FRAUD

Apart from constant member pressures to subdivide the farm, the vested interests of individuals in retaining the political and financial perquisites of local power, or with the Kalenjin, the incessant fights and arguments over numerical rights to cattle grazing, and a wide gamut of petty and individual differences, the single most important cause of group dissension has been executive or manager theft and fraud, and individual member petty theft and sabotage. So loose have been group financial controls and so frequent the occurrence of various forms of theft and fraud that members continually suspect committees and directors of perpetrating these through the secrecy of their meetings. Such attitudes are a continuous hamper to efficient management.

The variety and form in which individuals and small groups have made off with their fellows' assets are numerous, and on only a small number of occasions has legal punishment been

effectively applied. Typical examples include the pocketing of a proportion of the original share payments, as few members know how much has been collected, selling farm inputs purchased on a loan, and selling shares illegally to any willing buyer who wants land. In the context of the virtual rags-to-riches change at Independence, and the social dispersement and dissolution that occurred, it seems that without the traditional restraints, too many were unable to resist the chance of illicit personal enrichment. For many it seemed perhaps the only way that inculcated aspirations could be met. For others, the felling seems to have been that a man is a fool who does not exploit his acquired position to the full, and that theft is only socially stigmatic if it is detected or perpetrated against immediate family and friends. Given the loose social agglomeration of most groups there was little hesitation in exploiting the situation to the full.

Whilst it is possible to understand the complex reasons behind the frequency of theft and fraud when the absence of established social and physical financial checks increased temptation, theft and fraud have acted as a tremendous impediment to the ultimate success of group farm enterprises. Consequently, most groups operate in an aura of almost obsessive mistrust and suspicion, which is a major contribution to the universal desire to subdivide and farm individually, thereby eliminating the cause.

## 2.6 A SUCCESSION OF MANAGERS

Along with constant executive change, there is a general group history of rapid change of managers. Even the few relatively successful group enterprises rarely retain a manager for longer than a year unless he is an untrained and compliant member, satisfied with the salary paid. Groups generally demand too much and pay too little, and committees rarely allow any latitude in decision-making. Sometimes the best management decisions are in conflict with resident member requirements (e.g. overstocking and the use of group equipment for no payment), and frequently there is a lobby to have the manager removed or his endeavours are sabotaged and discouraged. Good management is also sometimes seen as a threat to vested interests or to the authority of a weak committee, although conversely, economic failure eventually leads to the committee's replacement. Managers are also subject to, and sometimes succumb to, the same theft temptations as the executive, and thus the group's belief in the need for tight restrictions is reinforced.

Only a very few committees have grasped how to establish a working relationship with a manager and how to provide a reasonable degree of control without stifling his initiative. Also only a few will admit the value of paying a reasonable salary, which is far beyond their own income potential, and which they as owners tend to resent, to a trained or experienced manager. In this latter attitude groups have been self-defeating, for the very few experienced managers have generally soon left and taken alternative employment with superior pay and less social stress, with the result that those now available are often less than adequate. A common occurrence now is for the entire committee to attempt the management of a farm through a resident committee member or Director, which although far from satisfactory at least excludes paying outsiders a large (and in their view generally unearned) sum.

## 2.7 BENEFITS TO MEMBERS

In almost every instance except where complete subdivision has occurred, the only benefit a member has derived from a large-scale farm is the right to a (temporary) subsistence plot. Rarely have any cash dividends been realised, and more often the opposite has occurred, members having been required to increase the value of their original subscription in order to meet land purchase debts and operating losses. Sometimes the group enterprise provided fringe benefits in an effort to give the members something while all the income was diverted to debt repayment. Such things as subsidised ploughing, crop drying, transport and milk allowances are useful to a resident member, but do little

to offset his view of the overwhelming advantages of subdivision and individual smallholdings. While numerous dissatisfactions are voiced, few members are totally antagonistic, for even their subsistence plots, unless in a marginal rainfall area, are far larger and more productive than their inherited entitlement (if any) would have been, and there is always the strong chance that individual plot size will increase.

## 2.8 SUCCESS STORIES

Not all group owners of farms have failed economically, or are torn by dissension, but these are the exceptions rather than the rule. While generalities are difficult to apply, the essential elements for group success are as follows:

- (a) The farm enterprise, though responsive to skilled management, should still return a profit under a relatively elementary level of management and preferably be based on mono-culture, such as coffee or ranching, and not require a wide variety of skills.
- (b) A majority or all the members must own an adequate alternative farm area and not require to settle on the farm owned by the group. Instances are now occurring where groups who meet most of these criteria are now at work trying to remove the minority lower strata of members (who are or will demand resident status) by, for example, raising the required shareholding to a relatively high level.
- (c) The level of education or business sophistication of most members and the committee or directors is high and they also have alternative sources of income.
- (d) A relatively skilled or at least honest manager is employed and takes full advantage of available technical advice.
- (e) If the income and alternative farm area criteria are not met, then the group must have very strong ties and discipline, such as can be enforced by a uniform and radical religious group, or at least have had a long previous tradition of cooperation, such as a pre-independence marketing society. This latter group will by no means necessarily be successful.

In a very few instances, where a clever and sophisticated executive group has combined with skilled management on a large estate to produce quick and adequate returns, a group farm has remained intact (e.g. some coffee estates). In almost every case, however, the membership has had to be large to meet the purchase price, and the prime aim of the executive is to purchase another farm for member settlement to ease the pressure on the main commercial operation.

## 2.9 THE PROBLEMS OF PARTNERSHIPS

A partnership of over 20 (these do exist, although they are illegal) is more or less a large group and subject to all the problems and stresses of group endeavours. Smaller partnerships, however, also have their problems and in a majority of cases, unless all except the manager are virtual sleeping partners, they have encountered trouble and have simply divided a farm into a few units still suited to large-scale operations. Because of their small numbers and high initial individual financial subscription, which pre-supposes a reasonable level of sophistication, partnerships have generally maintained a degree of lucid, if sometimes strained, interchange and have rarely been subject to the violence of dissension and absence of internal communication which is typical of some larger groups. Except for instances of partner-director misappropriation, or the illegal sale of land to others by individual partners, the basic reason for the dissolution of most smaller partnerships is an inability to agree on farming methods and management.

## 2.10 A FORTUNE FOR THE FEW

It was always obvious that the need and demand for the possession and ownership of land were easily exploitable. A small cadre of clever or devious entrepreneurs have used this means to build political power or accumulate large financial gains. The worst amongst these have simply collected money and disappeared or have led squatter walk-outs to the few remaining European-owned farms whose purchase they falsely allege they have arranged. In addition to these, there are a variety of facilitators and fixers, some of whom make a good living out of the bank interest on accumulated savings and others who are motivated by political ambitions.

Within the realm of legality, by far the most common practice is where one or a few individuals purchase land by loan or subscription and settle group members in areas the total value of which is much less (often as much as half) than the members' paid up sums. Provided the area is large enough or limited only to equivalent shares and the mistake is not made of settling subscribers on marginal cropping lands, as is beginning to happen with former Rumuruti ranches, the members are content not to question the company's finances, Director dividends or the profits from retained large-unit farm areas. Many such men see themselves as essential pioneers who are meeting the needs of a large group of people far more quickly and less expensively than formal Government schemes. One such company has over 20,000 paid up members, with another 20,000 on the waiting list. Their activities are not illegal and not necessarily even morally wrong, but the profits reaped are considerably greater than the country can afford and often wastage and profligate extravagance occurs. The most important criticism, however, is that the mode of land settlement is often physically destructive and conservation is sacrificed for expediency and profit.

## 2.11 THE FAILURE OF BUREAUCRACY

A major contributor to the management and operational difficulties of group farms has been the failure of Government agencies to provide the supervision, services and technical advice for which the new group executives and managers are so desperately in need.

### (a) The Department of Co-operative Development:

The Department of Co-operative Development has failed in most of its farm-related functions, from keeping adequate track of farm finances to visiting and advising groups on how best to work together. Many co-operative groups have not received an annual financial statement since 1974, and lack even this basic decision-making tool for management decisions. Although misappropriations of society funds have occurred from time to time, it is probable that far more misappropriations have been perpetrated by company directors than by co-operative committees. Co-operative farms, however, lack the recourse to other income that company members have, and being restricted by regulation from subdivision, are amongst the worst in debt. The apparent failure of co-operative group farming is such that the whole concept of group farm producer co-operatives should be discarded and the co-operative role tied solely to servicing functions.

### (b) The Ministry of Agriculture:

Most of the failures of the Ministry of Agriculture have been logistic, from the early shortages of extension staff to the more recent shortages of transport and materials. The farming sector requirements of skilled manpower have grown so rapidly that there has been virtually no practical means of keeping up and thus the sector has suffered. An unnecessary impediment to the extension work has been the frequency of members opposition to innovation, and the opposition of leaders who fear loss of prestige or position, or simply make local political capital out

of opposing unpopular technical measures such as stock number controls and soil conservation measures.

In addition to co-operative and agricultural advice inadequacies, the frequency of poorly researched or optimistic loan projections by the Agricultural Finance Corporation has contributed to debt accumulation and arrears. In a society such as Kenya's, where a large number of unsophisticated people seek loans, the onus of responsibility lies as much with the lending agency as with the recipients.

## 2.12 THE REALISATION OF FAILURE

With time the mood of groups changed from the early euphoria of ownership, which new groups still display, to one of disgruntlement and disillusion. Group farming as a whole has not succeeded, nor does there appear to be much hope for its success in the future. The concept had severe practical drawbacks and people were not sufficiently prepared or capable of adjusting overnight to the great technical and social requirements demanded. It was basically unfair and unreal to expect so much, and in reaction the members have increasingly turned from the superficially-applied group organisation which has failed them to the traditional concept of smallholdings from which they know they can derive a living and where one believes oneself to be in sole control of one's own enterprise.

# 3

## Sub-division

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### 3.1 GENERAL

Those groups which today stand free from debt, or at least carry only a small debt load, are predominantly those who from the beginning have subdivided and farmed as individuals, or who simply treated the farm as a piece of land which they grazed and occasionally cultivated in the traditional way. Most groups which attempted to undertake intensive large-scale cropping or livestock enterprises sustained losses, either through poor management or misappropriation, so that eventually not only were they carrying their original land purchase loan, but had accumulated considerable operational debts.

This failure has reinforced peoples' beliefs in traditional husbandry; beliefs which the large-scale farming concept was supposed to counteract. For the cattle-keeping Kalenjin the situation has been confirmatory of their tradition of maximising cattle holdings beyond accepted stocking rates. Selling cattle has been a relatively easy way to purchase farms outright, and when pressure was applied on them to meet their repayment on operational and development loans Kalenjin groups rapidly paid up by applying a cattle levy on all members. Similarly, agriculturally-orientated people have often realised yields on their smallholdings far greater than the poorly managed group enterprise and have come to believe that the only way to maximise personal income from the farm is by total subdivision.

Most groups rapidly came to recognise their own co-operative inadequacies and management failings, and rather than permit their indebtedness to increase generally cut back on risky cropping enterprises, sold capital assets, increased share contributions and devoted their total remaining group income or introduced an individual levy for the repayment of the land purchase loan in the belief that once this was achieved, the land would be secure. Groups would then be free to subdivide, buy another farm or do as they wished, without the fear of outside intervention or influence on activities. In aiming for this objective, some groups have achieved their first unanimity, for it equates with the fundamental desire of individual members for the land purchase to be completed and individual holdings maximised.

Unless members have alternative farms or incomes, the ultimate end for the majority of group farms is likely to be subdivision. Even then, the stay is only temporary until the next generation of Kenya's fast multiplying population demand their share from owner-parents. The antithesis to this is that any crop farming area which is required to remain intact for strategic national crop production reasons (e.g. production of seed maize) should not be sold to a group.

Membership of a group is generally regarded by individuals as actually owning a farm. After the years of social and economic group failure, members demand and expect what is to them their ultimate right, and in nearly all group farms subdivision is now the almost unanimous desire of the participants. Many groups, particularly those with larger unit areas per member (this seems more common in the Eldoret-Kitale area than elsewhere), have gone ahead and subdivided, and of those who have not, most wish they could do so or had done so.

The critical years for the self-recognition of group failure seems to have been from 1973-74 onwards, or generally after six to nine years of attempting to group farm. The first groups to subdivide were those whose members were relatively sophisticated and had the freedom of organisational decision which is possible in a company or partnership. The decision to subdivide almost always assumes either the completion of land purchase debt repayments or alternatively an agreed method of debt repayment which indicates an encouraging sense of responsibility. In this, individuals are surprisingly punctilious and willingly and regularly pay their levied daily amount of milk or annual sacks of maize for the eventual security of their individual plot.

There are some groups who have gone ahead and subdivided regardless of possible legal constraints or organisational or financial problems. Such groups have usually had a history of considerable financial misappropriation, non-registered member claimants, or disputant tribally-based owner groups and have simply carved out a mass settlement where every individual marked out and took what he could when all communication and interchange excepting violence broke down. Such instances are the exception rather than the rule, but are so unsettling and infectious that the resolution of their problems should be given the highest priority.

In terms of social harmony and member satisfaction, subdivided farms rank highly, for individual plot size and thus direct income-earning capacity has generally at least doubled (before subdivision most members would have had only subsistence plots), the threat of future group-incurred debt has been removed, and the farmers' desire for a holding of their own has been satisfied. However, even with amicable or arranged formal subdivision, dissension may still ensue, particularly where the dividing mechanism has been clumsy or unfair or where less sophisticated members do not properly understand the system of proportionate division equivalent to individual shareholdings, which gives some members larger holdings than others. Such problems are not insoluble.

Although subdivision is the most realistic solution to group farm problems, it has two main drawbacks:

- (a) A lack of technical supervision, in surveying and measuring land units, in determining the method of land utilisation, and the conservation of critical slopes, river valleys and other sensitive areas.
- (b) The absence of control over plot size, which may be smaller than required for an adequate income and thus force the member to find alternative employment, or be much larger than necessary, thus reducing the number of people which can be settled.

Subdivision has grown rapidly and is a spontaneous process which would be extremely difficult to stop, particularly as 'land companies' which offer nothing but the right to a defined acreage of smallholding per share show no signs of diminishing. Given the extent to which subdivision has already occurred and that it will inevitably continue the feasible course open is to improve the process by introducing technical and financial controls to ensure adequate plot sizes, and conservation measures, and to avoid excessive costs to the potential smallholder.

### 3.2 GROUPS WHICH HAVE NOT SUBDIVIDED

Although the trend is increasingly towards active subdivision, there are some groups who, reacting to mostly outside pressures, are either unwilling to subdivide or incapable of doing so. While subdivision almost always remains a future objective, some of the reasons why a group which has otherwise failed stays relatively intact or even reduces individual plot sizes (as a precondition for membership of the rehabilitation programme) are as follows:-

- (a) The belief held by a farm's executive body and members that if the farm is subdivided its group debts will not be repaid. This is linked to the obsessive need to own the farm outright as a priority and the fear that it may and can otherwise be taken away if not paid for. This criteria may not hold if the loan outstanding is not for land purchase. Such groups have generally drawn their membership from a poorer strata of society, and have little means of repaying debts other than the farm production. Group size is generally large and membership socially disparate, so that leaders fear that if subdivision occurs before loans are repaid, individuals will simply abdicate from group debt responsibility.
- (b) Where membership is large as compared with farm size, so that subdivision would result in which holdings are too small. Often it is only the more aware members and the executive who are preventing subdivision. Their strategy is often to hold the group together temporarily, pay off all the debts as soon as possible and then use the title deed as a collateral for the purchase of a bigger farm which will accommodate all members. Large groups rarely see the solution for inadequate farm size as being a reduction in the number of members, but usually consider the best method to be an increase in land holdings.
- (c) Co-operatives, which are the group organisation most commonly affected by the above problems, are subjected to greater pressures not to subdivide. These restrict freedom of choice, particularly for the many groups the majority of whose membership is traditional, from the lower strata of society who are more fearful and respectful of government than are company entrepreneurs.
- (d) A high proportion of non-resident members in a large group owning a relatively small farm also makes subdivision almost impossible. However, if individual plot entitlement is in the range of 2 hectares or more, a group will often allocate this exact amount to each resident member. The length of time the remaining large-scale area will remain intact will then relate directly to the rate of settlement of the presently non-resident members.
- (e) The demand for recognition by unregistered and unofficial members who have acquired or been sold shares illegally by a few members or executives. Such people are so afraid of losing their investment and their entitlement to land they feel is theirs by right of payment, that they strongly oppose subdivision in the fear that the majority of members who were not party to the transactions would exclude them. At the best, this results in stalemate and, at the worst, open clashes and violence.

Nearly all of these groups struggle on trying to solve the problems of reaching a point where subdivision is feasible. Some join the rehabilitation programme as a means to repay loans, some will get further into debt or will stultify, which may spark off spontaneous subdivision, and some will purchase farms to settle extra members or simply give up and divide into economically undersized plots. It should be realised that no matter what ensues in the interim period, once groups have repaid their loans a majority will eventually subdivide.

### 3.3 HOW DIVIDEND GROUPS OPERATE

#### 3.3.1 Methods of Division

Once subdivision is decided upon, unanimity supercedes previous dissension between members

and the process is often a reasonably well planned and implemented exercise. Quite often an entirely new executive is elected to supervise the process and every member is an involved participator, since their future livelihood is at stake. Apart from the case of full plot entitlement being allocated to the resident members of a group with a considerable proportion of non-residents (see Section (d) above) or the casual cultivation and group grazing practiced by some Kalenjin groups (neither of which are regarded as necessarily binding apportionments) there are two main prevailing methods of subdivision:-

(a) The formal procedure followed by the Kikuyu and most other agricultural tribes. Because of their desire to settle the issue once and for all, without the future problems which ambiguous or allegedly unfair subdivision would cause, such groups generally:

- (i) employ a qualified surveyor to survey and divide the farm into equivalent units excluding non-agricultural rocky or swampy areas and allowing for road access.
- (ii) allocate plots by a secret ballot system which is often carried out by a trusted third party and supervised by the local police. Thus a man has as much chance as any other of drawing a better plot. Generally the farm is surveyed into units equivalent to the share. Multi-shareholders may take up their entitled total as a block adjacent to their ballot-drawn plot in order to prevent the problems which would arise from fragmented holdings.

Where a company owns more than one farm, each may be divided independently with a member being allocated a piece of each, particularly if there is a considerable value differential.

Once achieved, the result of such subdivision is generally a relatively stable and normal social and economic smallholder grouping which could be formally legalised with a minimum of effort or physical adjustment (unless, as has occurred, the subdividing Committee bribes the surveyor to "hide" certain areas, which are later sold for considerable sums).

(b) The more casual Kalenjin method. Kalenjin groups rarely resort to precise land measurements or third party assistance. In general, estimates and measurements of plot sizes are made by rule of thumb, by references to the original farm map or by chain and pacing, utilising a trusted and known local individual. Plot allocations are not made by ballot, but because of the traditional penchant for separated homesteads, are generally simply area extensions of the original house and subsistence plot location. As these were made either on a first-come-first served uncontrolled basis, or under the direction of the first executive group, elements of unfairness may exist.

Similarly, areas acquired by individuals may not reconcile or be understood to reconcile to equivalent shareholdings. Resentment occurs and often violent annexing actions are taken by smaller shareholders who, out of ignorance or fact, believe they have been unfairly treated. It is probable that future attempts to properly survey and subdivide such farms will revive such disputes and result in considerable dissension.

### 3.3.2 Continuing Group Functions

While subdivided partnerships, because of their larger unit sizes, have often completely

disintegrated except for an ineffective executive which arranges the payment of continuing group debts and taxes, the better larger groups have developed new levels of group cooperation. In such cases the elected committees or directors assume some or all of the following functions:-

- (a) Arrange the bulk marketing of members' produce (milk and maize predominates). This is a logical area in which the Co-operative Department can provide assistance.
- (b) Maintain a group account, assess individual liability and arrange for debt repayment and pro-rata income payments to individual member producers.
- (c) Pay various group taxes such as income tax and land rates.
- (d) Maintain a register of individual holdings.
- (e) Approve and arrange the occasional sale of certain smallholdings.
- (f) Act as the group's representatives to outsiders and attempt to mediate in individual internal disputes.
- (g) Coordinate group activities such as the construction of schools, the location of a community centre and the allocation, to members only, of shop sites. (One subdivided company has even allocated the area for a cemetery).
- (h) Attempt to secure loans on the basis of the group holding, these loans being issued to individuals for smallholder use.

There is thus an extremely useful role for a committee to play in organising group affairs, which could logically continue even if subdivision is recognised and the group ceases to exist as an intact physical and legal entity. The larger shareholders may eventually prefer to market individually, but the bulk of the former group members, with their relatively small surpluses, would not. In such a situation there is obvious room for misappropriation, and it is essential that rules and controls be introduced now so that such occurrences will be minimised.

Not all groups have continued to manage their affairs in part or in total as described above, and there are those which have been so torn with dissension that once subdivided they have done away with all forms of group cooperation, a situation which is sometimes irredeemable.

Under the newly evolved system of group cooperation at a marketing and coordination level, and with each man looking to the income from his own plot rather than a group enterprise, two major concerns have arisen:-

- (a) Smallholder credit:

At present credit is available only for the large-scale group enterprise, and subdivided farms, although sometimes receiving loans through sympathetic local agency officials, are in fact ineligible. Group members are so anxious to receive loans for smallholder farm inputs, that groups would probably be prepared to cooperatively guarantee a large single unit loan made to the farm, but which was to be used by individual members. Again, however, a fairly foolproof input or cash distribution system would be essential to guard against misappropriation or use by individuals in non-farm enterprises. Interestingly, many farmers would extend their acceptance of group liability to water project loans as well as farm inputs, but not to the construction of farm roads and tracks. As members are already differentially

served, liability assessment would be difficult and road access is apparently considered by members to be low priority.

(b) Income tax:

The taxes on a group-constituted enterprise are much higher than each individual would have to pay if the group legally ceased to exist. This point is of importance to smallholders on a subdivided group farm who are realising a reasonable income but see a disproportionate amount of this lost to taxes. To avoid this, groups want subdivision to be legally accepted and then to reconstitute their formerly production-based company or society into a service organisation with operating costs but no income.

### 3.4 CONCLUSIONS

The example set by the best and most successfully subdivided farms is the most convincing counter to all the arguments of the social and economic virtues of persevering with group farm enterprises. In general, subdivision works well. In the majority of cases it assures a man of a better income than under large-scale group enterprises, there is far less dissension due to management disagreements, inadequacies or theft, and most farmers are much happier running their own holdings.

What is occurring now is an evolutionary phase in the Africanisation of former European-owned farms, whose obviously successful enterprise methods were first copied by both groups and individuals and have now been discarded by groups in favour of more practical arrangements better suited to the people involved. Already subdivided groups have ceased to regard themselves as businesses and are beginning to demand to be recognised and served as communities of smallholders in the fullest sense.

# 4

## Rationalisation and Rehabilitation

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### 4.1 GENERAL

Given that the present and future subdivision of most group-owned farms is meritable, it should be recognised that groups can no longer be regarded as sufficiently responsible to be entrusted with any of the few remaining nationally valuable large-scale farms (e.g. those engaged in the production of seed or pedigree breeding animals). Group purchase of these can be expected to result in a deterioration of the enterprise, and eventually subdivision which will make the farm unsuitable for the original farming enterprise. Land companies, part of whose objective is the settlement of subscribers on purchased farms, allow the realisation of potentially large profits by a few entrepreneurs whose method of subdivision is, from a conservation viewpoint, suspect. To avoid the likelihood of further group losses and to eliminate unnecessary profiteering of this type, it is recommended that in future no large group, be it Co-operative Society, Company or Partnership or 'Land Company' be sold an intact farm. Groups wishing to buy a farm in an area defined as suitable for smallholdings may do so, but only if the farm has been formally surveyed and subdivided first into viable units by the relevant technical agency, i.e. Ministry of Lands and Settlement or Lands Section of the Land and Farm Management Division of the Ministry of Agriculture.

Individuals, small partnerships and small companies would be allowed to purchase farms, however, but their charters as well as Government legislation must preclude settlement of any sort. People subscribing to such Companies must do so only on the basis of expected cash dividends and must clearly never expect the right of settlement.

Government has clearly recognised the decline of the Large Farm Sector in Kenya, as shown by its application for substantial World Bank funds for rehabilitation of part of the Sector. Under this project, the Group Farms Rehabilitation Project (GFRP), rehabilitation and the clearing of accumulated debts is to be achieved by, in effect, alienating a large unit of the farm, since it is to be operated basically under management imposed as a condition of the rehabilitation loan. While some management skills may be imparted to the group over the five-year period specified, all the other root causes of dissent will be likely to remain unchanged. It is thus recommended that the concept of rehabilitation should be broadened to include the possibility of accepting farm subdivision, reviewed and modified where necessary, with the technical development of the resultant smallholdings being an alternative solution and the means of group debt repayment.

### 4.2 THE RATIONALISATION OF MEMBERSHIP

A large number of group farms, particularly co-operative societies, have too large a membership ever to provide either a reasonable livelihood per member or an adequately sized plot when the farm is ultimately subdivided. Unless the farm is already subdivided, all members are rarely resident or represented; absentee and often unknown members are, therefore, a considerable complication. Added to this is the problem of unregistered resident members who, unknown to the majority of the

group, have sometimes been sold shares and are thus a considerable cause of dissension, or who also may have been fully accepted by the group in all but the legal sense (e.g. additional members to an otherwise fully subscribed 50-member private company).

Much of this problem is brought about by the practice of multiple membership, where groups, rather than sensibly restricting size, have maximised it in order to raise as much money as possible. Over the years, individuals seeking to increase their holdings have often only been able to do so by buying comparatively small shareholdings in new groups, thus creating the ultimate in fragmentation: this process is still going on.

This situation is both economically and socially unsound and what is required is the rationalisation of membership through the extremely complicated and sensitive process of the exchange and consolidation of individual shareholdings. This is a major issue requiring priority attention, and it is essential that membership lists be finally compiled and stabilised.

The first step would be for each group to advertise for all contending members to identify themselves and pay their full membership shareholding by a defined date. Non-appearance would disqualify a particular person from full membership entitlement (but not necessarily from non-payment, for which a longer term timetable could be set), although his proportionate subscription would be refundable.

Once membership lists have been stabilised, the process of exchange and consolidation could commence. After the consolidation of holdings has been achieved, on certain farms holdings may still exceed economic viability. In such cases a proportion of members should if possible be bought out (in companies mainly the smaller shareholders and volunteers, and in co-operative societies volunteers and, possibly, a number selected by ballot), or moved to compensatory areas. For the Kikuyu and perhaps the Western Province agricultural tribes in particular, this is a most sensitive and critical issue, for to date few have relinquished land once they have gained an entitlement. On the other hand, Kalenjin individuals have already sold or exchanged land areas, and would not necessarily be so basically opposed in principle to relinquishing one piece of land in exchange for money or another area. What they are opposed to, however, is tight controls on land use, for compared with the agricultural tribes, the Kalenjin are extravagant land users and very often overstock with cattle.

Provided that it is well planned and carefully introduced, however, buying out shareholders is theoretically possible, even though up till now most people, having purchased 'land shares' have generally retained them except where a farm has become totally unviable (as those societies who attempted to settle and farm ranching land in the Naivasha area have found). Under the auspices of a country-wide programme, a shareholder might be persuaded to sell:-

- (a) If he has adequate land and business interests elsewhere and the shareholding in question is relatively small or, if the holding is of a medium size, a good profit is assured.
- (b) If, lacking alternative interests or land, he were offered the repayment of his original investment, compensation for improvements and land elsewhere, preferably not too far away and at least as good as the plot relinquished.

The difficulties and problems likely to be encountered in attempting to introduce a programme of rationalising group membership cannot be over-emphasised, but neither can the need. The only effective means by which such a programme can be even partly implemented is with the co-operation, albeit sometimes grudging, of all members of all groups affected. For this to be achieved, a maximum of influence from both the political and administrative wings of Government will need to be exerted. An inducement could be official recognition of the resultant modified subdivisions.

### 4.3 SETTLEMENT FUND TRUSTEE FARMS: A POSSIBLE SOLUTION

The idea of Settlement Fund Trustee Farms (SFTs) was conceived primarily to see if a more viable form of land acquisition and loan repayment could be evolved than the existing systems of formal settlement schemes and group take-overs, both of which resulted in considerable loan arrears. Under the SFT programme, large-scale farms are purchased by the Ministry of Lands and Settlement (MLS) and a number of 'landless people' are settled on 1 hectare subsistence plots, the total area of which rarely exceeds 25 per cent of the total farm. The remaining area is farmed as a large-scale enterprise by a manager and subsidiary staff employed by contract and directly responsible to MLS. In theory this situation is intended to continue until at least the purchase price is recovered. When this occurs the farm will either revert to the settlers, who will be integrated into the large-scale management system, or will be formally subdivided under a settlement scheme. In practice, however, considerable problems and drawbacks have already developed in the three years since the concept was introduced.

The SFT venture, while theoretically sound, is practically of high risk, for the success of each farm depends almost entirely on the skill and honesty of the contract managers, whose incentive to perform is very often reduced by weight of settler opposition or apathy. Farm managers are also inadequately supervised. Total farm subsidiary staff often appears to be unnecessarily large, and management seems to have little contact with the settlers except to offer certain limited services or to control theft or illegal grazing and otherwise exert disciplinary control. A majority of SFTs are either operating at a level well below potential productivity and many incur substantial losses.

Members, on the other hand, sit on their 1 hectare plots, isolated and excluded from the large-scale enterprise, and look forward to the day when they will own the farm, which they believe has been promised by Government four or five years hence. Almost every settler considers the present plot size a temporary measure, and most believe that a smallholding of at least 4 hectares is the future optimum, with a small group enterprise if any land is left. In some areas, in fact, an area of 1 hectare is inadequate for subsistence, and this leads to members stealing wire, crops, farm inputs and other goods from the large-scale enterprise. Sabotage of the enterprise occasionally occurs due to, first, a mixture of resentment at an operation they see as excluding them from making an adequate living, and secondly a belief that if the large-scale enterprise fails often and badly enough it may sooner revert to total settlement ownership. This situation is aggravated by the fact that most plot holders have considerable excess time on their hands, often demand employment on the large-scale enterprise as a right and join the ranks of the discontented when employment is refused or unavailable (settlers are generally employed only for casual labour jobs).

On some SFTs where the plot size of 1 hectare is patently inadequate, not all allocations have been taken up but those who have settled have assumed a hopefully proprietary attitude and are not anxious for the number of settlers to be increased; this would reduce an individual's ultimate share. Settlers do have committees, ostensibly to deal with internal matters, but in reality these have little actual function, being unable to either co-ordinate or restrict settler activities. The selection of settlers is arranged mainly through the District Administration and settlers are multi-tribal and have a wide variety of backgrounds. This diverse nature of settler origins weighs heavily against the likelihood of future cooperation, which is usually dependent on some degree of similarity of social or educational backgrounds.

SFTs at the moment thus consist of two distinct and separate elements - the commercial large-scale enterprise and the settlers. A major fault is the lack of a supervisory managerial structure and too much is dependent on the farm manager. If the manager is effective, the concept works and the farm makes a profit, but if not then losses are incurred and the goal of loan repayment recedes further into the future. Settlers have nothing to do but cultivate their own meagre plots, and except

for casual labour are not in practice involved with the large-scale enterprise (in view of the general failure of group enterprise this is probably inadvertently realistic). Divorced from the large scale enterprise, settlers invariably think in terms of ultimate subdivision. Having no involvement with the enterprise, they take no responsibility for its losses and will not take these into account when they eventually begin to demand (to purchase or be given) the entire farm.

It is probable that a majority of SFT farms are unprofitable at the moment. The following suggestions should help to provide solutions to the present problems of both the settlers and the commercial enterprise and remove the socially complicating doubts about the future. These are as follows:-

- (a) Plot sizes on all SFT farms should be reviewed by the Ministry of Agriculture's relevant officers and readjusted to provide at least a reasonable subsistence - plus living. This would go a long way towards reducing discontent, theft and sabotage.
- (b) The settlers should never be expected (or be encouraged to expect) to run the present large-scale farm component as a group enterprise. Subdivision into small-holdings capable of yielding an adequate living should be the stated long-term objective, and this should be timetabled so that the settlers may anticipate and contain their impatience and frustrations. If any SFT is unsuitable for subdivision, the present settlers should be accommodated elsewhere and the farm classified to be retained as a large-scale unit.

#### 4.4 THE SCOPE FOR REHABILITATION OF GROUP FARMS

If the proposition is accepted that the best and most acceptable course for Government to take with respect to most group farms is to plan for their rational subdivision, then except for the objective of debt recovery the present rehabilitation programme is taking a fundamentally wrong approach in prolonging and artificially sustaining group enterprise. As described in Annex I group farms are being recruited for this programme more or less under pressure and at a very slow rate, and in contradiction to the objective of re-stimulating group enterprise, in almost every case the group's objective is to allow the programme's management to get them out of debt and then subdivide. From a social point of view it would seem that the emphasis on group farms is wrong, for people are being forced to do what they really dislike doing as 'owners' - moving on to a small subsistence plot and letting a relatively costly manager operate their farm. Freedom is thus surrendered for economic reasons and inevitably feelings of deprivation will germinate and grow either into submerged or open hostility.

The present programme is falling far short of its recruitment targets and to date has been almost mono-tribal in composition. It seems that it is only the Kikuyu who are prepared to take the risk and subsist on small acreages while someone else works with their committee to get their farm out of debt. Once this situation has been achieved they will revert almost certainly to larger smallholdings and the accumulated savings for their major long-term aim of purchasing more land. Even so, most of these groups have joined because they or their executive see no other way out if they are to repay their debts and avoid losing their land. They do not really like the idea of bringing in a Government management agency, but most hope that this will be only a temporary measure which will solve their immediate problems. This idea of handing over land to Government to manage (which despite the membership constituent of the managing committee many people believe is actually the case), is in fact a major point in opposition. This is so because of rumours which allege that rehabilitation is in fact just the first step in a planned Government programme to take over the land and either evict the present members to create more ADC farms or to reduce people from owners to a much disliked tenant status.

A majority of groups whom field officers are seeking to persuade to join are either undecided or actively opposed. Even though many are acutely aware of their own shortcomings and limitations, they have already seen the failure of some SFTs and the unenviable situation of the settlers, and cannot see how another form of Government-sponsored management will be more successful. In many instances the whole issue of acceptance hinges not around the fact of Government assistance but on the loss of personal control to an unknown manager whom they may not be able to reject. This worries and concerns them more than the fact of increasing their debt burden with additional development and input loans.

There is also a very definite bias and credibility gap amongst many group executives, who express disbelief in the ability of imposed African management, no matter with what training or experience to do any better than themselves (this is especially true of ex-European farm employees).

On the farm, managers will face numerous problems from dissenting members who may initiate actions which it is unfair to expect a manager to combat. It will thus be essential that if group farm rehabilitation is persisted with, that there must be a strong and cohesive committee standing between the manager and the members whenever disciplinary action is required.

Kalenjin groups are the most reluctant to join the rehabilitation programme. Their fundamental opposition lies with cattle keeping and their unwillingness to be confined to a small plot for the five-year duration of the programme. When threatened or believing they are threatened with foreclosure, they sell the requisite number of cattle and repay their loan arrears. Similarly, most Luhya groups are opposed to rehabilitation both because of difficulties of group co-operation and because this would necessitate giving up the often substantial areas they now individually farm in exchange for a restricted plot. The desire for a large holding is usually the very reason why they left the reserve and purchased a shareholding in a group.

Thus, in general Kalenjin do not want to be confined because of their cattle and a distaste for close proximity living, and the Luhya etc., are unenthusiastic because their unwillingness to accept a small plot and their apparent proneness to argument and dissent. Only the Kikuyu appear to be willing to readjust and be pragmatic enough to realise the potential benefits of rehabilitation; even then such groups are mostly the totally defeated. Joining groups believe they have to an extent both abdicated from and been relieved of the total responsibility of the additional loans made through the rehabilitation programme. In effect, it was not their decision to borrow, but Government's decision to loan. They will be happy to receive any profits, but they may be unwilling to accept a loss, the cause of which, although they endorsed, was actually Government's making.

A few of the more astute and better groups, realising their limitations in managing a valuable asset, such as coffee, have cautiously joined the programme. The additional debt burden projected by the often rather optimistic farm plans worry them, however, for crop failures are always possible. The root cause of this worry is probably a combination of the doubt of the rehabilitation programme to supply an acceptable and sufficiently skilled manager, along with an inherent unwillingness to incur debts for intangibles which have a degree of uncertainty in their repayment (crop loans) while loans for something concrete like land are a different proposition. The whole structure and the way in which rehabilitation loans to groups are made and used needs re-examination, for these often increase a group's debt burden to an amount well above the net worth of the farm, and are made by field officers and used by managers who do not have the responsibility of repaying them. The more educated executives are afraid that more debts will mean less freedom and more Government controls, while the others may not realise the liability for repayment which goes with them.

People cherish the freedom to exercise control over land they have purchased, even though

they may realise their management is lacking efficiency. Moreover, the suspicion exists that the rehabilitation programme is just the first of a series of steps towards loss of ownership. Suggestions of foreclosure and sale to encourage groups to join the programme have only aggravated these fears.

Many groups are waiting to see if the farms which have been persuaded to join will actually succeed. From this point of view it is therefore essential that if the present programme is to continue, it must possess a showcase of quick and highly visible success. The first farms to be selected should therefore be those with a minimum of organisational problems and easily remedied technical deficiencies, and individually-owned farms should not be excluded. The present selection criteria aims at 'problem group farms' first. These will be very slow to show visible improvement and thus will be a poor demonstration of the advantages of joining the programme.

A few farms having made the decision to join are now balked by an apparently slow approval procedure, particularly with co-operative farms, where the Co-operative Department is involved. Such farms may have already consolidated members onto small plots who are restive at no action, or have even been granted a large preliminary loan which they may not be able to repay for lack of management supervision.

It is strongly recommended that the present rehabilitation programme should switch its emphasis away from the group-owned farm sector, promoting large-scale managed enterprises, to concentrating on individually owned and small partnerships for large-scale production, and treating group owned farms in terms of productive smallholdings after subdivision.

#### 4.5 CONCLUSIONS

The overall conclusion of this Sociology Annex is that most group-operated large-scale farming enterprises have broken down and fragmented both socially and physically to an irredeemable extent. The concept therefore should be abandoned. This, of course, does not mean that groups should not own large-scale enterprises, but that they have a self-admitted incapacity to operate and at the same time live on them. Group co-operation is also not precluded, but should be concentrated on the provision of services such as marketing, and not on basic production.

It is considered that Government should accept Subdivision as a logical end to most group farms, but insist upon technical and social modifications and controls, including the rationalisation of membership in exchange for legal recognition. Implicit in this is the additional acceptance that existing group debts could be repaid through the earnings of constituent smallholders. Also, no more intact farms should be sold to groups whose members wish to settle on them unless formal Government-controlled subdivision first occurs and farm settlement capacity is defined. With the rehabilitation programme the emphasis should switch to the individual and small company or partnership owned farms with respect to large scale farm production, and broaden to include group-secured smallholder loans, and possibly the management of SFTs.

## Annex IV

# Production and Market Prospects

# 1

## Wheat Production and Market Prospects

### 1.1 INTRODUCTION

The production and marketing prospects of wheat are of particular importance to this study because the bulk of the commodity (approximately 80 per cent) is produced within the Large Farm Sector. This situation is unlikely to change as the former scheduled areas are agronomically well suited to wheat production and wheat is generally regarded as a crop which should be grown under large scale systems.

Structural changes in the pattern of land ownership, variations in the wheat price and the influence of alternative profitable enterprises contributed to a sharp fall in the area and output of wheat after the peak years of 1968 and 1969. Since 1972 however, the planted area has been relatively stable, with some increases in the 1975-77 period as compared with the preceding three years. Meanwhile, domestic flour consumption has risen rapidly. The export surplus of the late 1960's and early 1970's has disappeared and there is now a substantial annual deficit which is met by wheat imports.

It is Government policy to encourage wheat production and to attain self sufficiency, with an export surplus being available for sale to Uganda. Present trends in production and consumption indicate that these goals are unlikely to be achieved.

### 1.2 WHEAT PRODUCTION

In 1975, the latest year for which production data are available, the wheat area in Kenya was 118,200 hectares and gross production was 175,700 tonnes, representing an equivalent gross yield of 1.49 tonnes per hectare. It is estimated that there were 1,635 farms growing wheat in that year and that about half of these farms planted 20 hectares or more.

The Large Farm Sector produces the bulk of the country's wheat, its share of the national output averaging at least 80 per cent. Regardless of farm size, almost all the wheat area is cultivated by tractor and the crop is harvested mechanically. No tradition of smallholder wheat farming exists in the country.

Table 1.1 shows the area of wheat since 1968. The present planted area is similar to the 25 year mean (1951-1975) of 120,250 hectares. Acreages in 1968 and 1969 were abnormally high. Thereafter they fell markedly to 105,000 - 107,000 hectares in the 1972-74 period. In response to a substantial increase in producer prices the planted area subsequently increased slightly to between 114,000 hectares and 118,000 hectares.

Table 1.1 Wheat Areas From 1968 to 1977 (000 ha)

Year	Large Farms <sup>1</sup>	Other Areas <sup>2</sup>	Total <sup>3</sup>
1968	139.8	27.5	167.3
1969	137.3	27.2	164.5
1970	121.1	6.9	128.0
1971	92.7	22.4	115.1
1972	89.2	15.7	104.9
1973	83.6	23.7	107.3
1974	89.3	16.7	106.0
1975	NA	NA	118.2
1976	NA	NA	114.5
1977	NA	NA	116.3

NA = Not available

- (1) Large Farms - Statistical Abstract 1975 and Agricultural Census of Large Farms 1970 and 1971, Central Bureau of Statistics.
- (2) Other Areas - derived total
- (3) Total Area - Kenya Wheat Board Annual Report 1973/74 and MOA Development Planning Division estimates.

Despite the influence of climatic and other variations, wheat yields have remained remarkably stable. During the decade from 1964 - 1973 the average was 1,328 kg per hectare. Yields are now showing a tendency to increase and since 1970 have approached or exceeded 1,400 kg per hectare in all years except 1973. The national level of production is thus closely related to the area planted. As shown in Table 1.2, in 1968 it was 222,500 tonnes, slightly below the 1967 peak and in 1973 fell to its lowest level, 138,700 tonnes. Production has since recovered and rose to an estimated 163,800 tonnes in 1976.

Three factors are thought to have had a major influence on the level of wheat production since Independence. These are discussed below in terms of their likely effect on future production.

(a) Changes in Land ownership

The land transfer programme involving the sale of European owned farms to Africans, initiated before Independence is now virtually complete. This transfer has involved the subdivision of a proportion of the large farms into formal settlements and the sale of the remainder as intact large units to individual owners or to groups. Most of those farms which were transferred intact to groups have subdivided part of their area into subsistence holdings. In the main mixed farming zones, where most wheat production is concentrated, about one third of all large mixed farms are already completely subdivided into small units. This has substantially reduced the wheat area since the techniques for wheat growing on small farms have not been developed. On the farms that have retained large scale operations, poor wheat husbandry and financial constraints have both tended to cause reductions in the areas planted.

Complete subdivision of large farms into formal settlement schemes has now virtually ceased, but there remain some group owned mixed farms, of which a few are in the ecological zone

most suited to wheat growing. The development strategy outlined in the Main Report recommends that owners should be allowed to subdivide into individual production units where the majority of owners are in favour of subdivision and where the number of owners in relation to the area of land available would allow a reasonable sized individual holdings after subdivision. In a number of cases the resulting subdivided units will be large enough to enable the wheat enterprise to be continued, but in some cases they will not. This policy will therefore cause a further slight reduction in wheat area on large farms, because experience has shown that farmers on individual smallholdings will tend to grow maize at the expense of wheat.

Table 1.2 Wheat Production and Consumption

Year	Production <sup>1</sup> (000 tonnes)	Consumption <sup>2</sup> (000 tonnes)
1968	222.6	99.0
1969	215.5	101.1
1970	176.9	125.5
1971	170.3	156.8
1972	149.6	151.3
1973	138.7	173.6
1974	169.6	171.5
1975	175.7	154.3
1976 <sup>3</sup>	163.8	171.1
1977 <sup>3</sup>	166.7	189.0

*slimfall*

*- 22  
- 118  
- 50?*

Source: Kenya Wheat Board Annual Report 1973/74.

(1) Planting year

(2) Flour sales in wheat grain equivalent; data for 1974 onwards are based on Ministry of Agriculture (MOA) Development Planning Division estimates.

(3) Wheat Board estimates.

(b) Price response

The price of wheat is fixed by the Government. In the 1960's it was maintained at a level of between KShs50 and KShs53 per 90 kg bag (current prices) until 1968. A surplus over domestic requirements, at a time of relatively low world prices, led to a change in pricing policy and producers were paid some 20 per cent less for the commodity from 1968 to 1972. In response to this price reduction the area and output of wheat fell and the previous wheat surplus disappeared. The ensuing deficit in supply also resulted from a simultaneous rise in domestic flour consumption.

A casual observation of the data indicates a marked response by producers to price changes. However, a study by J.K. Maitha "A note on Distributed Lag Models and Wheat Production Response: the Kenya case" which compared areas planted and producer prices over the past five years, concluded that the response to the wheat price alone was inelastic and was much more so than with maize. If this is the case, it appears that raising the wheat price may not necessarily encourage an expansion in production, as discussed below, the wheat/maize price ratio appears to be the important factor. Apart from technological improvements, an increase will come about only through changes in structural policy and by more sophisticated methods of determining producer prices.

(c) The wheat/maize price ratio

J.K.Maitha's analysis suggests that attempts to relate wheat supply to the wheat price alone over simplifies the situation and that the most important factor determining variations in wheat supply is the ratio between the price of wheat and that of maize. In Maitha's study it is argued that, given the present level of technology, a wheat/maize price ratio of 1.6:1 is required to induce producers at the margin to substitute wheat for maize. The Development Planning Division of the Ministry of Agriculture (MOA) has pointed out that the price ratio fell to 1.53:1 in 1976 and estimates the area planted to wheat in the same year fell slightly. With the latest producer prices announced for wheat and maize in October 1976, the ratio is 1.5:1 and the wheat area can be expected to fall.

### 1.3 FUTURE PRODUCTION

The above review of the important factors influencing the supply of wheat and the discussion of trends in production clearly points to an unfavourable supply situation developing which may be remedied only by:

- (a) an intensification of production on the remaining large scale farming areas,
- (b) the development of new 'wheat lands' in Narok District, although the outlook for wheat production in this area is less promising than was previously thought, due to technical and land adjudication problems, and
- (c) the use of more sophisticated pricing techniques, allowing for such factors as price cross elasticity of supply of alternative commodities.

At this stage, the level of future production is difficult to forecast, but taking account of the factors mentioned above it is assumed for the purpose of this analysis that the small decrease in the area planted in the large farm areas will be compensated for by higher average yields and that the total output from the large farm areas over at least the next 5-10 years can be expected to remain more or less unchanged. With regard to Narok the increase in wheat area in the medium term is likely to be in the order of 20,000 hectares with an output of between 30,000 - 35,000 tonnes.

### 1.4 MARKET PROSPECTS

#### 1.4.1 Domestic Consumption

The fall in wheat production in recent years has been matched by an equally significant increase in domestic flour consumption (see Table 1.3), which in 1973 stood at 173,600 tonnes in wheat equivalent, compared to less than 100,000 tonnes in 1968. Demand did, however, fall slightly in the latter half of 1975 in response to higher bread prices, but is now thought to have returned to its previous high level.

The rapid but fluctuating rise in consumption creates difficulties for demand projections. A straightforward analysis of the demand since 1970 indicates that total consumption grew by 4.5 per cent per annum up to 1975. In its Agricultural Sector Survey of Kenya (1973) the World Bank suggested a rate of 5.2 per cent up till 1985, on the basis of population projections and coefficients of income elasticity. Demand projections used by the Wheat Board and by the Ministry of Agriculture in the preparation of the 'Commercial Farming Project' report have employed five per cent; this rate will be used here.

The projected demand and production of wheat over the 10-year period from 1976 to 1985, and the resulting annual shortfall, is given in Table 1.3. This indicates that the wheat deficit will widen over the period to a point where Kenya is producing about 65 per cent of her domestic requirements, and the increase in demand will have to be met by higher wheat imports.

Table 1.3 Projection of Wheat Consumption and Annual Deficit 1976 - 1985.

Year	Gross <sup>1</sup> Production (000 tonnes)	Net <sup>2</sup> Production (000 tonnes)	Consumption <sup>3</sup> (grain equivalent) (000 tonnes)	Annual Deficit (000 tonnes)
1976	163.8	150.7	171.1	20.4
1977	166.7	153.4	189.1	35.7
1978	166.7	153.4	198.6	45.2
1979	166.7	153.4	208.5	55.1
1980	196.7	181.0	219.0	38.0
1981	196.7	181.0	229.9	48.9
1982	196.7	181.0	241.4	60.4
1983	196.7	181.0	253.5	72.5
1984	196.7	181.0	266.1	85.1
1985	196.7	181.0	279.5	98.5

- (1) As described in Section 1.3, production is assumed to level off in 1977. Allowance has been made for increased production from Narok of 30,000 tons from 1980. This increase is likely to be phased, but has for simplicity been included in total from 1980.
- (2) Net production is the amount available for off-farm consumption after deduction for seed requirements, wastage and on-farm use.
- (3) Consumption: the wheat grain equivalent of demand for flour for 1976 and 1977 are Wheat Board estimates; consumption is thereafter assumed to increase by 5 per cent per annum.

#### 1.4.2 Export Trade

For the foreseeable future, the principal policy objective is likely to remain one of import substitution. Should production increase to a level where an exportable surplus became available Kenya would be well placed to resume exports to Uganda, which imported an average 26,300 tonnes (unmilled) annually during the period 1965-1974. A significant though smaller market exists in Tanzania.

### 1.5 PRICES

#### 1.5.1 Producer Prices

The price of wheat in August 1976 stood at KShs 102.75 per 90 kg bag or KShs 1,142 per tonne for Grade I and KShs 101.00 per 90 kg bag or KShs 1,122 per tonne for Grade II. This represents an increase of 108 per cent at current prices over the level in 1972. In constant price terms (using a GNP deflator) it has increased by 54 per cent over the same period. In August 1976 the price was raised again to an average level of KShs 120 per 90 kg bag (KShs 1,330 per tonne). Consumer prices of wheat flour have also risen during the period, increasing from KShs 2.70 per kg to

KShs 5.0 per kg, an increase of 85 per cent. The producer price movements from 1972 to 1976 are given in Table 1.4; these are average prices and take account of the lower prices paid for grades below Grade II.

Table 1.4 Average Producer Prices of Wheat

	1972	1973	1974	1975	1976	Increase (Per cent)
Approximate average producer price (KShs per 90 kg bag)	46 (Mar) 48 (Nov)	58 (Aug)	70 (Feb) 80 (Aug) 90 (Nov)	100 (Jan)	100 (Sep) 120 (Oct)	150

### 1.5.2 Import Parity Prices

On the basis of projections made by the Development Planning Division (DPD) of the MOA, the import parity price in financial terms for wheat delivered at the main consumption centre, Nairobi, is estimated to be KShs 121.60 per 90 kg bag (KShs 1,351 per tonne) for 1977 and KShs 129.10 per bag (KShs 1,434 per tonne) for 1978 (see Table 1.5). These are at current rather than constant prices and thus allow for general inflation.

Table 1.5 Import Parity Prices of Wheat (KShs per 90 kg bag).

	Financial Price		Economic Price	
	1977	1978	1977	1978
Wheat, c.i.f. Mombasa	107.2	113.6	128.6	136.4
Transport and handling from Mombasa to Nairobi	14.4	15.5	16.1	17.4
Producer parity delivered Nairobi	121.6	129.1	144.7	153.8

Source: Adapted from DPD internal paper on the 1976 price review.

To compare official producer prices with import parity, allowance must also be made for the cost of transport and handling to bring locally produced wheat from the main farming areas (official prices are in terms of wheat delivered at local centres in these areas) to Nairobi. According to DPD estimates, the average cost in 1977 would be some KShs 9 per bag. The cost of Kenyan wheat delivered at Nairobi would thus be KShs 129 per bag, some six per cent above import parity levels.

This analysis indicates that the current official prices are only very slightly higher than what might be considered to be the real value of wheat production to the Kenyan economy, as represented by the import parity price. Moreover, it can be argued that the import parity price quoted above understates the real cost of imported wheat, because the economic value of the foreign exchange used to import wheat is above the official exchange rate.

This factor was taken into account in estimating economic wheat prices made by the DPD in the above paper. Using shadow prices, the DPD estimated that the producer parity price at economic (social) values would be KShs 134.60 per 90,kg bag (KShs 1,495 per tonne) in 1977, roughly equivalent to the official price of wheat delivered at Nairobi, and KShs 142.85, per bag (KShs 1,587 per tonne) in 1978. The calculation was based on the assumption that:

- (a) Australia was the cheapest source of reasonable quality wheat,
- (b) the official exchange rate over-values the Kenya shilling in relation to the US Dollar by 20 per cent, the shadow foreign exchange rate thus being KShs 10/US\$,
- (c) f.o.b. prices of Australian hard wheat increase by six per cent between 1976 and 1978,
- (d) the cost of ocean freight and other expenses between f.o.b. Australian port and c.i.f. Mombasa would be Australian \$8 per tonne,
- (e) the foreign exchange component of the cost of transport and handling between Mombasa and Nairobi is 60 per cent.

To derive a price for use in the farm budgeting and economic analysis in this study, account must be taken of likely future price trends in the world market for wheat. On the basis of World Bank estimates, which are considered to be the best source available, wheat prices in real terms (i.e. ignoring the effects of general price inflation) in the 1980-85 period are expected to be 13-17 per cent above 1976-77 levels. Assuming an average 15 per cent increase, long-term c.i.f. prices at Mombasa at constant 1977 values would be KShs 123.3 per bag, compared with the value of KShs 107.2 given for 1977 in Table 1.5. Delivered at Nairobi, imported wheat would thus cost KShs 137.7 per bag (KShs 123.3 + 14.4 for transport and handling). In terms of import parity, the price of locally-produced wheat would be KShs 127.8 (KShs 137.7 - 9.0 for transport and handling between the producing areas and Nairobi). Allowing for transport and other costs between the farm and the local market centres, and not taking account of a possible over-valuation of the Kenya shilling at current exchange rates, a farm-gate economic price of KShs 120 per bag or KShs 1,333 per tonne has been assumed.

Market prices can be expected to continue to be above import parity levels because of the Government's desire to attain self sufficiency in wheat and thereby avoid dependence on overseas suppliers. For planning purposes a financial farm-gate price of KShs 132 per bag or KShs 1,467 per tonne, 10 per cent above the projected import parity-based values, has therefore been assumed.

# 2

## Maize Production and Market Prospects

### 2.1 INTRODUCTION

Maize is Kenya's most important commodity and its most widely produced and consumed crop. By far the largest proportion of the crop is grown on smallholdings and although no reliable estimates of national output exist, it probably averages between 1.4 and 1.6 million tonnes annually.

A parastatal body, the Maize and Produce Board (MPB) has a legal monopoly over virtually all purchases except for small local sales and enforces fixed producer and consumer prices. The Board has increased its intake over the past few years to its highest ever level of 552,700 tonnes in 1975/76. This level of purchases is considered indicative of a generally rising trend in national production, in response to both favourable producer prices and to the increased adoption of maize hybrids. However, considerable fluctuations occur due not only to climatic variations but also to erratic marketing policies. Most officials generally believe that increases generated by the

The country is now self sufficient in maize and there have been no imports since 1971/72. A strategic reserve is maintained and surpluses are exported, but as the producer price is above border parity this involves the MPB in considerable losses. In view of the expected continuation of this surplus situation, the policy of maintaining a high producer price should be subject to a critical review.

The Large Farm Sector produces only a small part of the national output and although most of its crop is sold, rather than consumed on the farm, it delivered only about 16 per cent of the MPB's total intake in 1974/75. The impact of the Large Farm Sector on the quantities of maize marketed is therefore of limited importance compared to the variations in such factors as climatic conditions and the rate of spread of improved varieties to smallholder farmers.

### 2.2 MAIZE PRODUCTION

The national output of maize has never been reliably estimated, although in 1966 a Commission of Enquiry considered that the MPB was handling some 40 per cent of the crop (deliveries in 1965/66 were 132,700 tonnes). More recently the MPB itself estimated that the proportion purchased may be about 40 per cent, in which case total production in 1974/75 would be about 1.35 million tonnes. The World Bank Agricultural Sector Survey 1973, indicated that total production might be 1.46 million tonnes (1969-1971) off an area of about 1.0 million hectares.

Table 2.1 shows the MPB's purchases and internal sales of maize since 1968-69.

The balance left after meeting internal demand is exported or retained to build up stocks.

Table 2.1 Maize and Produce Board Purchases and Sales (000 tonnes)

Year	Purchases	Internal sales <sup>1</sup>
1968/69	292.1	115.6
1969/70	193.7	180.2
1970/71	240.1	288.7
1971/72	379.0	190.5
1972/73	457.4	193.8
1973.74	335.4	348.8
1974/75	450.8	339.5
1975/76	552.7	378.3
1976/77 <sup>2</sup>	450.0	369.0
1977/78 <sup>2</sup>	540.0	377.0

Source: MPB Ninth Annual Report 1974/75

<sup>1</sup> Includes human consumption, famine relief and stock feed.

<sup>2</sup> MPB estimates.

Maize output from the Large Farm Sector is comparatively small and in relative terms is probably declining. Between 1968 and 1974 the area sown to maize on large farms has varied between 51,000 hectares and 77,000 hectares (see Table 2.2), the absolute area showing a small decline over the last two years of this period, compared to a slight rise in the wheat acreage.

Table 2.2 Area of Maize, Wheat and all Cereals on Large Farms from 1968 to 1974 (000 hectares)

Year	Maize	Wheat	All cereals
1968	51.6	139.8	205.8
1969	51.8	137.3	206.4
1970	59.3	121.1	203.4
1971	66.3	92.7	184.0
1972	77.2	89.2	191.5
1973	75.8	83.6	180.2
1974	63.7	89.3	171.2

Source: Statistical Abstract 1975 and the Census of Large Farms 1971  
Central Bureau of Statistics.

The level of deliveries from the Large Farm Sector to the MPB is more difficult to determine, but on the basis of the intake by MPB in Nakuru, Uasin Gishu and Trans Nzoia districts, which produce about 89 per cent of the maize grown on large farms, the Sector contributed only about 16 per cent of the total MPB deliveries in 1974/75.

The importance of the main factors affecting maize supply and producers' decisions varies according to whether the commodity is produced on smallholdings or on large Scale farms. A maize

supply analysis by the Development Planning Division (DPD) of MOA has indicated that for the nation as a whole, the price elasticity of supply is inelastic (approximately 0.7), but is more elastic than that of wheat.

Because data on total production is limited, this calculation involved using areas under hybrid maize as a proxy for output. The analysis indicated that the recent price increase of October 1976 from KShs 65 to KShs 80 per 90 kg bag may increase MPB deliveries by 18 per cent. In addition, the technological improvement resulting from the greater use of hybrids will itself shift the supply function, so that production would increase regardless of the response to price changes.

On the large farms the factors affecting decisions by producers are different. Firstly, virtually all large farms are thought to have already adopted the use of hybrid maize, and although improved technology may move the supply function outwards, it is likely to be less dramatic than in the case of the production elsewhere. The second factor is the returns available from alternative crop and livestock activities. Unlike the smallholder, whose production possibilities are severely limited, the large farms have a considerable degree of choice. Thus it is the relative profitability of competitive activities which determines the variation in commodity supply. In the paper by J.K. Maitha referred to in Chapter 1, it was postulated that a wheat/maize price ratio of 1.6:1 was necessary to maintain wheat supplies from large farms. In the period 1969/70 to 1973/74 the price ratio was reduced from 1.8 - 2.0:1 to 1.3 - 1.4:1.

Figure 2.1 illustrates how the wheat area fell and that of maize rose as marginal wheat farmers substituted maize for wheat up to 1973. In 1974 the price ratio increased in favour of wheat to 1.8:1 and the maize area fell substantially in that year from 75,800 hectares to 63,700 hectares, whilst the wheat area showed a modest increase of 5,600 hectares to 89,200 hectares. Although of less importance, the relative profitability of milk production, compared to that of wheat and maize, also exerts an influence on the area planted. Finally, the de facto subdivision of large farms resulting from the transfer from the previous owners has a negative effect on wheat production, since under these circumstances the maize area usually increases at the expense of wheat.

## 2.3 FUTURE PRODUCTION

The trend in national maize production over the next few years will depend upon the price of maize and the continued spread of hybrid varieties, which between 1970/71 to 1976/77 increased by an average of 62,000 hectares annually. On the large farms, if it is assumed that the major factor determining maize production is the wheat/maize price ratio, then the latest price increase which has reduced the ratio to 1.5:1 will probably reverse the slight downward trend in maize production on large farms. Subdivision of the large farms, both legal and illegal, is likely to encourage an upward trend, particularly if the strategy of controlled subdivision recommended in the Main Report is accepted.

## 2.4 MARKET PROSPECTS

### 2.4.1 Domestic Consumption

As in the case of production, the total national domestic consumption of maize has not been reliably estimated, although in their Agricultural Sector Survey of 1973 the World Bank estimated it to be 1.42 million tonnes in the period 1969/1971, equivalent to a per capita consumption of 126 kg per annum. The factors which will most affect domestic consumption are the price of maize substitutes, income elasticity of demand and the growth in population. Based on an income elasticity of 0.1 estimated by IBRD in 1970 and a projected population growth of 3.5 per cent, overall consumption was estimated to increase by 3.9 per cent annually. General

consumption as defined by MPB includes maize sold for human consumption, famine relief and stock feed. The level of MPB internal sales shows considerable variation. This does not reflect national consumption, but simply the actions of near subsistence producers who sell surpluses to the MPB in good or normal years (and purchase little) and buy from the Board in poor years, when deliveries are low. In order to be able to maintain supplies even in a poor year MPB has to maintain expensive storage facilities or alternatively rely on timely imports, or a combination of the two. The former course of action now appears to be Government policy.

Kenya has not imported maize since 1971/72 and has exported substantial quantities in three of the last four years and with the build-up of a strategic reserve of over 300,000 tonnes has adequately satisfied the objective of self sufficiency in maize, so that only in exceptional years will imports be again necessary.

#### 2.4.2 Export Trade

Kenya's exports of maize between 1970 and 1974 varied between nil and 216,000 tonnes. This is a very small proportion of world trade and has little impact on total volume or prices. According to IBRD data, in 1975 the world market f.o.b. price of maize was US\$ 127.3 per tonne and in real terms is projected to remain around this level up to 1985. As maize exports from Kenya are already subsidised due to internal prices being above world market levels, the prospects for increasing exports without heavy expenditure on export subsidies are not encouraging.

### 2.5 PRICES

#### 2.5.1 Producer Prices

The producer price of maize has been changed in a cyclical fashion over the last decade in an attempt to regulate supplies. Hence in 1966, following the acute shortages of supply in 1964/65, the average price paid was KShs 36 per bag. Over the next four years it was then severely reduced (in 1970 the price was KShs 24.3 per bag), due to the significant increase in supply resulting largely from the adoption of hybrid varieties. In 1969-70 production fell and imports were required; the price was then raised in 1971. Since then the price has been steadily increased from a Grade I price of KShs 35 per bag in 1972 to KShs 65 in 1975 and KShs 80 in 1976. This represents an increase in current prices of 86 per cent between 1972 and 1976 or, in real terms, an increase of 37 per cent using a GNP deflator at 1972 base.

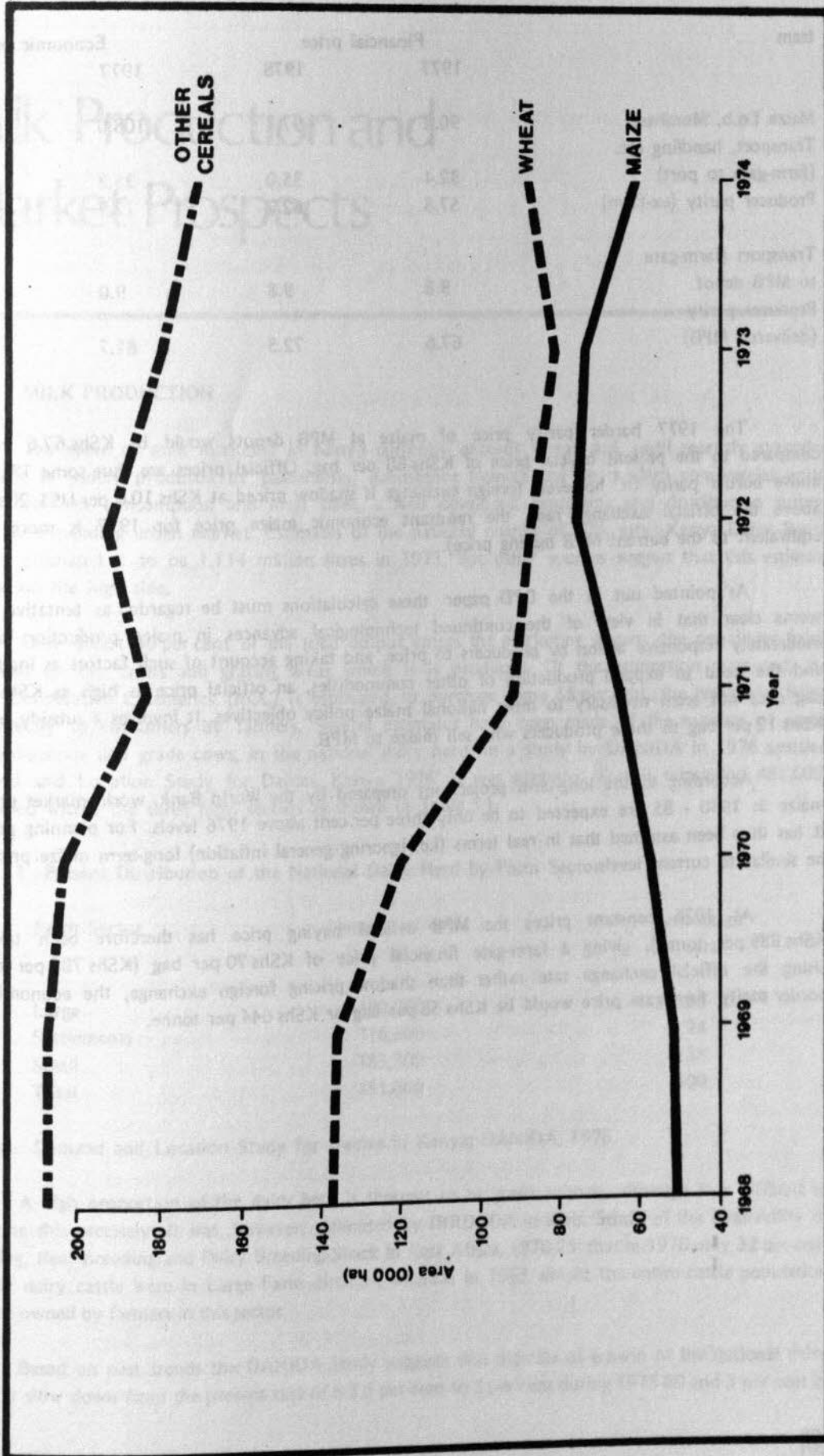
#### 2.5.2 Export Parity Prices

As for wheat (see Chapter 1), the Development Planning Division has determined border parity prices for maize in 1977 and 1978, in both economic and financial terms. These are shown in Table 2.3.

The calculation is based on a projected price of US maize f.o.b. Gulf port of US\$ 130 per tonne in 1977 and US\$ 140 per tonne in 1978 and a discount of eight per cent (which is apparently available) on Kenyan white f.a.q. (fair average quality). The financial price was based on the official exchange rate of KShs 8.35/\$ while for the economic price a shadow rate of KShs 10/\$ was used. Based on these assumptions the f.o.b. Mombasa values at financial prices would be KShs 90.2 per bag and KShs 97.7 per bag (KShs 1,002 and KShs 1,085 per tonne) for 1977 and 1978 respectively. The equivalent values at economic prices would be KShs 108.0 and KShs 117.0 per bag (KShs 1,200 and KShs 1,300 per tonne).

The cost incurred between farm-gate and Mombasa, the point of export, is estimated to be KShs 32 and KShs 35 per bag in 1977 and 1978 respectively. These figures are based on data supplied by MPB. MPB's official buying prices are quoted in terms of maize delivered at MPB depots. Costs involved in moving maize from the farm to the depots are estimated to be between KShs 9 and 10 per bag.

Figure 2.1  
Changes in planted areas of cereals in the large farm sector



**Table 2.3 Export Parity Prices of Maize (KShs per 90 kg bag)**

Item	Financial price		Economic price	
	1977	1978	1977	1978
Maize f.o.b. Mombasa	90.2	97.7	108.0	117.0
Transport, handling etc. (farm-gate to port)	32.4	35.0	35.3	38.1
Producer parity (ex-farm)	57.8	62.7	72.7	62.7
Transport (farm-gate to MPB depot)	9.8	9.8	9.0	9.0
Producer parity (delivered MPB)	67.6	72.5	81.7	87.9

The 1977 border parity price of maize at MPB depots would be KShs 67.6 per bag, compared to the present official price of KShs 80 per bag. Official prices are thus some 18 per cent above border parity (if, however, foreign exchange is shadow priced at KShs 10.0 per US\$, 20 per cent above the official exchange rate, the resultant economic maize price for 1977 is more or less equivalent to the current MPB buying price).

As pointed out in the DPD paper these calculations must be regarded as tentative, but it seems clear that in view of the continued technological advances in maize production and the moderately responsive action by producers to price, and taking account of such factors as input costs and the need to expand production of other commodities, an official price as high as KShs 80 per bag does not seem necessary to meet national maize policy objectives. It involves a subsidy of some KShs 12 per bag to those producers who sell maize to MPB.

According to the long-term projections prepared by the World Bank, world market prices of maize in 1980 - 85 are expected to be only three per cent above 1976 levels. For planning purposes it has thus been assumed that in real terms (i.e. ignoring general inflation) long-term maize prices will be similar to current levels.

At 1976 constant prices the MPB official buying price has therefore been taken as KShs 889 per tonne), giving a farm-gate financial price of KShs 70 per bag (KShs 788 per tonne). Using the official exchange rate rather than shadow pricing foreign exchange, the economic (i.e. border parity farm-gate price would be KShs 58 per bag or KShs 644 per tonne.

# 3

## Milk Production and Market Prospects

### 3.1 MILK PRODUCTION

The value of milk marketed in Kenya currently exceeds wheat and, until recently exceeded maize. It is widely produced by pastoralists, subsistence farmers and on modern commercial units. Besides on-farm consumption and local sales, a well developed processing and distribution system serves an expanding urban market. Estimates of the national output of milk vary; Kenya Dairy Board roughly estimated it to be 1,114 million litres in 1973, but other sources suggest that this estimate may be on the high side.

Only about 30 per cent of the total output enters the marketing system, the remainder being consumed on the farms and grazing areas where it is produced. Of the proportion marketed, the Kenya Cooperative Creameries (KCC) is estimated to purchase some 65 per cent, the remainder being sold directly to consumers by farmers. Several estimates have been made of the number of cows, both indigenous and grade cows, in the national dairy herd. In a study by DANIDA in 1976 entitled 'Demand and Location Study for Dairies, Kenya 1976' it was suggested that it numbered 481,600, distributed within the three farm sectors as shown in Table 3.1

Table 3.1 Present Distribution of the National Dairy Herd by Farm Sector

Farm Sector	Number of cows	Percentage of total
Large	182,000	38
Settlements	116,300	24
Small	183,300	38
Total	481,600	100

Source: Demand and Location Study for Dairies in Kenya; DANIDA, 1976.

A high proportion of the dairy herd is thought to be grade animals, although it is difficult to determine this precisely. It was, however, estimated by IBRD/IDA in their 'Study of the Availability of Fattening, Beef Breeding and Dairy Breeding Stock in East Africa, 1970-75' that in 1970 only 32 per cent of grade dairy cattle were in Large Farm districts, whereas in 1963 almost the entire cattle population has been owned by farmers in this sector.

Based on past trends the DANIDA Study suggests that the rate of growth of the national dairy herd will slow down from the present rate of 6-7.5 per cent to 5 per cent during 1975-80 and 3 per cent in

1981-85. The main growth is expected to be in the Small Farm Sector, it being considered unlikely that further expansion will occur on the large scale farms. The past trend and projected size of the national dairy herd is given in Table 3.2.

Table 3.2 Past and Projected Dairy Herd Size 1970-85 (000 cows)

Farm Sector	1970	1975	1980	1985
Large	163.7	182.0	182.0	182.0
Settlements	94.8	116.3	170.5	221.7
Small	99.8	183.3	292.9	344.5
Total	358.3	481.6	645.4	748.2

Source: DANIDA 1976

The total annual amount of milk marketed is not recorded but KCC, which claims to purchase 65 per cent of the total milk marketed, maintains precise records of purchases and sales. Table 3.3 shows KCC intake between 1970 and 1976.

Table 3.3 Milk Deliveries to KCC from 1970 to 1976<sup>1</sup>

Year	1970	1971	1972	1973	1974	1975	1976
Million litres of milk equivalent	232.0	220.4	268.4	279.7	249.8	230.6	200.0 <sup>2</sup>

Source: Statistical Abstract 1975 and Economic Survey 1976.

- (1) Includes sales licensed by Kenya Dairy Board.
- (2) Consultants' estimate based on KCC intake records for 1976 (January - November).

In the period when farmers delivered their milk by quota, the KCC intake was maintained at around 200 million litres per annum. Abolition of the quota system in 1970 effectively raised the average price for liquid milk and intake rose to a record 279.7 million litres of whole milk equivalent in 1973. In spite of optimistic forecasts of expanded intake and fears of surplus of milk over domestic requirements, the total annual amount of milk delivered to KCC fell back to 230 million litres in 1975, about the same level as in 1970. It appears that annual deliveries have now fallen to about 200 million litres.

The recent drop in deliveries has been blamed on climatic conditions (the period 1973-75 was drier than normal) and in the resultant absence of sufficient grass, on the high prices of alternative purchased feedstuffs. It is also reported that an increasing proportion of milk has been sold through channels other than the KCC, indicating that the fall in the level of all marketed milk may not be as great as shown by the figure for deliveries to KCC and licensed sales alone.

Another factor which may be of considerable significance is that milk yields in the Large Farm Sector have probably fallen substantially in the past few years. In the farm survey undertaken by the Consultants, which is described in the Main Report, milk yields on farms which have been transferred from their original owners (the majority) were found to be lower than on those still in the hands of the former owners. This was particularly true in the case of group farms. If this is the situation throughout the Large Farm Sector, its output would have declined because dairy cattle

numbers have not increased markedly in recent years. Since the Sector is estimated to supply about 70 per cent of KCC's intake, such a decline would have a major impact on national marketed milk production.

## 3.2 FUTURE PRODUCTION

The future level of milk production (in terms of quantities marketed) is extremely difficult to estimate, due to the uncertain trend in supplies in the period 1970 - 1976 and the lack of data on the overall level of marketed production. The factors which have determined the level of supply in the past will affect production in the future, although their relative influence will be modified by Government policy and natural variables such as the weather. The factors which can be influenced by Government or the producers are as follows.

### 3.2.1 Price

The price of milk was raised when the quota system was abolished in 1970 and encouraged an increase in deliveries, but although prices also rose in 1975 this latter increase seems to have had little effect. This may well be because the relative profitability of competing enterprises like maize and wheat production have improved at a greater rate. At the end of 1976, a substantially higher producer price was announced, raising it from 90 cents to approximately KShs 1.30 per litre, a rise of over 40 per cent. This increase is considerably higher than that allowed for either maize or wheat, which may therefore have the effect of shifting resources from these enterprises into milk.

### 3.2.2 Extension and Supporting Services

In the current Five Year Development Plan (1974 - 1978) it is expected that the increasing use of AI (artificial insemination) in smallholder areas will have a positive effect on output. As regards the Large Farm Sector, the extension effort appears to have had little influence on dairy production. Unless substantial improvements are made in the extension effort, this situation seems unlikely to change and output may well continue to stagnate or even decline, due to low yields and poor standards of dairy husbandry.

### 3.2.3 Herd Size and Yields

Based on past trends, the size of the dairy herd is expected to increase overall, although it may remain at its present level in the Large Farm Sector. This in itself will have a positive influence on production, provided of course that the composition of the herd in terms of grade/indigenous cattle does not change and that yields do not fall. In the 1974 - 1978 Development Plan some decline in yields is expected, but despite this an overall expansion in production is anticipated because of an increase in cattle numbers in the smallholder areas. The 1976 DANIDA Study and KCC dispute this assumption and expect average yields to increase.

As far as yields in the Large Farm Sector are concerned, there does not appear to be strong grounds for expecting an improvement in milk yields from the Sector as a whole. In the past several sources have projected substantial increases in milk production, these have not materialised, and the 1974 - 1978 Development Plan target of 400 million litres of marketed output has little chance of being achieved.

The DANIDA Study also expects an increase in production to occur under 'normal climatic' conditions and gives examples of projected production based on different assumptions regarding growth of herd size and increases in unit yield of 0.2 per cent per cow annually. If a low increase of one per cent in national average yield and a growth of three per cent in the national herd is assumed,

the estimated intake by KCC would be 321.8 million litres in 1980/81 and 368.3 million litres in 1985/86. Most recent statistics indicate that even these modest assumptions may be optimistic.

### 3.3 MARKET PROSPECTS

Estimates of demand and marketing prospects of milk and milk products are considerably more involved than wheat and maize, firstly because of the high proportion of milk which is sold 'unrecorded' through local channels, and secondly because of the differentiation of milk into several products each in turn requiring its individual supply and demand analysis. This review will be restricted to a discussion of the demand for products sold through KCC and will concentrate largely on the market for liquid milk.

#### 3.3.1 Liquid Milk

The success of KCC's marketing operations depends upon the proportion of fresh milk sold, for KCC claim that domestic sales of processed products are unprofitable and that most processed products exported are subsidised, as Kenya is not competitive with traditional suppliers like New Zealand. The importance to its financial viability of the proportion of KCC's intake sold as liquid milk was clearly illustrated in the period 1970-72, when the intake of liquid milk rose faster than demand, with the result that a higher proportion of the intake had to be processed. This situation put KCC under severe financial strain until the period 1973-1974, when as the milk intake dropped the sales of liquid milk continued to rise, enabling KCC to show a profit again.

The most important single product sold by KCC is liquid milk, the sales of which in 1974/75 totalled 113 million litres, equivalent to 51 per cent of KCC's total intake. This compares with sales of 49.7 million litres nine years before (1965/66). Table 3.4 shows the sales of liquid milk between 1970/71 and 1974/75.

Table 3.4 KCC Sales of Liquid Milk

	1970/71	1971/72	1972/73	1973/74	1974/75
Million litres of liquid milk	77.7	90.1	92.4	103.5	113.0

Source: KCC Statistical Department.

Between 1970/71 and 1974/75 the annual growth of sales averaged nine per cent.

Although not of comparable reliability, it has been estimated that approximately 130 million litres of liquid milk are sold direct to consumers by farms. This represents about 55 per cent of the fresh milk market, the remainder being accounted for by KCC. The large farms have no alternative but to supply their milk to KCC.

Liquid milk is exported only to Uganda and Tanzania. Uganda, which was importing some 15 million litres in the sixties, has increased this to about 30 million. This demand is expected to grow, although problems over payments and other political considerations currently place this market at risk. The market in Tanzania, which in comparison is much smaller (4.5 million litres in 1972/73) has been reduced following Tanzania's balance of payments crisis and is not expected to be a major factor in the overall demand.

In addition to factors such as population growth, price and income elasticities, the future prospects for sales of liquid milk depend to some extent on the distribution system. There are indications that KCC may be under supplying certain areas, although the extent of this is not known. Accurate demand estimates are difficult to make because there is little empirical data available to enable an accurate determination to be made of income elasticities for the various consuming groups. These are thought to be elastic for the lower paid and inelastic for high income groups. The DANIDA Study did, however, attempt to determine in some detail the future demand for KCC liquid milk, using various assumptions for the home and export markets. The DANIDA estimates form the basis of the demand forecast given in Table 3.5.

Table 3.5 Projected Demand for Liquid Milk from KCC (domestic and export)

Million litres

Area	1974/75	1980/81	1985/86
Kenya	113.0	177.0	240.0
Uganda and Tanzania	33.0 <sup>1</sup>	40.0	53.0
Total	146.0	217.0	293.0

Source: Adapted from 'Demand and Location Study for Dairies in Kenya 1976', DANIDA.

<sup>1</sup> For year 1974 only.

### 3.3.2 Milk Products

As shown in Table 3.6, consumption of dairy products in Kenya has been stable since 1969-70. Demand can be expected, however, to rise as incomes and population increase, (this has occurred during recent years). It is not clear why consumption has remained static, particularly as Kenya had considerable quantities of these products available for export in this period (i.e. in theory, consumption should not have been held down by supply shortages). Despite this past trend, it is expected that consumption will expand over the next 10 years.

Table 3.6 Consumption of the Main Processed Dairy Products in Kenya.

Item (tonnes)	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75
Cheese	290	256	307	312	309	267
Butter	2,151	2,168	2,216	2,142	2,191	2,210
Milk powder	2,809	3,110	3,258	3,693	2,915	3,629
Ghec	421	353	390	442	532	469

Source: Adapted from an 'Evaluation of the Kenya Dairy Production Improvement Programme', Institute of Development Studies (IDS) Nairobi.

Table 3.7 gives the exports of processed dairy products between 1969 and 1974. These have shown considerable annual fluctuations. This is to be expected, since they are mainly sold at a loss, exports being used as a means of disposing of the surplus milk intake. In line with the downward trend in milk deliveries in the last three years, exports of milk products have also fallen by 30 per cent between 1974 and 1975.

Table 3.7 Exports of Processed Dairy Products.

Item (tonnes)	1969	1970	1971	1972	1973	1974
Cheese	209	197	96	324	557	267
Butter	1,624	1,596	891	2,399	2,463	1,742
Milk powder	1,221	2,310	1,641	3,900	4,410	1,273
Ghee	257	327	180	359	265	155

Source: 'An evaluation of the Kenya Dairy Production Improvement Programme', IDS, Nairobi.

There is considerable overseas demand for Kenya's processed dairy products, but until prices are more competitive they will only serve as a convenient means of disposing of surpluses.

Although the market prospects for milk and milk products are difficult to determine with certainty, it is likely that the growth of the liquid milk market should be able to absorb any increase in KCC's intake over at least the next 10 years. In the short term, a continued reduction in the level of exports will be necessary if domestic milk supplies are to be maintained. The expansion possibilities are therefore good as long as the rate of growth of demand for liquid milk in domestic and other East African markets is continued.

### 3.4 PRICES

The price paid for milk by KCC is determined by the Government. Locally sold milk is marketed at a much higher price, largely because it is sold direct to the consumer. Where local markets are well supplied, prices are nearer the KCC official levels.

Until 1970, milk was paid for on a quota basis, milk in excess of the stated quota being converted to butter fat and realising a much lower price. The abolition of the quota system in 1970 raised the price from 57 cents per litre to 77 cents per litre. It was increased in 1975 and then in mid-1976 was raised to 90 cents. In October 1976 it increased approximately KShs 1.30 per litre, although these prices are not yet being paid. Allowing for transport and other costs of about KShs 0.15, the expected farm gate price for use in budget preparation is KShs 1.15 per litre.

In the past the quota system restricted growth of production, and although the new flat rate price is an improvement, it has been criticised for a number of reasons. These are as follows:

- (a) The rate is paid regardless of location, which because of the high cost of transporting milk leads to distortions in the distribution of milk-producing areas.
- (b) Despite the marked seasonality of production, the producer price remains unchanged throughout the year and there is thus no incentive to produce dry season milk. Apparently it was the original intention of KCC to introduce a dry season bonus, but for a number of reasons this has never materialised. If the seasonality of production could be lessened, the losses on processed milk products might be reduced or even eliminated.

# 4

## Beef Production and Market Prospects

### 4.1 BEEF PRODUCTION

Several attempts have been made to estimate the size of the national beef cattle herd. An IBRD/IDA study in 1970 put the number (both grade and indigenous animals) at over 9.0 million. These were apportioned by farming sector and separated into grade and indigenous animals, as shown in Table 4.1.

Table 4.1 Numbers of Beef Cattle by Farm Sector. 1970.

Cattle ('000 head)	High potential smallholder	Range and subsistence Cultivator	Pastoralist	Large Farm	Total
Beef, improved (percent)	35 (8)	42 (10)	- (-)	345 (82)	422
Indigenous Zebu (percent)	3,446 (39)	2,292 (26)	3,069 (35)	(-)	8,807
Total	3,481	2,334	3,069	345	9,229

Source: Adapted from IBRD/IDA Study of the availability of Fattening, Beef Breeding and Dairy Breeding Stock in East Africa, 1970 - 1975.

The data on large farms given above are not entirely consistent with information provided by the Central Bureau of Statistics, which has estimated that the trend in beef cattle numbers on large farms over a period of years (the distribution of the national herd was not calculated). This estimate suggests a 1970 population of 492,000 a considerably higher number than in the IBRD study. The difference in these figures might be explained by the apparent absence of indigenous cattle on large farms in the IBRD estimate. The IBRD assumption that there were no indigenous type cattle in the Large Farm Sector is thought to be incorrect.

Estimated cattle numbers on large farms are shown for the period 1970 - 1974 in Table 4.2. Since 1970 the herd size has remained almost unchanged, except for a large increase in numbers between 1973 and 1974.

The marketing channels for beef are complex; besides the considerable movement of pastoralists' cattle for fattening on smallholdings and large farms, cattle are either slaughtered and consumed on the farm, sold locally, enter secondary marketing channels to be sold, for example the

Kenya Meat Commission (KMC). Information on the number of cattle moving in the various channels is limited, the only reliable information being the intake by KMC. However, a 1974 study by KMC estimated that, (as shown in Table 4.3), of the total offtake of 183,000 tonnes CDW (Cold Dressed Weight) in 1972, 74,000 tonnes were consumed on farms or in the producing areas where it was slaughtered and 109,000 tonnes were marketed through formal channels. Of the latter, 81,000 tonnes were sold to local butchers and the remaining 28,000 tonnes were sold to KMC.

Table 4.2 Beef Cattle Numbers on Large Farms (1970 - 1974)

Cattle ('000 head)	1970	1971	1972	1973	1974
Cows	136.2	133.6	135.9	133.9	140.4
Bulls and bull calves	355.9	347.8	352.8	346.2	428.0
<b>Total</b>	<b>492.1</b>	<b>481.4</b>	<b>488.7</b>	<b>480.1</b>	<b>568.4</b>

Source: Statistical Abstract 1975

Table 4.3 Quantity of Beef Entering Various Marketing Channels in 1972

Destination/Channel	Tonnes (CDW)	Per Cent
Slaughtered/consumed on farm	74,000	41
Sold to local butcher	81,000	44
Sold to KMC	28,000	15
<b>Total</b>	<b>183,000</b>	<b>100</b>

Source: Kenya Meat Commission, Abattoir/Cold Storage Study, 1974.

Private traders are the most important marketing agents and are generally able to offer a higher price for cattle than KMC, due to their lower transport costs and overheads. The Livestock and Marketing Division (LMD) of the MOA is an important buyer, particularly of pastoralists' cattle which may then be sold direct for slaughter or for further fattening. In 1972/1973 LMD purchased some 54,000 head. KMC, which effectively offers a floor beef price, has seen its share of the market severely eroded, due primarily to competition from private traders and butchers. It still controls however, almost the entire export market, which in 1975 accounted for 80 per cent of KMC's total meat output. The level of KMC's intake is affected by factors such as drought. For example in the first half of 1976 the downward trend in purchases was reversed and deliveries to KMC rose dramatically (the second quarter slaughterings were up 82 per cent on 1975), following a severe drought, particularly in Machakos and Kajiado districts. KMC's intake between 1971 and 1975 is given in Table 4.4

## 4.2 FUTURE BEEF PRODUCTION

The overall production of beef is projected to expand by 4.2 per cent per annum over the period of the 1974 - 1978 Development Plan, marketed production increasing by 5.2 per cent. This increase in production is expected to come about as a result of the intensification of the major livestock development programme.

Beef exports are forecast to increase by 4.1 per cent annually, from 15,600 tonnes in 1972 to 19,800 tonnes in 1978. Whilst it is not clear whether the overall increased production and

marketed target is being met, the KMC's limited ability to compete with private traders is severely restricting its performance in both the domestic and export market.

**Table 4.4 KMC Beef Intake from 1971 to 1975**

Year	Head of cattle/calves
1971	209,900
1972	199,100
1973	155,000
1974	159,500
1975	134,100
1976 (January - June)	105,893

### 4.3 MARKET PROSPECTS

#### 4.3.1 Domestic Consumption

Several estimates of per capita consumption of beef, ranging from 9.8 kg by an IBRD pre-investment study (1967-70) to 14.36 kg estimated by Meyn for 1970. The future demand for beef will be affected by a number of factors, particularly population growth, consumers' incomes and the price of beef and beef substitutes.

Information on demand elasticity is difficult to establish but in developing countries in general, elasticities of beef are normally over unity. Based on varying levels of population and income growth and using different beef price assumptions, the KMC Abattoir/Cold Storage study (1976) projected four possible consumption patterns up to 1982, from a base in 1972. The forecasts are not highly sensitive to the variables employed in the calculation, the low and high rates of growth in annual consumption being between 4.8 per cent and 6.1 per cent respectively. The KMC forecast based a growth rate of 5.5 per cent is given in Table 4.5.

**Table 4.5 Projected Beef Consumption in Kenya (1972 - 1982)**

Year	Tonnes (CDW)
1972	175,557
1974	193,547
1976	215,423
1978	239,771
1980	266,871
1982	297,034

Source: Adapted from Kenya Meat Commission Abattoir/Cold Storage Study, 1974

#### 4.3.2 Exports

Meat and meat products (mainly beef) are important exports and were worth over K£ 10 million in 1974.

The largest proportion of exported beef is sold canned, total annual sales varying between 7,800 to 10,000 tons between 1970 and 1975. The United Kingdom is the major importer. Severe

import regulations restrict the sale of fresh and frozen beef to European countries. Kenya will have to meet these regulations if she is successfully to penetrate this market (over 700,000 tonnes were imported by eight European countries in 1971). At present, only Switzerland is importing fresh meat from Kenya, under a provisional agreement. Alternatively, large and expanding markets exist in Africa and the Middle East, mainly for lower quality meat which Kenya would be well placed to supply.

#### 4.3.3 Comparison of Supply and Demand

A precise comparison of likely future supply and demand cannot be made because of the lack of reliable data. For the purposes of analysis, however, it could be assumed that internal consumption in 1976 was some 215,000 tonnes, as projected in Table 4.5 and exports were about 15,000 tonnes. Under these assumptions total beef output would have been 230,000 tonnes. If consumption increases at 5.5 per cent per annum, the rate used in Table 4.5 and production rises by the figure of 5.2 per cent per annum given in the 1974-78 Development Plan during the next few years the surplus available for export would remain approximately at the present level of 15,000 tonnes. This suggests that the objective of increasing beef exports, given in the 1974-78 Development Plan, may not be attainable, especially as the projections for the expansion in output since 1974 could well be too optimistic.

In view of these points, particularly the probable rapid expansion in the internal demand for beef, market prospects for beef producers during at least the next 5-10 years are considered to be favourable. Little difficulty should be experienced in marketing any increased output at an adequate price. As regards exports, Kenya has a well established market in the United Kingdom and is ideally situated to serve the growing markets for beef in the Middle East.

#### 4.4 DOMESTIC PRICES

Both producer and consumer prices are controlled by the Government, the policy being to keep consumer prices low whilst at the same time expanding beef production for the domestic market, with any surpluses being exported. This policy is frequently criticised for subsidising the affluent consumers at the expense of producers and allowing little incentive for stratification in the industry.

The minimum KMC beef prices paid to the producer (delivered at railhead) since 1970 are given in Table 4.6.

Table 4.6 KMC Beef Prices to Producers 1970-76 (KShs per Kg CDW)

	Minimum Price Per Grade			
	GAQ	FAQ	3rd Grade	Average price paid
1970	3.49	3.32	2.73	-
1971	4.06	3.76	2.85	2.86
1972	4.43	4.08	3.02	3.18
1973	4.77	4.42	3.46	3.70
1974	5.29	4.96	4.13	4.14
1975	5.85	5.50	4.45	4.77
1976	OPEN	7.00	4.85	-

Note: GAQ = Good Average Quality  
FAQ = Fair Average Quality

Source: Statistical Abstract 1975, Economic Review of Agriculture Vol. 8, 1976 and KMC Annual Report 1975.

The actual price paid fluctuates according to market conditions and farmers selling beef graded f.a.q. or above can expect a premium of some KShs 0.30 per kg. Prices received by large scale farmers are probably above the average and are assumed to be between f.a.q. and Third Grade, that is, KShs 5.90 per kg CDW (cold dressed weight) at rail head and KShs 5.70 at farm-gate. Farmers who sell direct to local butchers can usually receive a price some 15 per cent higher than the prevailing official price. This differential has, however, been reduced during 1977 as local buyers are now less competitive, following recent increases in the price paid by KMC.

#### 4.5 EXPORT PARITY PRICES

There are no published estimates of the relationship between the beef producer price and border parity price but the Development Planning Division of MOA have made some preliminary calculations of the situation since 1970. Based on the f.o.b. values of carcass and canned beef, ex-factory costs and transport and handling charges to Mombasa were derived by DPD from the KMC Annual Reports. Factory costs were estimated to have increased from KShs 0.18 per kg in 1970 to KShs 0.32 per kg in 1975. Deducting these costs from the f.o.b. values for beef carcass, which varied between KShs 7.12 -8.79 per kg over the six year period, producer export parity prices were obtained. As shown in Table 4.7, these prices were compared with the KMC producer price for f.a.q. and above, assuming that most export carcass meat is of this standard.

Table 4.7 Comparison of Producer Export Parity Beef with KMC Prices for FAQ (1970 - 1975)

	Export parity prices in terms of producer equivalent (KShs/Kg CDW)	Official producer prices FAQ and above (KShs/Kg CDW)
1970	6.84	3.37
1971	7.56	3.85
1972	7.29	4.14
1973	8.17	4.52
1974	7.65	5.11
1975	6.12	5.73

Source: Development Planning Division, preliminary estimates.

The table shows that in 1970 producer prices were almost half of the equivalent border parity price but that by 1975 the price paid approached border parity. Estimates for 1976 suggest the producer price may now have slightly exceeded it. For the purpose of estimating long term producer prices it is assumed that world market prices will improve in real terms compared with the present prevailing low levels, by 25 per cent, that is from the 1976 producer farm gate price of KShs 5.70 per kg CDW to KShs 7.10.

It is not known whether KMC will maintain producer prices at border parity equivalent but in view of the exceptional rise in producer costs and continuing competition from private traders it is thought likely that they will be kept at, or even slightly above, attainable export parity levels. Thus both the producer prices and economic prices (i.e. border parity on the basis of the official exchange rate) of beef cattle at farm gate are taken as KShs 7.10 per kg CDW.

# 5

## Sheep Production and Market Prospects

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### 5.1 PRESENT SITUATION

The number of sheep on large farms has declined sharply over recent years and was estimated to be only 353,000 in 1974, compared with almost 480,000 in 1967. The national sheep flock is thought to be about 3.7 million head. The unfavourable international prices for wool and the virtually constant price for mutton and lamb between 1965 and 1973, have reduced the profitability of these enterprises compared with alternatives such as milk production. A further decrease in wool sales is anticipated in the 1974 - 1978 Development Plan. KMC's intake of sheep fell from 50,000 head in 1970 to 6,600 head in 1974 but recovered to 15,200 in 1975. This low level of intake has resulted in KMC experiencing difficulties in meeting export quotas. It is estimated, however, that KMC handles only one third of the sheep and goats marketed nationally.

### 5.2 FUTURE PROSPECTS

By far the largest proportion of mutton and lamb produced nationally is consumed on small farms or sold locally. Producers in the Large Farm Sector sell their mutton and lamb through semi-formal channels to local butchers or to KMC.

Domestic demand for mutton and lamb can be expected to increase with rising incomes, but this demand will be strongly influenced by the price of other meat, particularly beef. The present policy of maintaining low beef prices in relation to mutton and lamb has tended to restrict their growth in consumption. Domestic retail prices are Government controlled and KMC producer prices are determined accordingly. Sheep producers, unlike beef producers are required to pay for rail transport to the KMC depot.

A recent study has shown that sheep enterprises can be profitable, at present prices, but taking account of management problems associated with large numbers of small stock, sheep production is not thought to be an attractive enterprise under present conditions. A pricing policy, taking producer costs into consideration would be necessary to expand production. Consumption, however, would then be curtailed if beef prices continued to be relatively low.

Regarding the possibility of export, a recent sheep and goat development study argued that although the size of the frequently quoted Middle East market was virtually unlimited, prices and conditions of delivery may not be suitable for Kenya at the present time.

### 5.3 PRICES

Most producers of exotic sheep sell their mutton as Grade A. The trend in prices paid by

KMC since 1970 is shown in Table 5.1. In real terms, the price per kg has slightly declined as shown by the price index over the period.

Table 5.1 Producer Prices for Mutton 1970-75

	KMC Producer Prices Grade A mutton (KShs/Kg at KMC depot)
1970	4.19
1971	4.39
1972	4.59
1973	4.90
1974	7.00
1975	7.00
1976	7.00

The price quoted are in terms of delivery KMC depot. Allowing for costs between the farm and the depot, especially rail transport, which are assumed to be KShs 0.50 per kg CDW, the farm gate price for mutton in 1976 would be KShs 6.50 per kg CDW.

There is little information on the prices obtainable on the world market for Kenyan mutton and lamb, but a report entitled 'Sheep and Goat Development Kenya: a macro economic evaluation', concluded that prices of sheep delivered to Middle East markets might be as low as KShs 8 - 10 per kg CDW. Assuming a 10 per cent increase in price since then, this would indicate that the present producer prices are probably above the export parity equivalent and thus reducing the opportunity for export.

At farm gate price of KShs 8.10 per kg CDW has been projected for the preparation of farm budgets. This is similar to the official price after allowing for a 25 per cent increase above present levels.

A recent study has shown that sheep enterprises can be profitable at present prices but taking account of management problems associated with large numbers of sheep, sheep production is not thought to be an attractive enterprise under present conditions. A major factor taking producer costs into consideration would be necessary to expand production. However, would then be called if best prices continued to be relatively low.

Regarding the possibility of export a recent sheep and goat development report stated that although the size of the frequently quoted Middle East market was virtually unchanged, prices and conditions of delivery may not be much better than at the present time.

Most producers of exotic sheep sell their mutton as Grade A. The price in prices paid by

# 6

## Coffee Production and Market Prospects

### 6.1 COFFEE PRODUCTION

Coffee is Kenya's major cash crop and export earner. In 1974 it contributed K£38.4 million to domestic export earnings, 24 per cent of the total and provided 24 per cent of the total value of marketed crop production.

The crop is grown both on estates and on smallholdings. Thirty five per cent of the total 1972/73 area of about 84,800 hectares was in the estate sector. The coffee area in both sectors currently appears to be expanding.

The average level of yield differs between the estates and smallholdings. On estates, which are better equipped to finance chemical control of coffee berry disease (CBD) and where irrigation facilities are often available, yields averaged 1,320 kg per hectare in 1972/73, compared to only 630 kg per hectare on smallholdings.

The production of coffee expanded between 1970 and 1973 exceeding the 1974 - 1978 Development Plan target of 70,000 tons. Output then fell back in 1974 and 1975, to 66,200 tons. Estimates for the 1976 crop indicate it will be at a similar level. Output over the past seven years is shown in Table 6.1.

Table 6.1 Coffee Production 1970 - 1976 ('000 tons)

Year	Estates	Smallholders	Total
1970	27.9	30.4	58.3
1971	31.5	28.0	59.5
1972	34.2	27.8	62.0
1973	35.1	36.1	71.2
1974	30.8	39.3	70.1
1975	31.2	35.0	66.2
1976 (Est)	-	-	66.7

Source: 1976 Economic Survey; 1976 estimate obtained from Economic Review of Agriculture, Vol 8.

## 6.2 COFFEE MARKETING

On estates, which normally have their own factories, the processed dried bean is sold to the Kenya Producers' Co-operative Union (KPCU) at a price approaching the current market price. Smallholders on the other hand, send their berries to a co-operative which processes and sells on their behalf. Because many of the co-operatives are run inefficiently, smallholders receive only about about a third of the value of the processed coffee and often wait months for payment.

Since the ending of the International Coffee Agreement restrictions, Kenya has been free to sell all the coffee produced on the world market at the recent favourable prices. Coffee prices have hardened over the past decade; they rose markedly in 1975, as a result of a severe frost in Brazil and have since continued to move upwards reaching almost K£ 3,000 per tonne in January 1977. These compare with prices of K£ 1,150 a tonne in 1975/76 and K£ 450 a tonne in 1974/75.

The World Bank 1976 commodity projections have been used to project a long-term producer price. These assume that prices will tend to decline in real terms over the next few years and then to generally level off in the period 1980-1985. The projected average f.o.b. prices in this period is equivalent to K£ 630 per tonne (based on the official exchange rate of KShs 8.34 per US\$1.0). This price is well below present levels which are regarded as exceptional and are unlikely to be maintained.

There are no taxes or subsidies on coffee exports, and because the internal prices are determined by the world market price, producer prices can be directly related to border parity values. Producer prices are paid in a series of interim payments, with final payments being made at the end of the year according to the average price received by the Coffee Board.

Table 6.2 shows the deviation of the projected long-term producer price, based on the forecast f.o.b. world market price of K£ 630 per tonne and deducting all the costs normally incurred between the farm-gate and f.o.b. Mombasa. The resultant long term producer price would be KShs 12.0 per kg of clean coffee equivalent.

Table 6.2 Projected Export Parity Price of Coffee

Item	Clean coffee (KShs/tonne)
Coffee FOB Mombasa	12,600
Handling/transport (Nairobi-Mombasa)	200
Coffee Board of Kenya	20
Coffee milling, at 200 per tonne parchment	250
Handling/transport farm - coffee mill	100
Total transport/milling etc.	570
Producer price (clean coffee equivalent)	12,030
Producer price (clean coffee equivalent) per kg	12

Source: Derived from Coffee Board of Kenya Annual report 1975/76 and Consultants' estimates.

# 7

## Pyrethrum Production and Market Prospects

As shown in Table 7.1, national expenditure on agricultural inputs rose by 50 per cent in the period 1971 - 1975, while the early period was due to both expansion in the area being planted and the use of more expensive inputs. By 1975, the total expenditure on agricultural inputs had risen to KSh 174 million.

In contrast to a few years ago, only about one-eighth of the national output of pyrethrum now comes from the Large Farm Sector. At present the impetus for growth in production comes from the smallholder sector.

Total production has increased over the last five years, with flower deliveries reaching 15,402 tons in 1975, giving a pyrethrum content extract of 204 tons. Drought conditions in early 1976 reduced deliveries by about eight per cent compared with the same period in 1975. Extract production between 1971 and 1975 is shown in Table 7.1.

Table 7.1 Pyrethrum Extract Production (1971 - 75)

Year	Medicines	Tons
1971	1,130	143
1972	1,487	185
1973	860	157
1974	1,104	196
1975	14,231	204
Total	18,812	785

Market prospects for pyrethrum are good, as demand for a safe, non-persistent insecticide (mainly for household use) remains strong. The possibility of pyrethrum having a more widespread application for commercial purposes would considerably expand the market. The only doubt surrounding its long term prospects is the threat of the development of a cheaper synthetic substitute. The 1974 - 1978 Development Plan has set a target of 21,000 tons of dried flowers for 1978. In 1972, Kenya's share of the world export market was about 70 per cent.

The price to growers has recently been increased from KShs 365 per kg to KShs 392 per kg of pyrethrum, representing a price of KShs 4.50 - 6.22 per kg of dried flower, depending on the pyrethrum content, which varies between 1.3 - 1.5 per cent. For planning purposes a farm gate price of KShs 6.0 per kg has been used, taking account of the favourable long term market prospects for pyrethrum and consequent likelihood of further increases in its real price.

# 8

## Agricultural Inputs

As shown in Table 8.1, national expenditure on agricultural inputs rose by 160 per cent in the period 1871 - 1975. Whilst the early growth was due to both expansion in use and rising prices, the 10 per cent increase to K£ 37.8 Million in 1975 was entirely the result of inflation, the level of input use actually declining. This was particularly noticeable in the case of fertilisers, where despite higher prices, expenditure actually fell.

Table 8.1 Expenditure on Agricultural Inputs from 1971 to 1975 (K£'000)<sup>1</sup>

Item	1971	1972	1973	1974	1975 <sup>2</sup>
<b>Material Inputs-</b>					
Fertilisers	3,711	4,224	5,893	12,876	11,472
Other Agricultural Chemicals	1,640	2,936	3,124	4,090	4,659
Livestock Drugs & Medicines	1,152	1,683	1,488	1,762	2,506
Fuel and Power	3,090	3,458	3,782	5,328	6,773
Bags	1,057	1,465	1,806	2,328	2,858
Manufactured Feeds	1,487	2,124	2,841	4,606	5,450
Purchased Seeds	800	736	1,206	1,475	2,233
Other Material Inputs	1,594	1,644	1,557	1,756	1,875
<b>Total</b>	<b>14,531</b>	<b>18,270</b>	<b>21,697</b>	<b>34,221</b>	<b>37,826</b>
<b>Service Inputs Total</b>	<b>2,907</b>	<b>3,680</b>	<b>3,843</b>	<b>4,314</b>	<b>4,555</b>
<b>Total Inputs</b>	<b>17,438</b>	<b>21,950</b>	<b>25,540</b>	<b>38,535</b>	<b>42,381</b>

Source: 1976 Economic Survey

(1) Except Labour

(2) Provisional

A reduction in the volume of purchases of other items not included in Table 8.1 has also occurred. For example, the number of completed tractors imported into Kenya has remained below 1,000 per annum for the past four years compared with a peak of 1,168 in 1968.

Due to the massive rises in input prices, particularly fertilisers, the Government provided a subsidy on fertilisers for the 1975-76 crop season. For fertilisers as a whole and for other inputs, however, overall there is some cross subsidisation between individual inputs.

The input prices used for the farm budgets have been based on present prices at constant 1976 values except where there are clear indications that the prices of particular inputs will change relative to general price levels. The only major item affected in this way is fertilisers. Recent World Bank projections suggest that in constant value terms the 1985 World market prices of triple superphosphate, diammonium phosphate and urea will be 62 per cent, 66 per cent and 52 per cent respectively above their 1976 level. Allowing for the fact that certain components of the farm-gate price of fertilisers, such as distribution costs, will not rise so markedly, it has been assumed as an approximate estimate that long term farm gate fertiliser prices will be 50 per cent above 1976 levels.

As shown in Table 8.1 national expenditure on agricultural inputs rose by 280 per cent in the period 1971 - 1975. Whilst the early growth was due to both expansion in use and rising prices, the 10 per cent increase to KES 37.8 million in 1975 was entirely the result of inflation, the level of input use actually declining. This was particularly noticeable in the case of fertiliser, where despite rising prices, expenditure actually fell.

Table 8.1 Expenditure on Agricultural Inputs from 1971 to 1975 (KES'000)

Item	1971	1972	1973	1974	1975
Total Input	17,438	22,930	25,240	38,232	42,381
Service Input Total	2,807	3,680	3,842	4,314	4,252
Total	14,631	19,250	21,397	33,918	38,129
Other Material Inputs	1,294	1,544	1,257	1,238	1,372
Fertilised Seeds	800	730	1,208	1,172	2,222
Manufactured Fertiliser	1,487	2,124	2,841	4,098	5,428
Fuel and Power	1,027	1,452	1,805	2,328	2,838
Tractor, Drugs & Medicines	3,090	3,428	3,780	4,028	4,772
Plant and Power	1,122	1,083	1,488	1,787	2,108
Plant - Agricultural Chemicals	1,640	2,236	3,124	4,090	4,828
Fertilisers	2,717	4,224	2,802	12,876	11,172

Source: 1975 Economic Survey  
(1) Except Labour  
(2) Provisional

A reduction in the volume of purchases of other items not included in Table 8.1 has also occurred. For example, the number of completed tractor imports into Kenya has remained below 1,000 per annum for the past four years compared with a peak of 1,154 in 1985.

Due to the massive rise in input prices, particularly fertiliser, the Government provided a subsidy on fertiliser for the 1975-76 crop season. For fertiliser as a whole and for other inputs, however, overall there is some cross-subsidisation between individual inputs.

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# Annex V

## Institutions

# Introduction

In this Annex the Large Farm Sector is examined in its institutional context and recommendations are made regarding the utilisation of institutions in implementing the basic strategy identified by the Study and described in the Main Report (Chapter 9). An initial review of institutions indicated that the institutional framework required to implement the proposals already exists; the emphasis in this report, therefore, will be on utilising this rather than on creating new organisations. Special sections and additional staff will probably be required, however, but they will be established within existing organisations.

In addition a number of projects either aimed directly at the Large Farm Sector or which have an affect on it, are currently being implemented. Where applicable, proposals will be made to utilise the projects in implementing the strategy.

The proposals are concerned primarily with the 1,800 mixed farms the majority of which are concentrated in Nakura, Uasin Gishu, Trans Nzoia and Kericho Districts of the Rift Valley Province and to a lesser extent in Kiambu District of Central Province.

The Study has shown that farming systems within the Large Farm Sector range from the conventional large scale highly mechanised operations to the small subsistence plot where the occupier has to supplement his farm yields by seeking paid employment elsewhere. Between these extremes there are farms partly divided into subsistence plots and partly operating large scale systems. Also there are farms completely subdivided into individual holdings which are large enough to provide a reasonable living and employment for the farm family. Throughout the entire range there are variations in technical and financial performance.

The number of owners/shareholders relative to the land area of the farm is regarded as one of the most important determinants of farming systems and the scale of operations and has been used in identifying three major categories of farms for which specific proposals are made. The three categories are defined as follows:-

- (a) **Category 1 Farms:** This category includes farms which are either in individual ownership or are owned by a small number of partners, not exceeding the legal maximum of seven. These farms are still run as single units or in units of a size where the techniques of large-scale farming are still appropriate.
- (b) **Category 2 Farms:** This category covers farms which are group-owned, but where the number of owners in relation to the overall size of the farm would permit each owner, in the event of subdivision, to have a smallholding of sufficient size to undertake commercial mixed farming.

- (c) **Category 3 Farms:** This category includes farms which are also group-owned, but where the number of members is greater than the area could support as individual commercial farmers, or in some cases even as subsistence farmers.

Within the overall programme for the development of the Large Farm Sector a different strategy is proposed for each of the three categories defined above. These are described in detail in the Main Report, a brief summary being given below.

**Category 1 Farms:** Here the main emphasis should be to ensure that the potential of these farms is fully exploited through the provision of planning and other assistance. This assistance would take the form of a package comprising credit, farm planning, management help and other components and would be similar to that at present provided to group farms under the IBRD – supported Group Farms Rehabilitation Project.

**Category 2 Farms:** On the basis of the Consultants' farm survey and sociological studies, it is anticipated that almost all of the Category 2 farm owners will wish to subdivide, if they have not done so already. For this Category the main objectives will be to ensure that such subdivision takes place on a rational and well-planned basis, to help the farmers to organise the provision of group services (e.g. tractor cultivation), where they consider this desirable, to oversee the other institutional arrangements required (e.g. the procedure to be followed in dealing with debts incurred by the original group farm) and, lastly, to provide extension, credit and other supporting services. Farms initially identified as Category 2 but where the members do not wish to subdivide would for practical purposes be treated in the same way as Category 1, the programme's involvement being confined to supplying the assistance "package".

**Category 3 Farms:** These present the most serious problems. In virtually every case members can be expected to want subdivision. On many farms this is already occurring or has occurred. For this category the primary objectives would be to ensure that the subdivision, where it has not yet taken place, is undertaken on a proper basis, to provide extension and other services in order to raise productivity, and to encourage, through the exchange, transfer or sale of shares by members, the consolidation of holdings into units of sufficient size for commercial, rather than purely subsistence, farming.

In this Annex a review is first made of the existing institutions and projects (Chapters 2 and 3). On the basis of this review and of the programme objectives described above, detailed proposals for the institutional measures and support required are then made (Chapter 4).

# 2

## Existing Institutions

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### 2.1 INTRODUCTION

The institutions which will be involved in the programme are the three Ministries, the Ministry of Agriculture (MAO), the Ministry of Co-operative Development (MCD) and the Ministry of Land and Settlement (MLS). In addition the Agricultural Finance Corporation (AFC) will be closely involved in the provision of credit. The particular services concerned are Extension, Training, Co-operatives, Credit, Marketing, Land Survey and Settlement. Credit and Marketing are discussed elsewhere (Annexes VI and IV respectively) together with the related problems of input supply.

### 2.2 EXTENSION

Figure 2.1 illustrates the organisation of the Department of Agriculture. In this structure, a great deal of authority is exercised at the Provincial level, where there is also a considerable concentration of qualified professional staff, under the administrative control of the Provincial Director of Agriculture, but with their technical guidelines deriving from the central divisions under the Director of Agriculture. The skills of these technical divisions are available to the District Agricultural Officers (DAO's) who become the focal point for agricultural development in the field.

The standard establishment in a District consists of a District Agricultural Officer with a degree, responsible for one or more Assistant Agricultural Officers, with diplomas, in each Division in the District. These in turn have a number of Agricultural Assistants (with certificates) for the various locations. The District Agricultural Officers have administrative and supervisory functions. These functions include responsibility for pursuing the departmental policy in the District and for contributing to the evolution of a district plan. This is prepared in the District Agricultural Committees and the District Development Committees, both of which are under the Chairmanship of the District Commissioners. Thus a considerable amount of their time is occupied on matters of national and departmental policy and administration.

Below the level of the DAO's the qualifications and status of the field workers become more attenuated, while numerically they increase, until the actual farmer contact is usually made in the first instance by a certificated Agricultural Assistant (AA) or an uncertificated Junior Agricultural Assistant (JAA). In some cases, however, the contact is made by the DAO himself.

The specialist technical services such as Crop Production and Livestock Production (see Figure 2.1) are available at the District, Provincial and Headquarters level, as required. Individual field staff may have specialised in one of the subjects, but each specialist service has its own management structure. The L & FM Division is the more important of the specialist divisions in the Agricultural Department providing a service to the Large Farm Sector and has become the natural agency through which extension for the Sector can be applied.

Direct contact between farmer and extension service is mainly at the JAA and AA level, and only in exceptional cases is the quality of their understanding and technical knowledge sufficient to gain the confidence of a farmer whose difficulties stem from a number of sources. Although this is the single most important influence on the effectiveness of the extension service there are other additional factors such as lack of transport, poor housing and inadequate demonstration facilities.

The problems of the Large Farm Sector are discussed in other Annexes, but may be summarised here as the technical problems of appropriate resource use, the human problems of motivation, the legal problems of land tenure, the financial problems of credit supply and the overall problems of management. These are diverse and complex problems, and failure to deal satisfactorily with one of them would affect the others. They call for a specialised approach which a general agricultural extension service is not equipped to offer through the medium of the lower levels of a bureaucratic system.

That the need for an integrated approach is generally recognised, is shown by such proposals as those in the Ndegwa Report to establish District Development Committees (DDC), where the District is seen as the basic planning unit, which should be given a planning and implementation function. The revised Agricultural Act of 1967 established the important District Agricultural Committees (DAC) (Section 22 of the Act), made up of representatives from the farming community, from the senior officers in the District of the Agricultural, Veterinary, Forestry and Co-operative Departments, and from local county councils, all under the chairmanship of the District Commissioner. The Large Farm Rehabilitation Project has adopted the same system, in response to widespread appreciation of the importance of the integrated approach, and Group Farm Rehabilitation Committees (GFRC), have also been set up at the District level.

There are, perhaps, too many Committees, and it may well be that one only would suffice. In practice what appears to happen is that sub-committees are either formally or informally constituted; these provide a valuable meeting point for the various agencies with responsibility for the agricultural sector in the District concerned. At best, these District Committees can only identify problem areas, recommend broad lines of policy and issue instructions: they cannot look at every individual problem farm and produce an individually tailored solution to each one. The broad recommendations of a committee and its specific instructions must filter down through Divisions to Locations, to a level of expertise and experience which is not equipped to communicate a solution which involves farming systems, people, credit and management, each dependent upon the other.

The successes of the extension service have been considerable, but they are concerned with the dissemination of a straightforward proposition, such as the use of hybrid maize, or when a single cash crop such as coffee is concerned, where there is a well developed and authoritative marketing system to reinforce the basic extension work. The Large Farm Sector's problems are not susceptible to a single solution, and before any extension work could hope to achieve even a modest success, it would have to look at the existing structure of the ownership groups, the extent to which the land available is being used, and the sort of incentives which could motivate the owner or owners.

## **2.3 CO-OPERATIVES**

### **2.3.1 General**

The development of the co-operative movement in Kenya has been influenced by the development of the large-scale Western type of farming as well as by the establishment of a Department of Co-operative Development. On the one hand such organisations as the Kenya Co-operative Creameries Ltd. (KCC), and the Kenya Farmers' Association (Co-operatives) Ltd. (KFA), grew in response to the specific needs of large-scale crop and livestock farming, and are now exempt from the provisions of the



Co-operative Act under Section 86(1). On the other hand, the Co-operative Department has been active in promoting the growth of the co-operative techniques among the subsistence and small-scale farming communities, and has had some outstanding successes in handling crops where there is a specific operation which provides scope for a co-operative enterprise, such as primary processing of coffee and cotton, and the collection of milk.

The original co-operative legislation, based on the Model Ordinance for the guidance of colonial governments, provided for the establishment of the Department of Co-operative Development in 1945. By 1953, 260 Societies had been formed among the rural African communities, with a membership of some 39,000. At this stage the main success had been with dairy and coffee societies, and although their turnover represented only about 3 per cent of the value of produce handled by the European-run co-operatives, it was indicative of an interest in the possibilities of corporate activities in which the emphasis was upon what an individual produced rather than on what capital he could subscribe. The movement continued to develop at these two levels, with the powerful and well-established European co-operatives increasingly liberalising their attitude toward the cautiously developing African co-operatives.

During the early and middle 1960's however, a policy was followed of forming co-operatives without first of all promoting a basic understanding among the members of the rights and responsibilities which are a prerequisite for success. The effect was a rapid increase in numbers, with a serious decline in standards of efficiency and integrity. These shortcomings tended to cloud the fact that by 1970, co-operative societies in the smallholder sector were estimated (Sessional Paper No.8 of 1970) to be accounting for a turnover of some K£ 22.5 million, or 50 per cent of the total co-operative turnover. The Co-operative Act of 1963 was repealed, and the current Act of 1966 and the Rules of 1969 provided for direct government intervention in the management of a society's affairs in the event of the failure of a committee to perform its duties properly. The present organisation of the Department of Co-operative Development, whose responsibility it is to promote and supervise co-operative societies, is illustrated in Figure 2.2.

### 2.3.2 Co-operatives in the Large Farm Sector

Co-operative development in the Large Farm Sector has taken two main forms, the Farm Purchase Societies and the Shirika system. These are essentially group farming systems (except for the subsistence plots), engaged in production, marketing and all other aspects of normal farm operations. In the mixed farm sector there are virtually no co-operatives dealing only with marketing or credit.

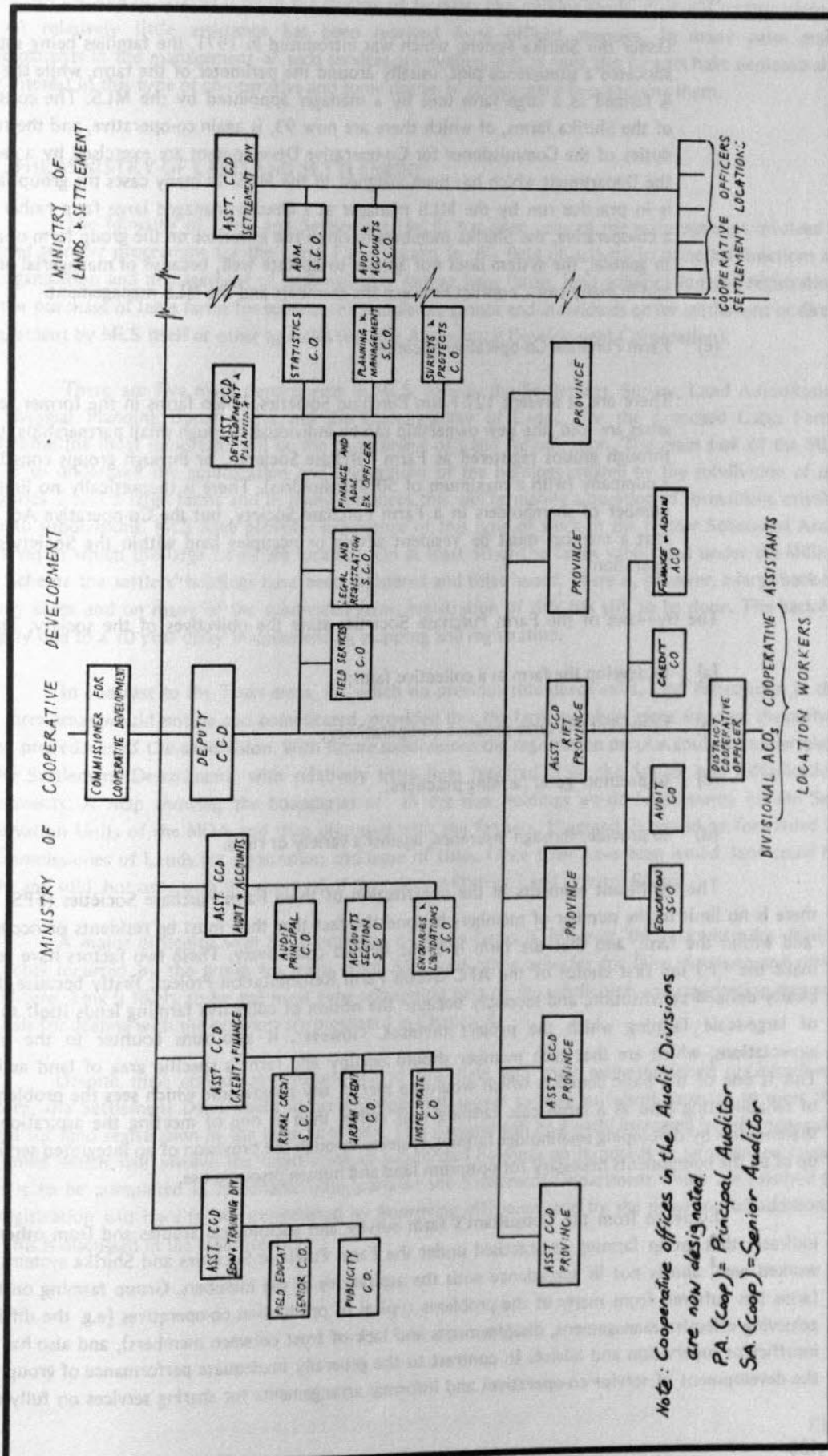
These co-operatives came into being as a result of the transfer of land from expatriate farmers to groups of indigenous farmers. The transfer has taken three main forms:

- settlement schemes whereby the large units were bought by Government and were completely subdivided into small individual holdings (e.g. the Million Acre Scheme)
- purchase of large farms by Government for Shirika type settlement
- private purchase by groups which have formed Farm Purchase Societies

#### (a) The settlement schemes

The Ministry of Land and Settlement (MLS) brought in groups of landless applicants and settled them on individual plots of land in accordance with conventional resettlement practices. The Co-operative Department supplied the promotion, training and supervision needed to provide these groups with a co-operative organisation for marketing and input supply.

Figure 2.2 Department of Cooperative Development



(b) The Shirika System

Under the Shirika system, which was introduced in 1971, the families being settled are allocated a subsistence plot, usually around the perimeter of the farm, while the balance is farmed as a large farm unit by a manager appointed by the MLS. The constitution of the Shirika farms, of which there are now 93, is again co-operative, and the statutory duties of the Commissioner for Co-operative Development are exercised by a section of the Department which has been assigned to the MLS. In many cases the group farm area is in practice run by the MLS manager as a directly-managed large farm rather than as a co-operative, the Shirika members having little influence on the group farm operations. In general, the system does not appear to operate well, because of managerial problems, and in many cases, conflict between the members and the MLS management.

(c) Farm Purchase Co-operative Societies

There are at present 127 Farm Purchase Societies. When farms in the former scheduled areas are sold, the new ownership can be individual, through small partnerships (up to 7), through groups registered as Farm Purchase Societies, or through groups constituted as a company (with a maximum of 50 shareholders). There is theoretically no limit to the number of shareholders in a Farm Purchase Society, but the Co-operative Act requires that a member must be 'resident within or occupies land within the Society's area of operation'.

The Bye-laws of the Farm Purchase Societies state the objectives of the society. They are:-

- (a) to develop the farm as a collective farm;
- (b) to market the farm produce co-operatively;
- (c) to promote good farming practices;
- (d) to provide, through insurance, against a variety of risks.

The significant elements in the constitution of these Farm Purchase Societies (FPS) are that there is no limit to the number of members beyond the fact that they must be residents or occupants of land within the farm, and that the farm is to be farmed collectively. These two factors have tended to make the FPS the first choice of the AFC Group Farm Rehabilitation Project, firstly because there is a clearly defined constitution, and secondly because the notion of collective farming lends itself to the sort of large-scale farming which the project involves. However, it also runs counter to the members' expectations, which are that each member should occupy and farm a specific area of land as his own. This is one of the basic conflicts which would be met in any programme which sees the problem as one of rehabilitating land as a large-scale farming unit rather than as one of meeting the aspirations of the shareholders by developing smallholder farming systems through the provision of an integrated service made up of all the components necessary for optimum land and human resource use.

Evidence from the Consultant's farm survey and sociological studies and from other sources indicates that group farming as practised under the Farm Purchase Societies and Shirika systems has not worked well, and is not in accordance with the aspirations of the members. Group farming on the large farms has suffered from many of the problems typical of production co-operatives (e.g. the difficulty of achieving effective management, disagreements and lack of trust between members), and also has received insufficient supervision and advice. In contrast to the generally inadequate performance of group farming, the development of service co-operatives and informal arrangements for sharing services on fully or partly

subdivided large farms has been promising. Farmers running their own holdings on such farms have shown themselves capable of co-operating in the sharing of facilities like milking sheds, dips and tractor services. As yet relatively little assistance has been received from official agencies. In many cases major improvements in the management of such services are needed, but at least the farmers have demonstrated their interest in this type of co-operative and some degree of competence in organising them.

#### 2.4 THE MINISTRY OF LAND AND SETTLEMENT

The Ministry of Land and Settlement (MLS) has been one of the main agencies involved in the land transfer programme for the Large Farm Sector. In this field of activity its principal functions are the organisation and management of settlement on former large farms, land adjudication and registration, and the purchase of large farms for subsequent transfer to groups and individuals or for settlement or direct management by MLS itself or other agencies (e.g. the Agricultural Development Corporation).

There are five main departments in MLS, namely the Settlement, Survey, Land Adjudication and Physical Planning Departments and the Commissioner of Lands. For the proposed Large Farms programme the most important will be the department of Land Adjudication. The main task of the MLS will be to undertake the adjudication and registration of the holdings created by the subdivision of the Categories 2 and 3 large farms and in many instances this will be merely a question of formalising existing de facto subdivisions. MLS have plentiful experience of this type of work in the former Scheduled Areas (the areas in which the large farms are located). On at least 50 of the farms subdivided under the Million Acre Scheme the settlers' holdings have been registered and titles issued. There is, however, a large back-log of such cases and on many of the subdivided farms registration of title has still to be done. The back-log is largely due to a 10 year delay in commencing mapping and registration.

In contrast to the Trust areas, for which no previous title deeds exist, land registration in the large farm areas would not be too complicated, provided that the farm members agree amongst themselves on the procedures of the subdivision. With future subdivisions the registration process could be undertaken by the Settlement Department, with relatively little help required from the Survey and Adjudication Departments. A map showing the boundaries of all the new holdings would be prepared by the Soil Conservation Units of the MOA and then discussed with the farmers. If agreed, it would be forwarded to the Commissioner of Lands for registration and issue of titles. Once titles have been issued, land could be bought and sold, but only with the approval of the relevant District Land Control Board.

A major difficulty with the subdivision of group farms is, however, the procedure for dealing with debts incurred by the group for loans from AFC and other agencies for farm purchase and other expenditure. This is likely to be the most time-consuming part of the subdivision and registration process. Proposals for dealing with the problem are presented in Chapter 4.

Despite their considerable experience in this field and their well-established organisational structure, the Settlement Department at present does not appear to have sufficient capacity to meet the demand for land registration in the large farm area. This demand will be greatly increased by the proposed programme which will involve the registration of subdivided holdings on hundreds of large mixed farms. If this is to be completed in reasonable time, parts of the Settlement Department which are involved in land registration will have to be strengthened by improving efficiency and by the provision of additional staff. This is discussed in the Main Report.

## 2.5 TRAINING

### 2.5.1 Introduction

The strategy recommended by the Consultants places considerable emphasis on the development of a strong commercial smallholder category of farms within the Large Farms Sector. The organisation for providing the specialised extension advice required is discussed in Chapter 4. This section will comment on the training institutions which currently have the responsibility for providing the necessary staff to the Ministry of Agriculture and the Ministry of Co-operative Development.

### 2.5.2 Agriculture and Farm Management

Formal training in agriculture is available at several levels; degree courses at the University of Nairobi, three year diploma courses at Egerton College, certificate courses at Embu, Bukuru and Kabete and short vocational courses with no specific qualification at Narosura (Farm Mechanisation) Naivasha (Dairy) or at the 32 Farmers Training Centres established throughout the country. In addition courses in farm management are available at the Large Farm Management Centres of Nyahururu and Eldoret. The courses at Egerton and at the Large Farm Management Centres will be important in meeting the training needs of staff to implement the consultants' proposals for the Large Farm Sector.

#### (a) Egerton College

Egerton College offers three year Diploma courses in the following subjects:-

1. Agriculture and Home Economics
2. Animal Husbandry
3. Agriculture
4. Horticulture
5. Dairy Technology
6. Farm Management
7. Agricultural Education
8. Agricultural Engineering
9. Range Management

The syllabuses for each course are built up from varying proportions of teaching from each of the ten teaching Departments, namely Home Economics, Animal Science, Biology, Chemistry, Crop Production, Dairy Technology, Economics, Agricultural Engineering and Range Management. Thus a diploma in any one of the first six of the subjects would cover much of the ground needed.

#### (b) The Farm Management Training Centres

The aim of the two Farm Management Training Centres, at Eldoret and Nyahururu is to provide training in managing large farms. The courses are for nine months, followed by a year working as an assistant manager on a well-run large scale farm. The syllabus is as comprehensive as is consistent with the capacity of the type of student who is normally taken. These are usually people with a rural background, possibly handicapped by a limited education. The course covers production, economics, farm planning, records and accounts, agricultural marketing, crop and animal production and farm machinery. The best students are selected for further supervised training by organisations like East African Acceptances. Some are employed on settlement farms and occasionally on private farms. Both institutions are hampered by the fact that Farm Management is not seen as one of the occupations suited to the best school leavers.

The teaching staff at the Centres are usually diplomates fresh from Egerton College with little experience either of teaching or practical farming. The lecturers are appointed for short periods; hence there is neither continuity nor time for teaching skills to be built-up. So far the training has not been successful and after the nine month course and year's practical training only a small proportion of the students has reached an acceptable standard. The most obvious measures to improve training would include:-

- (i) setting more rigorous educational requirements for entry to the course
- (ii) increasing the length of the course to enable each topic to be taught thoroughly
- (iii) insistence upon good practical experience i.e. at one approved farm before joining the course
- (iv) introducing more experienced lecturers and improving continuity by insisting on a longer period of stay at the college
- (v) ensuring that practical training after completion of the formal course is on the best managed farms such as those run by ADC

These measures will no doubt improve training but what is even more important is to attract the highest possible calibre of trainee with an aptitude for management to the course.

### 2.5.3 Co-operative Training

The facilities and opportunities for co-operative training at all levels are fairly well developed. The Co-operative College at Langata is the centre of formal training and courses lasting from one week for co-operative committee members to three months for Co-operative Assistants are available.

Correspondence courses are also available and considerable effort is put into organising demonstrations, farm walks, and short residential courses at Farmers Training Centres.

# 3

## Related Programmes and Projects

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### 3.1 INTRODUCTION

In considering a suitable approach to the problems of the Large Farm Sector, it is necessary to take into account relevant projects and programmes already planned or in operation. There are a number of such programmes which, although not specifically directed at the Large Farm Sector should become involved in the implementation of the proposed strategy. There are, for instance, the Nordic-assisted training programmes in the co-operative sector which could be adjusted to the specific needs of group owners of large farms who elect to subdivide their farm into smallholdings and register under the Co-operative Act. In the same way, the Co-operative Production Credit Scheme (CPCS), the Co-operative Thrift Scheme (CTS) and the Smallholders Production Services and Credit Project (SPSCP) should be deployed in the Large Farm Sector wherever the processes of subdivision have altered the nature of the relationship between the farmer and the credit institution (usually the Agricultural Finance Corporation AFC).

The three programmes or projects which have the most direct bearing on the Sector are the Group Farm Rehabilitation Project (GFRP), the Commercial Farming Project, and the Integrated Agricultural Development Programme (IADP). The first is directed specifically at the Sector and aims at providing management assistance and credit to participating group farms under a management system controlled centrally by the Agricultural Finance Corporation (AFC) and co-ordinated with the Land and Farm Management Division (LFMD) of the MOA. The Commercial Farming Project is in general a continuation of earlier IBRD/IDA finance for selected commercial smallholder credit through AFC, assisted by the LFMD. The IADP is directed at the small subsistence farmer with a target of some 70,000 credit packages through the co-operative system or through AFC, with the LFMD once again assuming the functions of direction and co-ordination.

### 3.2 GROUP FARM REHABILITATION PROJECT

The Group Farm Rehabilitation Project was originally designed to fit into the existing structure of the Agricultural Finance Corporation (AFC) as the credit institution, with MAO as the agency concerned with agricultural extension and farming practices. The proposed organisational structure is shown in Figure 3.1. The Steering Committee was to be at the headquarters level of both AFC and MOA and the control of operations would have been vested in a District Large Farm Committee composed of the district heads of MOA, MCD and AFC. This would have provided the project with a focal point for the various agencies and interests involved in the rehabilitation process and would have provided a medium through which the individuals and communities concerned could be involved in the process of rehabilitation. It would also have provided these communities with a means of making their aspirations clear.

The actual composition of the management structure of the Project (Figure 3.2) moves the point of focus away from the District and establishes the control of the farming practices within the credit institution. The principal weakness in this is that the whole project is dominated by credit. The recovery of overdue loans by further investment becomes more important than looking at the basic causes of the failure of the farms in the first instance. In addition the co-ordination machinery does not permit satisfactory interplay between MOA, MCD and AFC.

The group farms which lend themselves most readily to the attention of the rehabilitation programme happen to be the co-operative Farm Purchase Societies (see Section 2.3.2) This is because they are registered under the Co-operative Act and are therefore under the supervision of the Commissioner for Co-operative Development. The co-operatives have a clearly defined institutional structure within identifiable legal restraints. This is attractive to the project with its natural concern for the security of its lending.

The other type of group, the Farm Company, lacks supervision and is thus an easy victim to undetected misappropriations, although under proper management it can provide more effective decision-making machinery. A well-managed Company, however, would not come within the definition of a group farm needing rehabilitation. The Project is thus left with a choice of bad Farm Companies and bad Farm Purchase Co-operatives, with a preference for the latter. This was not taken into account in the first instance, and the AFC has tended to ignore the statutory obligations of the Co-operatives and of the Co-operative Department. This could have been avoided had the IBRD Appraisal report provided for the co-operative participation in planning and implementation.

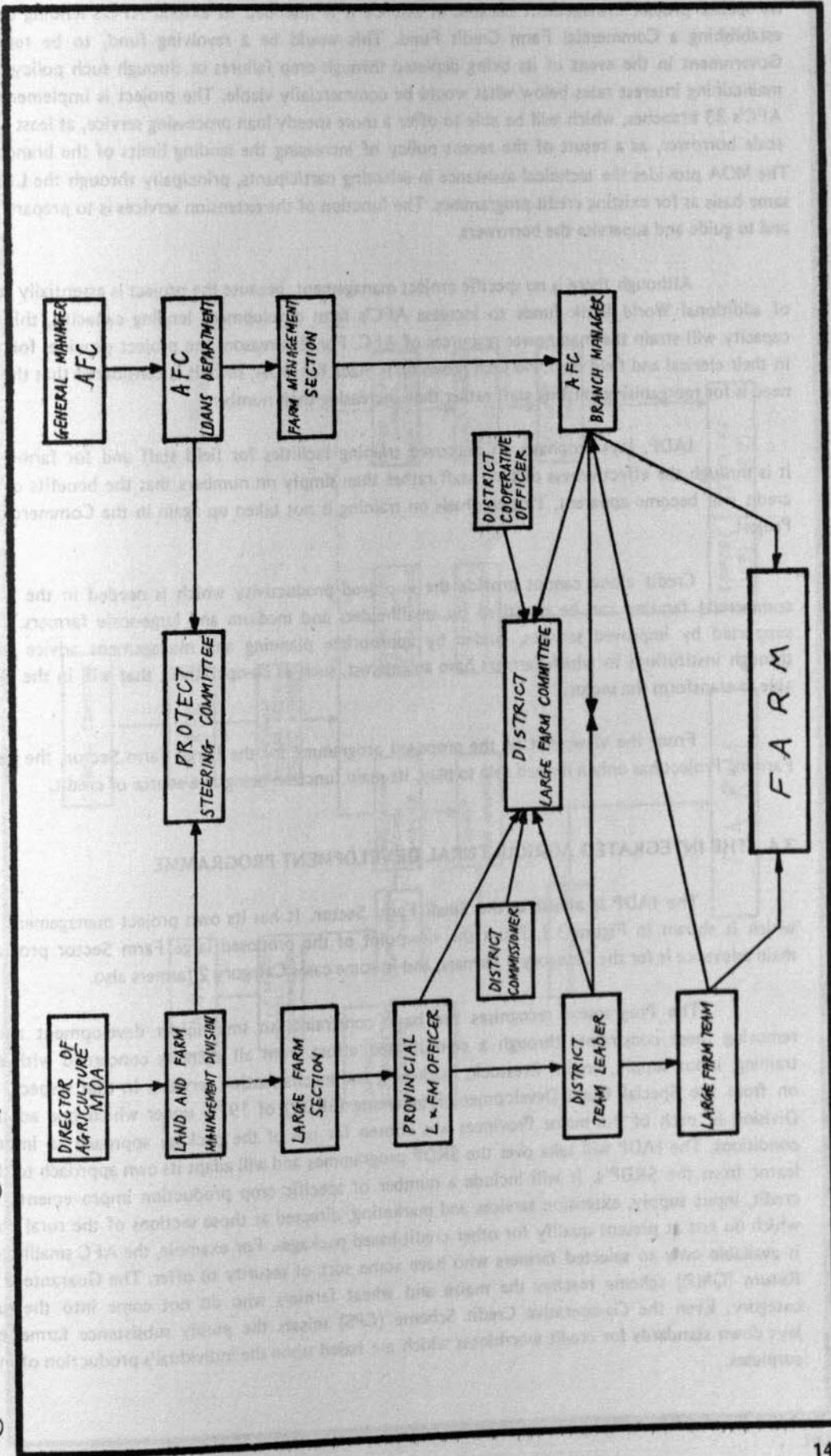
The original proposal (Figure 3.1) would also have proved to be less than satisfactory, for although it avoids placing the actual management of farming within the credit institution, it pays insufficient attention to the need for a defined management structure for the project and for a suitable institution through which the project could operate. The type of rehabilitation envisaged, which is to provide trained managers, supervised by experienced visiting managers and provided with farm plans and credit to enable them to be implemented, could be applied most effectively to the run-down or badly-managed individually owned farms, and to the farms with two or three partners: to that category of ownership, in fact, to which Government may look for a continuation of the large-scale mechanised farming needed to provide supplies of seed and grade livestock for the rest of the agricultural sector.

A review of the current situation of the Group Farm Rehabilitation Project was made by the Consultants and is given in Annex I of this report. It is clear that progress to date has not been encouraging and that the project has certain fundamental weaknesses. As constituted at present, the project has limited applicability to the strategy and programme proposed by the Consultants for the Large Farm Sector. In this programme its main possible role would be the provision of managerial assistance and credit to the Category 1 farms.

### 3.3 THE COMMERCIAL FARMING PROJECT

The Commercial Farming Project is a continuation of previous IBRD/IDA credit/loans aimed, through AFC, at both smallholders and larger farmers. It involves seasonal credit and longer term loans. Lines of credit are provided over a period of three years, for seasonal loans for cash crops and food crops for sale, and for land clearing, small-scale equipment and other items. The project also covers livestock improvement and gives loans of up to KShs. 250,000 for on-farm development on medium and large commercial farms. It makes special provision for loans for machinery and equipment to increase the number of farm contractors and for loans to stockists to make input supplies more readily available at the time they are needed.

Figure 3.1 Original proposal for group farm supervised credit project (March 1974)



Under the present proposals for the continuation of the Commercial Farming Project, there is no special project management because in essence it is intended to extend AFC's lending capability by establishing a Commercial Farm Credit Fund. This would be a revolving fund, to be replenished by Government in the event of its being depleted through crop failures or through such policy decisions as maintaining interest rates below what would be commercially viable. The project is implemented through AFC's 33 branches, which will be able to offer a more speedy loan processing service, at least to the small-scale borrower, as a result of the recent policy of increasing the lending limits of the branch managers. The MOA provides the technical assistance in selecting participants, principally through the LFMD on the same basis as for existing credit programmes. The function of the extension services is to prepare farm plans and to guide and supervise the borrowers.

Although there is no specific project management, because the project is essentially an injection of additional World Bank funds to increase AFC's farm development lending capacity, this additional capacity will strain the man-power resources of AFC. For this reason, the project provides for an increase in their clerical and field staff. No such provision is made for MOA, since it is considered that the Ministry's need is for reorganising existing staff rather than increasing their number.

IADP, lays emphasis on improved training facilities for field staff and for farmers, because it is through the effectiveness of field staff rather than simply on numbers that the benefits of additional credit will become apparent. This emphasis on training is not taken up again in the Commercial Farming Project.

Credit alone cannot provide the improved productivity which is needed in the areas where commercial farming can be practised by smallholders and medium and large-scale farmers. It is credit supported by improved services, guided by appropriate planning and management advice and applied through institutions in which farmers have an interest, such as co-operatives, that will in the long run be able to transform the sector.

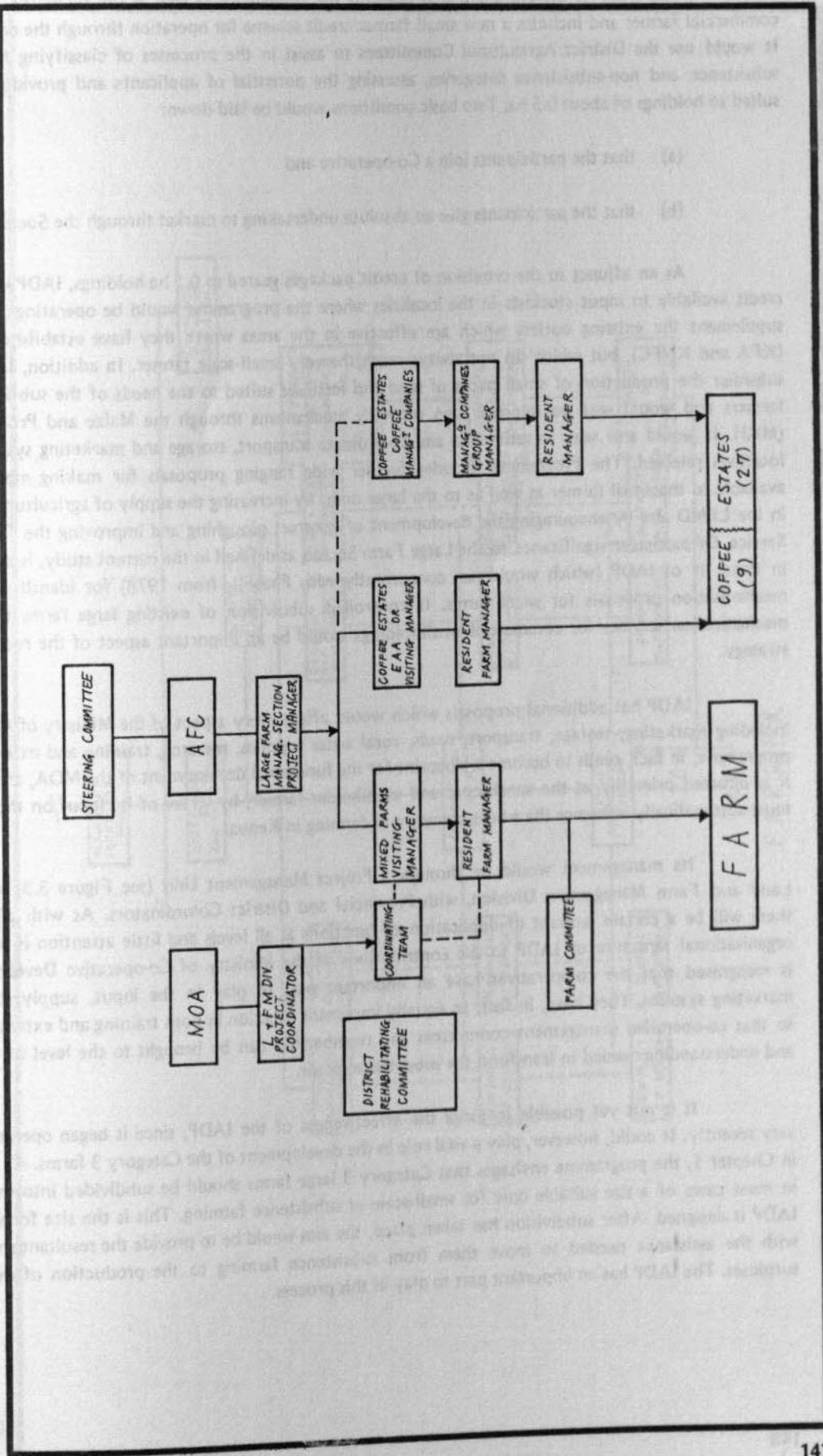
From the viewpoint of the proposed programme for the Large Farm Sector, the Commercial Farming Project has only a limited role to play, its main function being as a source of credit.

### 3.4 THE INTEGRATED AGRICULTURAL DEVELOPMENT PROGRAMME

The IADP is aimed at the Small Farm Sector. It has its own project management structure, which is shown in Figure 3.3. From the viewpoint of the proposed large Farm Sector programme, its main relevance is for the Category 3 farmers, and in some cases Category 2 farmers also.

The Programme recognises the basic constraints to smallholder development and aims at removing these constraints through a co-ordinated effort from all agencies concerned with extension, training, input supply, credit, livestock, marketing and mechanisation services. In that respect, it follows on from the Special Rural Development Programme (SRDP) of 1971, under which one administrative Division in each of the major Provinces was chosen for use of the package approach to improve rural conditions. The IADP will take over the SRDP programmes and will adapt its own approach to the lessons learnt from the SRDP's. It will include a number of specific crop production improvements, based on credit, input supply, extension services and marketing, directed at those sections of the rural community which do not at present qualify for other credit-based packages. For example, the AFC smallholder credit is available only to selected farmers who have some sort of security to offer. The Guaranteed Minimum Return (GMR) scheme reaches the maize and wheat farmers who do not come into the subsistence category. Even the Co-operative Credit Scheme (CPS) misses the purely subsistence farmer, because it lays down standards for credit worthiness which are based upon the individual's production of marketable surpluses.

Figure 3.2 Present organisation group farm rehabilitation project (February 1975)



The IADP is therefore aimed at reaching the subsistence as well as the established small-scale commercial farmer and includes a new small farmer credit scheme for operation through the co-operatives. It would use the District Agricultural Committees to assist in the processes of classifying farmers into subsistence and non-subsistence categories, assessing the potential of applicants and providing packages suited to holdings of about 0.5 ha. Two basic conditions would be laid down:

- (a) that the participants join a Co-operative and
- (b) that the participants give an absolute undertaking to market through the Society.

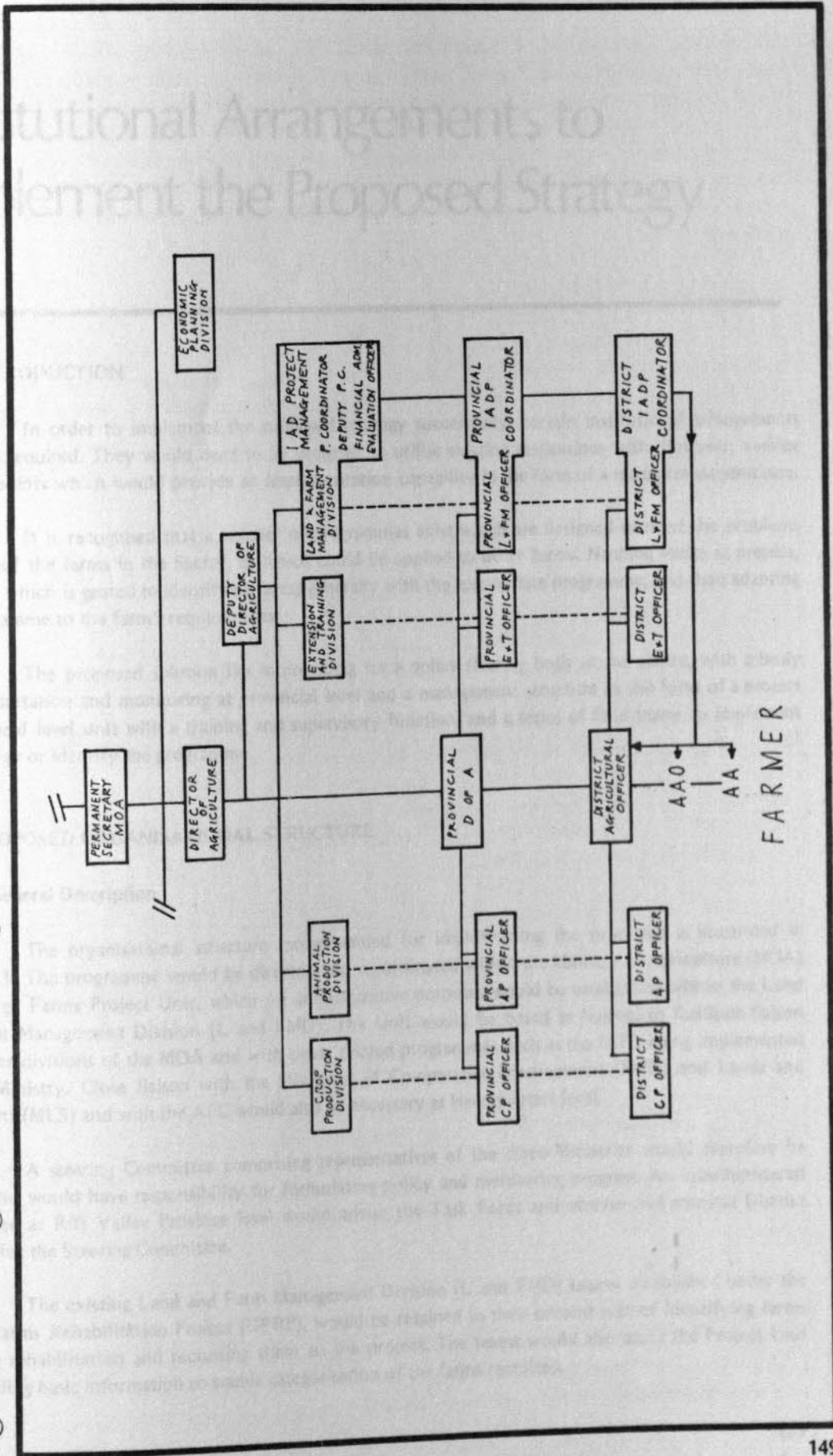
As an adjunct to the provision of credit packages geared to 0.5 ha holdings, IADP would make credit available to input stockists in the localities where the programme would be operating. This would supplement the existing outlets which are effective in the areas where they have established branches (KFA and KNFC), but which do not always reach the very small-scale farmer. In addition, IADP would subsidise the production of small packs of seed and fertiliser suited to the needs of the subsistence level farmers and would seek to improve loan recovery mechanisms through the Maize and Produce Board (MPB). It would also seek to rationalise and co-ordinate transport, storage and marketing systems in the locations selected. The Programme includes further wide ranging proposals for making mechanisation available to the small farmer as well as to the large ones, by increasing the supply of agricultural engineers in the LFMD and by encouraging the development of contract ploughing and improving the Tractor Hire Service. Of particular significance to the Large Farm Sector, as defined in the current study, is the proposal in Phase II of IADP (which would run concurrently with Phase I, from 1978) for identifying specific mechanisation proposals for small farms. If controlled subdivision of existing large farms takes place, mechanisation services for commercial smallholdings would be an important aspect of the recommended strategy.

IADP has additional proposals which would affect every aspect of the Ministry of Agriculture, including marketing, storage, transport, roads, rural water supplies, research, training and extension. The programme, in fact, tends to become a blueprint for the functional development of the MOA, and although it is directed primarily at the subsistence and smallholder farmer, by virtue of its focus on the LFMD it must automatically influence the whole spectrum of farming in Kenya.

Its management would be through a Project Management Unit (see Figure 3.3) within the Land and Farm Management Division, with Provincial and District Co-ordinators. As with all projects, there will be a certain amount of duplication of functions at all levels and little attention is paid in the organisational structure of IADP to the contributions of the Ministry of Co-operative Development. It is recognised that the co-operatives have an important part to play in the input, supply, credit and marketing systems. They have, in fact, an equally important function in both training and extension work, so that co-operative management committees and membership can be brought to the level of efficiency and understanding needed to transform the subsistence sector.

It is not yet possible to judge the effectiveness of the IADP, since it began operations only very recently. It could, however, play a vital role in the development of the Category 3 farms. As explained in Chapter 1, the programme envisages that Category 3 large farms should be subdivided into small units, in most cases of a size suitable only for small-scale or subsistence farming. This is the size for which the IADP is designed. After subdivision has taken place, the aim would be to provide the resultant small farms with the assistance needed to move them from subsistence farming to the production of marketable surpluses. The IADP has an important part to play in this process.

Figure 3.3 Organisation for Integrated Agricultural Development Programme



# 4

## Institutional Arrangements to Implement the Proposed Strategy

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### 4.1 INTRODUCTION

In order to implement the proposed strategy successfully, certain institutional arrangements would be required. They would need to be designed to utilise existing institutions with, however, a series of focal points which would provide an implementation capability in the form of a management structure.

It is recognised that a number of programmes exist which are designed to meet the problems of some of the farms in the Sector, or which could be applied to other farms. Nothing exists at present, however, which is geared to identifying farms generally with the appropriate programme, and then adapting the programme to the farm's requirements.

The proposed solution lies in providing for a policy steering body at the centre, with a body for interpretation and monitoring at provincial level and a management structure in the form of a project unit, a field level unit with a training and supervisory function, and a series of field teams to implement the strategy or identify the programme.

### 4.2 PROPOSED ORGANISATIONAL STRUCTURE

#### 4.2.1 General Description

The organisational structure recommended for implementing the proposals is illustrated in Figure 4.1. The programme would be directed and co-ordinated within the Ministry of Agriculture (MOA) by a Large Farms Project Unit, which for administrative purposes would be established within the Land and Farm Management Division (L and FMD). The Unit would be based in Nairobi to facilitate liaison with other divisions of the MOA and with other related programmes such as the IAPD being implemented by the Ministry. Close liaison with the Ministries of Co-operative Development (MCD) and Lands and Settlement (MLS) and with the AFC would also be necessary at Headquarters level.

A steering Committee comprising representatives of the three Ministries would therefore be set up and would have responsibility for formulating policy and monitoring progress. An interministerial Committee at Rift Valley Province level would advise the Task Force and observe and monitor District progress for the Steering Committee.

The existing Land and Farm Management Division (L and FMD) teams, established under the Group Farms Rehabilitation Project (GFRP), would be retained in their present role of identifying farms requiring rehabilitation and recruiting them to the project. The teams would also assist the Project Unit by providing basic information to enable categorisation of the farms recruited.

For the planning and implementation stage, Category 1 farms would be assigned to the existing Large Farm Management Section of the AFC. For Categories 2 and 3 farms, the following new arrangements are proposed. A Task Force would be established as the principal agency in the implementation of proposals. It would assist in categorising farms and would in particular be responsible for the training of a number of Smallholder Development Teams (SDT) which would ultimately carry the burden of planning and extension work for Category 2 farms. These teams would also be involved to a lesser extent with Category 3 farms, which would receive most of the services they required under the Integrated Agricultural Development Programme IADP. The role of the SDT would be to organise smallholders into groups on Category 2 farms, each of which would be known as a Smallholder Land Use Society (SLUS):

#### 4.2.2 The Large Farms Project Unit

A single body to plan and direct the programme would be essential. This should comprise full-time staff rather than a committee. To meet this requirement, the establishment of a special unit within the LFMD is proposed. This should be a relatively small section comprising highly qualified staff. The technical staff required would include a Project Manager (a farm management specialist), a Legal Adviser, familiar with Co-operative law and organisation and a Farm Management Economist, together with appropriate counterpart staff.

The Unit's main responsibilities would be planning, direction and co-ordination, implementation being in the hands of the proposed Task Force, Smallholder Development Teams and the Large Farm Management Section of the AFC. One of its first tasks would be to review each of the mixed farms in the Large Farm Sector as they are recruited to the Rehabilitation Programme and place them in one of the three farm categories. The unit would be responsible for preparing guidelines for categorisation based upon factors such as land potential, appropriate farm systems and numbers of owners.

The Unit would also have responsibility for approving farm plans and budgets prepared by the AFC for Category 1 farms, as well as for development proposals for farms in Categories 2 and 3. The Legal Adviser would have responsibility for ensuring that the correct procedures for settling legal disputes over ownership, liability for debts incurred, etc. were adopted. He would also advise on procedures for registration of titles, division of debts (in consultation with AFC) and formation and constitution of co-operatives (in consultation with MCD).

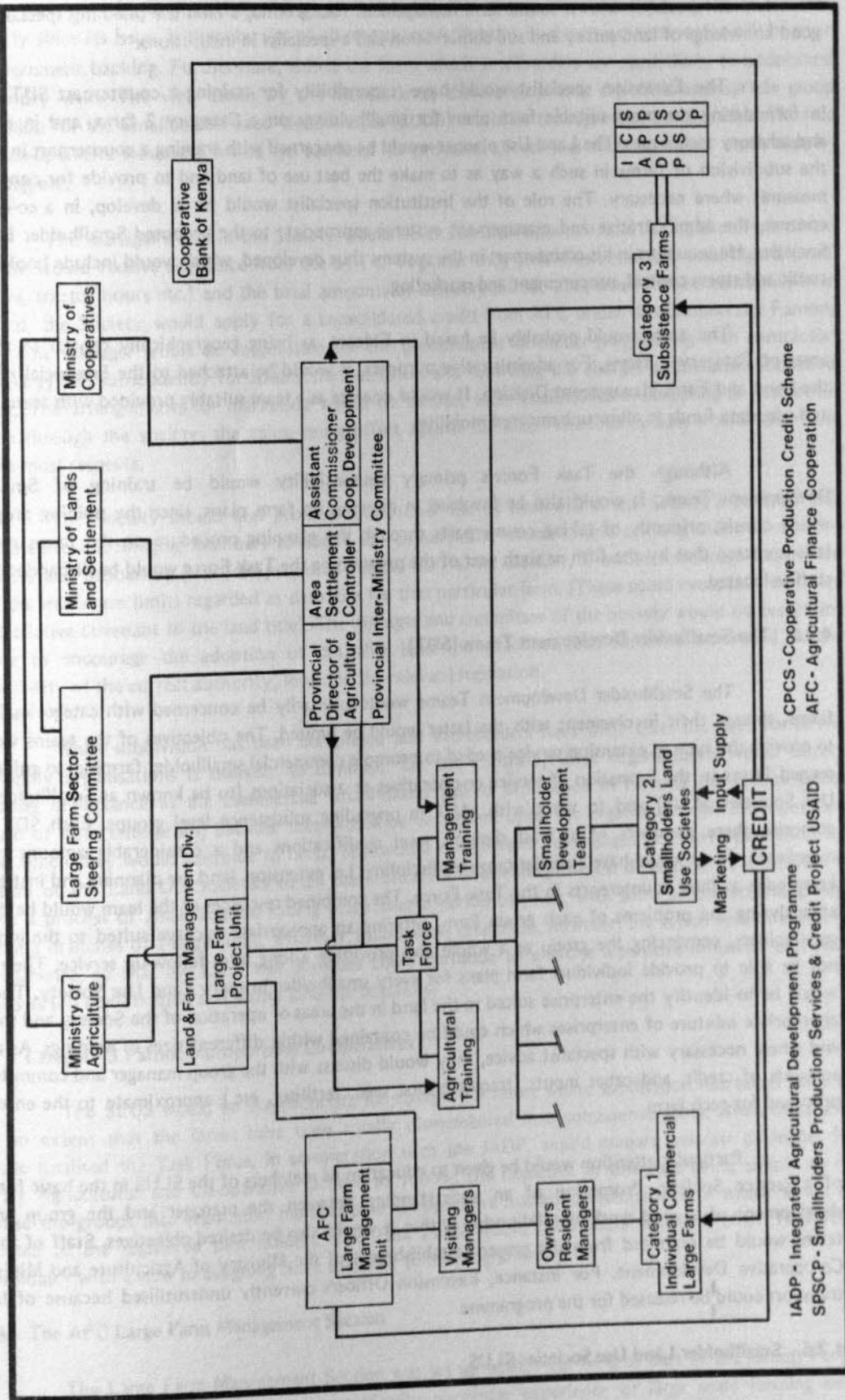
#### 4.2.3 District Land and Farm Management Division Teams

The District Land and Farm Management teams were created under the Group Farm Rehabilitation Project (GFRP) to identify farms requiring rehabilitation, prepare plans and budgets and submit them for approval to the District Rehabilitation Committees (also established as part of the GFRP) programme). These District teams would be retained within the proposed structure. Their role, however, would be enlarged to cover farms in all three categories. They would identify farms requiring rehabilitation, describe the objectives and alternatives within the programme and finally, if the farmers were willing to participate, then would collect all the relevant information which would enable the farm to be categorised. This would include information on farm size, the number of owners (registered, unregistered, absentee etc.), the farm enterprises, proportions of potentially arable, rough grazing and unutilisable land, etc. If possible the present level of indebtedness would also be indicated. The teams would report directly to the Project Unit.

#### 4.2.4 The Task Force

The Task Force would be set up to train a number of Smallholder Development Teams (SDT) and to initiate the programme for development of commercial smallholdings. It would consist of three members, all specialists in small farm development but with a wide range of skills. The team would include

Figure 4.1 Proposed organisation



an extension specialist with a sound farm management background, a land use planning specialist with a good knowledge of land survey and soil conservation and a specialist in institutions.

The Extension specialist would have responsibility for training a counterpart SDT member in formulating the most suitable farm plans for smallholdings on a Category 2 farm, and in extension and advisory techniques. The Land Use planner would be concerned with training a counterpart in planning the subdivision of farms in such a way as to make the best use of land and to provide for conservation measures where necessary. The role of the Institution specialist would be to develop, in a co-operative context, the administrative and management systems appropriate to the proposed Smallholder Land Use Societies. He would train his counterpart in the systems thus developed, which would include bookkeeping, credit and stores control, procurement and marketing.

The team would probably be based in Eldoret, as being geographically central to the main areas of Category 2 farms. For administrative purposes, it would be attached to the Provincial offices of the Land and Farm Management Division. It would operate as a team suitably provided with team vehicles and adequate funds to allow unhampered mobility.

Although the Task Force's primary responsibility would be training of Smallholder Development Teams, it would also be involved in drawing up farm plans, since the training programme would consist primarily of taking counterparts through the planning procedure on the farms recruited. It is expected that by the fifth or sixth year of the programme the Task Force would be disbanded and the staff re-located.

#### **4.2.5 The Smallholder Development Teams (SDT)**

The Smallholder Development Teams would primarily be concerned with categories 2 and 3 farms, though their involvement with the latter would be limited. The objectives of the teams would be to provide the type of extension service needed to promote commercial smallholder farming, to guide group owned farms in the formation of service co-operatives or associations (to be known as Smallholder Land Use Societies SLUS) and to work with IADP in upgrading subsistence level groups. Each SDT would comprise three members of at least diploma level qualifications and a considerable amount of field experience. They would have a similar range of disciplines i.e. extension, land use planning and institutional knowledge as their counterparts in the Task Force. The combined resources of the team would be directed at analysing the problems of each group farm, offering an appropriate package suited to the individual smallholders, convincing the group as a whole and providing a long term follow-up service. They would not be able to provide individual farm plans for every smallholder in every Land Use Society. Their aim would be to identify the enterprise suited to the land in the areas of operation of the Society and the most appropriate mixture of enterprises which could be contained within different sizes of holdings. As a team, and where necessary with specialist advice, they would discuss with the group manager and committee the amounts of credit, and other inputs (tractor hours, seed, fertiliser, etc.) approximate to the enterprises proposed for each farm.

Particular attention would be given to education of members of the SLUS in the basic functions of a service Society. Promotion of an understanding between the manager and the group and the development of a good working relationship within it would also be desired objectives. Staff of the SDT teams would be recruited from the present establishment of the Ministry of Agriculture and Ministry of Co-operative Development. For instance, Extension Officers currently underutilised because of lack of transport could be released for the programme.

#### **4.2.6 Smallholder Land Use Societies SLUS**

In deciding the most appropriate group structure for participating Category 2 farms two alternatives, companies and co-operatives were considered. There are arguments in favour and against both,

but the policy of the Government of Kenya, as stated in the current Development Plan and as repeated frequently since its issue, is that the use of co-operative institutions in the agricultural sector will be given full Government backing. Furthermore, this is the form which smallholders are most likely to understand and identify with. The view taken by the Consultants, therefore, is that the most appropriate group organisation for the Smallholder Land Use Societies (SLUS) would be the registered Co-operative. The role of the co-operative however, would be confined to provision of services such as credit, input supply, marketing, etc.

The manager's role in the Society would be extremely important, and during the development period he would receive assistance from the SDT's. Together they would establish the total inputs (seed, fertilisers, tractor hours etc.) and the total amounts of credit required. Once these requirements have been identified, the Society would apply for a consolidated credit from AFC under the Commercial Farming Project. The manager would be responsible for the procurement of inputs (negotiating with contractors if necessary) and subsequently for issuing the quantities and recording the charges against each individual account. The arrangements for marketing would be similar, each smallholder undertaking to market his produce through the society, the value being offset against his loan. The loan system would follow the CPCS in most respects.

The Society should also promote the proper use of land within the Society's control. This would involve encouraging members to adopt soil conservation measures and advising them on stocking intensities and husbandry practices proposed by the SDT's. In addition, it would discourage subdivision below the minimum limits regarded as desirable for that particular farm. (These could eventually be stated as a restrictive covenant to the land title). The manager and committee of the Society would do everything possible to encourage the adoption of desirable land use practices, but enforcement would be the responsibility of the correct authority, invoking the relevant legislation.

When subdivision has been completed and shareholders have their titles the need for service and supply organisations is unlikely to diminish. On the contrary, these organisations would assume increasing importance as the commercial smallholders gained experience in running the recommended mixture of farm enterprises, because they would be dependent upon the organisation for the inputs and advice which they would continue to need. This would not prevent the changes and developments in the structure of the Land Use Societies which the economics of operation would determine. It is possible to foresee a process of amalgamation taking place over a period of years, with some of the original groups becoming branches of a larger unit. Whatever adjustments take place, however, the actual system would be a permanence, so that the Land Use Societies could continue to exercise a positive influence over such matters as soil conservation and sound land use practices.

#### 4.2.7 Category 3 Farms: Multipurpose Co-operatives

The SLUS would be inappropriate for Category 3 farms where subdivision has taken place to such an extent that the farms have been totally dismembered into subsistence plots. When ownership lists are finalised the Task Force, in co-operation with the IADP, would prepare separate guidelines for District Agricultural and Co-operative Offices to follow, the objective in this case being simply to re-organise the groups into regulation multipurpose Co-operative Societies, membership of which would be restricted to the registered plot holders. The Task Force would co-ordinate with the IADP Provincial Co-ordinator with a view to assigning these societies to his programme.

#### 4.2.8 The AFC Large Farm Management Section

The Large Farm Management Section was set up within the AFC as part of the Group Farms Rehabilitation Project (GFRP). Specialist staff with particular experience of large scale farming were recruited and given responsibility for implementing the project. As explained in Annex I the GFRP in

its present form has so far had little success, mainly because the basic desire of most shareholders in group owned farms is to subdivide the farm into individually farmed holdings. It is proposed therefore that a change of emphasis be introduced to the project, its main function becoming the provision of assistance and services to Category 1 farms. With regard to Category 1 farms the AFC's Large Farm Management Section would have the following responsibilities-

- preparation of farm plans and budgets
- selection of trained managers where necessary for participating farms
- supervision and assistance in the implementation of the plan through the present system of Visiting Managers

The farm plans and budgets, however, would have to be approved by the District Rehabilitation Committees and by the Large Farm Project Unit before implementation could commence.

The Large Farm Management Section would continue to expand by enlarging its complement of Visiting Managers. The need to provide trained managers would be reduced, as in the majority of cases Visiting Managers would work through resident owner managers.

#### 4.2.9 Committees

Reference has already been made in 4.2.1 to the Steering Committee, and to the Interministerial Committee at Provincial level, and Figure 4.1 illustrates the interrelationships between Committees, and between committees and the management structure. An alternative option is offered in Figure 4.2, whereby the Provincial Committee is omitted. There are arguments both for and against including a Provincial Committee. One view is that a Provincial Committee would not contribute to the development, which would be better placed in the hands of District Committees. In any event, the District Rehabilitation Committees would be retained, with enlarged functions to include perusal of plans for Category 2 as well as those prepared for Category 1 by the Large Farm Management Section of AFC.

The Consultants tend to favour the retention of the Provincial Committee, which would be a 3-man body to co-ordinate the Ministries' contributions as regards training requirements, to advise the Task Force on Policy and to keep the Steering Committee in touch with overall progress and the general reactions to the strategy.

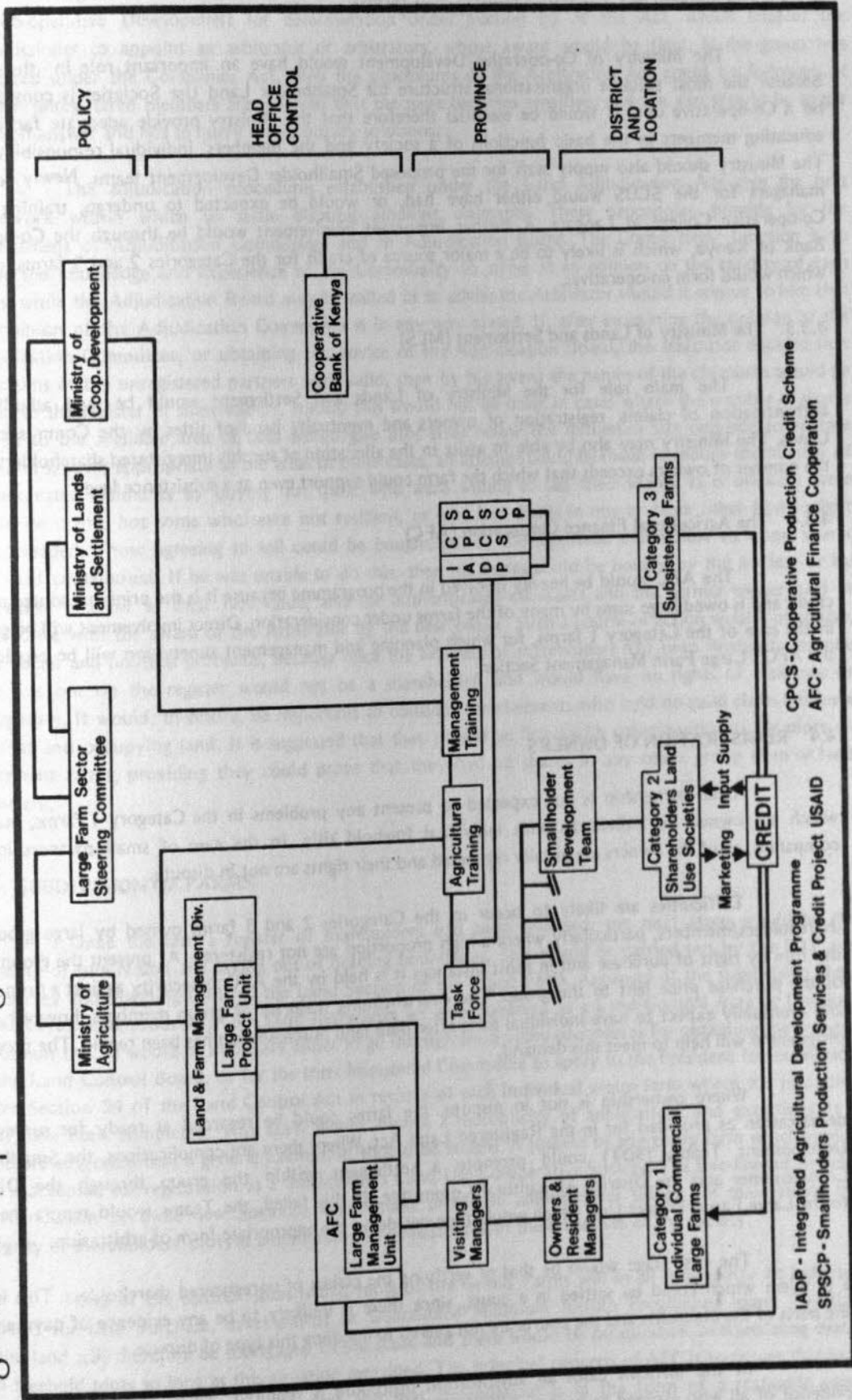
### 4.3 DEVELOPMENT OF THE MINISTRIES AND THE AFC

#### 4.3.1 The Ministry of Agriculture (MOA)

The Ministry of Agriculture would have the most important role in the programme since its Land and Farm Management Division (LFMD) would contain the proposed Large Farms Project Unit and the District Large Farm Management Teams. The Lands Section of the LFMD would also provide assistance for the survey of farms, preparation of maps and laying out plot boundaries for farms to be subdivided. This assistance would need to be extended to farms already completely subdivided in order that existing plot boundaries could be established and the possibility for reorganisation assessed. The Section has 27 survey teams based in Nakuru and two teams in each of the main districts. The availability of this service should not be a constraint if the programme is allocated some priority. Already two teams have been assigned to carry out similar work for the GFRP.

The IADP which is also co-ordinated within the L and FMD of the Ministry would be required to extend some of its services such as extension, credit and possibly land preparation and machinery, to Category 3 farms.

Figure 4.2 Proposed organisation



#### 4.3.2 The Ministry of Co-operative Development (MCD)

The Ministry of Co-operative Development would have an important role in the project, because the most suitable organisational structure for Smallholder Land Use Societies is considered to be a Co-operative one. It would be essential therefore that the Ministry provide adequate facilities for educating members in the basic functions of a society and the members' individual responsibility to it. The Ministry should also supply staff for the proposed Smallholder Development teams. Newly recruited managers for the SLUS would either have had, or would be expected to undergo, training at the Co-operative College at Langata. A further important involvement would be through the Co-operative Bank of Kenya, which is likely to be a major source of credit for the Categories 2 and 3 farms, most of which would form co-operatives.

#### 4.3.3 The Ministry of Lands and Settlement (MLS)

The main role for the Ministry of Lands and Settlement would be land adjudication, authentication of claims, registration of owners and eventually issue of titles by the Commissioner of Lands. The Ministry may also be able to assist in the allocation of surplus unregistered shareholders where the number of owners exceeds that which the farm could support even at a subsistence level.

#### 4.3.4 The Agricultural Finance Corporation (AFC)

The AFC would be heavily involved in the programme because it is the principal source of farm credit and is owed large sums by many of the farms under consideration. Direct involvement will be greatest in the case of the Category 1 farms, for which planning and management supervision will be provided by the AFC's Large Farm Management Section.

### 4.4 REGISTRATION OF OWNERS

Land ownership is not expected to present any problems in the Category 1 farms, many of which are owned by individuals with individual freehold title. In the case of small partnerships and companies, all of the owners are usually registered and their rights are not in dispute.

Difficulties are likely to occur in the Categories 2 and 3 farms owned by large groups of shareholders/members, particularly where a high proportion are not registered. At present the group owns the title by right of purchase and in most instances it is held by the AFC as security against a proportion of the purchase price lent to the group. The overwhelming majority of group members, however, want and eventually expect to have individual titles after their land purchase loan has been repaid. The proposed programme will help to meet this demand.

Where ownership is not in dispute, the farms could be regarded as ready for survey and demarcation as provided for in the Registered Land Act. Where there are complications, the Smallholder Development Teams (SDT) could promote a settlement within the group through the District Commissioner and the District Agricultural Committee. If this failed, the Teams would report the fact to the Large Farms Project Unit which would then decide on the appropriate form of arbitration.

The first stage would be that of verifying the claims of unregistered shareholders. This is not a problem which could be settled in a court, since there is unlikely to be any evidence of payment on the parts of the claimants and the courts are not geared to handling this type of dispute.

In the difficult cases an adjudication procedure is required, which could take the verbal evidence of all who claimed to have an interest in the farm and authenticate or reject such claims. If the

group was registered under the Co-operative Act, the problem could be referred to the Commissioner for Co-operative Development for determination under Section 80 of the Act, which enables the Commissioner to appoint an arbitrator or arbitrators, whose award would be final. If the group was registered under the Companies Act, then the procedures of the Arbitration Act could be followed. It is when unregistered members are involved that the issue becomes sensitive, and the aim should be to get the right answer and not to hurry into arbitrary solutions.

The adjudication procedures established under the Land Adjudication Act give the best framework within which to settle disputes amongst claimants. These procedures provide for the appointment of Adjudication Committees and an Adjudication Board. The Committees' function is to utilise the knowledge and experience of the Community to arrive at an opinion on the validity of each claim, while the Adjudication Board may be called in to advise the Arbitrator should it appear to him that the opinion of the Adjudication Committee is in any way biased. If, after examining the opinion of the Adjudication Committee, or obtaining the advice of the Adjudication Board, the arbitrator decided that the claims of the unregistered partners were valid, then by his award the names of the claimants would be added to the register of shareholders. Ideally this would not be done in cases where the number of shares related to the available area of land would give plot sizes below the minimum size required to operate the farm systems appropriate to the area. In these cases, an attempt could be made to reduce the number of authenticated claimants by buying out those who were willing to sell their shares. It is unlikely there would be many, but some who were not resident, or who had shares in one or more other farms might be persuaded. Those agreeing to sell could be bought out by the registered shareholder to whose shares he had contributed. If he was unable to do this, then his shares could be bought by the Society or by any other member at their face value, and the authenticated claimants and the former owner paid in accordance with the award of the Arbitrator by the new owner. Such a course of action would, of course, raise social and political problems, because once the registers of shareholders had been finalised, any one who was not on the register would not be a shareholder, and would have no rights of residence or occupation. It would, therefore, be important to consider the claimants who held no valid claim but were resident and occupying land. It is suggested that they should be listed with other applicants for plots on settlement farms, providing they could prove that they had no shares in any other group farm or land elsewhere.

#### 4.5 SUBDIVISION OF FARMS

Once the farm's register of shareholders had been finalised, the next stage would be the planning of subdivision and laying out of holding boundaries. This would be carried out by the SDT and the Survey and Mapping Units of the Land Section of the L and FMD. Approval of the subdivision plans would be required, however, if the farm lies within an area Gazetted as a Land Control Area or Division. To obtain this, it would be necessary either to go through the lengthy procedures for obtaining the consent of the Land Control Board, or for the Inter-Ministerial Committee to apply to the President for exemption under Section 24 of the Land Control Act in respect of each individual group farm where the preceding steps have been completed. This again would involve a multiplicity of applications and gazettings. It is therefore suggested that a general exemption should be sought in respect of any group farm which applies and is accepted for registration as a Smallholders Land Use Co-operative Society. The Bye-laws or Articles of Association of these new Societies would make provision, among other things, for maintaining the integrity of shareholders' plots at a minimum size consistent with the objectives of the society.

One of the central issues is that most of the Group Farms will in all probability be indebted to AFC for land purchase, development or Guaranteed Minimum Return Programme loans. The title to the land will therefore be mortgaged to the Bank and there would be no question of translating shares into freehold plots so long as this situation remained. The principal concern of AFC is to ensure that loan repayment schedules are kept up to date and that its collateral is in the form of a realisable asset.

Because of this the Land Use Societies must continue as the registered owners of the land, and retain responsibility for maintaining loan repayment until an agreed procedure has been accepted by all concerned.

There are two alternatives for such a procedure which could only be taken with the consent of the creditor. The situation on each group farm would be assessed by the SDT's and guidance given over the most appropriate course to adopt. The first alternative would be for a General Meeting of the Land Use Society to pass a resolution to apply for partition under Section 104 of the Registered Land Act, in a manner which would provide shareholders with plots proportionate to their shareholdings. The subsequent survey under Section 20/21 of the Act would provide approximate boundaries for the purpose of registration, and the Freehold Certificates would contain restrictions as to subdivision and would be charged to the Land Use Society. As creditor, AFC could require that the individual charges be transferred to them, but whatever arrangement was made, it would thereafter be the responsibility of the Society to open a loan account in the name of each shareholder with a share of the debt of the original Farm Purchase Society proportionate to the shareholding.

The second alternative would be for the Land Use Society to retain the title to the group land, apply as above for partition, and lease the plots to the registered shareholders. Their leases could be in the form of periodic tenancies subject to an undertaking on the part of the Society to convert the plot to freehold once the Society is freed from all debts. They could alternatively be for a specified term of perhaps 33 or 99 years, in which case they would be registered and the certificate could have the same restrictions and charges entered as with a freehold title. On this basis, the shareholders would pay a rent to the Society in addition to paying for the various services which the Society would be providing. The rents would be set at a level which would enable the Society to enter into an agreement with AFC for liquidating outstanding debts over a specific period.

#### 4.6 CO-OPERATIVE BYE-LAWS

For those group farms which adopt the Co-operative structure, one of the early steps would be to discuss the objectives of the Smallholder Land Use Society with the shareholders and to draft bye-laws for the new society or to lay down procedures to be followed for amending the bye-laws of the former Farm Purchase Societies. This would be done by the Task Force or SD Teams in consultation with the Commissioner for Co-operative Development and the Provincial Assistant Commissioner. Although it appears that Section 10 of the Act may be sufficient authority for changing both the name and objectives of the original group, it is appreciated that there are complex issues involved which would require joint study by the MCD, AFC, the Large Farm Project Unit and the Task Force. One of these is the present indebtedness of the farms to AFC which was discussed in the previous section.

#### 4.7 TRAINING

To implement the proposed strategy the following types of training will be required:-

- Training of managers for large Category 1 farms
- Training of Smallholder Development teams for Category 2 farms
- Training of managers for service co-operatives to be known as Co-operative Land Use Societies.

##### 4.7.1 Training of Managers for Large Farms

The current training programme of one year's formal training followed by a year's practical experience (Section 2.5) does not adequately equip a manager to deal with the complex task of managing

a large farm. The courses presently available at the Large Farm Management Training Centres at Eldoret and Nyahururu are comprehensive and in theory cover the important aspects of farm management. The primary limitation, however, lies with the calibre of trainee attracted to the courses and the low educational requirements set for entry. It is doubtful, therefore, whether the students can absorb the material presented in the Courses in the time available. It is essential that a manager must have a thorough knowledge of crop and livestock production techniques gained either through formal training or practical experience, or a combination of both, before commencing specialised management training. In addition, he will need management skills such as an ability to analyse a farm with regard to the interrelationship and relative profitability of different enterprises, maintain and use a system of record keeping, prepare complete and partial budgets and appraise investment decisions. These latter skills are best acquired after a sound knowledge of crop and livestock production has been obtained. Lastly, the manager will need an organisational capacity which will combine the ability to make effective use of machinery and equipment on the farm with organising and working in harmony with large numbers of men. The job is therefore a demanding one and the following sequence of formal training and practical experience is considered necessary:-

- At least one year's practical experience in farming, before beginning his formal training in agriculture.
- Diploma course at Egerton (Farm Management).
- Post-diploma course in farm management (at the farm management training centres, improved as recommended in Section 2.5).
- Three years' practical experience as an assistant to a good manager.

The opportunities for reducing the overall time required are limited. Formal training may be reduced to three years if the specialist diploma course in farm management at Egerton College is taken, and practical training could perhaps be decreased by one year. Three years formal and three years practical experience is regarded, however, as the minimum training necessary to equip the new managers who will be required by the smaller but more stable Large Farm Sector resulting from implementation of the proposed strategy.

#### 4.7.2 Training of Smallholder Development Teams

Each SDT would comprise three members, an extension specialist with experience in farm management economics, a land use planner and soil conservation specialist, and a specialist in institutions. The first two are likely to be seconded from the Ministry of Agriculture and the other from the Co-operative Department. It is assumed that each member will have received the appropriate formal training and be highly experienced before joining the SD Team. Two members, the extension specialist and the Co-operative Department member, would have experience in group training and communication methods. Training for team work would be almost entirely practical and would be obtained in the field by each SD Team member working as a counterpart to a member of the Task Force, whilst going through the process of establishing a number of Land Use Societies. The training content would therefore comprise the analysis of the present stage of the group farm being considered, the preparation of a plan, the justification of the plan to group members, training of a society manager, and ultimately the implementation and supervision of the plan. It is considered that having gone through the process on at least two farms the team members will have the capacity to plan other farms on their own, but with the supervision and, if necessary, advice from the Task Force.

The SD Teams would also be involved in training sessions, organised by the Task Force. They would be brought together for regular seminars at a District or Provincial Centre, in order to compare experiences and evolve the most effective methods of introducing the concepts of commercial smallholder production supported by co-operative services.

#### 4.7.3 Training of Land Use Society Managers

With the substitution of Land Use Societies for the present Farm Purchase Societies, Farm Companies or Partnerships, the organisations would no longer be concerned directly with farming or production but would instead be involved with the provision of services. These would include disbursing, controlling and recovering credit, procuring supplies of inputs, organising group machinery hire with contractors, storing and marketing, record-keeping, savings schemes, etc. The Land Use Societies would thus be the medium through which the SD Teams would endeavour to transform a static or declining group farm into a more dynamic entity of individually owned units of commercial production.

The correct selection and training of the SLUS managers would be a most important factor in the progress of the project. Successful management of the sort envisaged here calls for special aptitudes. It is part of the co-operative training system to foster these aptitudes at the same time as developing the particular techniques needed to give direction to them. The Society managers should therefore be selected as far as possible from individuals who have had previous training in co-operative management, or whose record indicates that the special aptitudes are there. They must also be in sympathy with the aspirations of the group members, and acceptable to them.

Their appointment would be followed by an in-service training course, undertaken within the co-operative training system and conducted at one or more of the Farmer Training Centres. These courses would be concerned with the specific requirements of an SLUS in respect of record-keeping, book-keeping, and accounting, procurement of supplies, credit control and marketing. The overall theme of the course would be designed to give direction to the students' managerial aptitudes as they would be needed to promote rational land use practices. The Task Force and the SD Teams would participate in the design and conduct of the courses, in collaboration with the Co-operative Departments' Training Officers.

It is not considered that any useful purpose would be served by running courses at the FTCs for the smallholders themselves, although every opportunity for running courses in Home Economics for the wives of smallholders at the Centres should be taken.

Annex VI

Credit

# 1

## A Review of Existing Sources of Farm Credit

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### 1.1 INTRODUCTION

The agricultural credit system in Kenya was studied in detail by J.D. von Pischke in 1972-1973 and was reported on in two volumes, 'A Survey of Major Agricultural Credit Programmes and Institutions Operating in Kenya', and 'Farm Credit in Kenya: the Poor Farmer Paradox', published in 1973 by the Institute of Development Studies, University of Nairobi. This was prepared for the Development Economics Department of the International Bank of Reconstruction and Development (IBRD, or the World Bank) as part of their African Rural Development Studies.

Although the statistical information set out in those two volumes is somewhat dated, the system which they describe is still basically the one that operates in Kenya today and many of the points and criticisms they contain are still valid. In this first section, therefore, Pischke's material is updated where possible in the light of figures obtained from the various institutions involved. Also attention is drawn to the several aspects in which present arrangements seem deficient and which, if uncorrected, will continue to hinder agricultural development in Kenya.

Valuable as the Pischke study is, it provides little appraisal of farm systems and management and of on-the-farm credit use. For many purposes Vasthoff's study, 'Small Farm Credit and Development', Afrika-Studien, Munich 1968, provides the most recent evidence, although it relates to the mid-1960's. No subsequent study has been made to fill that gap, but it is clear both from published material and from the Consultants' survey that one is greatly needed. Nevertheless, a number of firm conclusions do emerge on which policy decisions can be based. They are, however, less detailed than would have been the case had more comprehensive local data been available.

### 1.2 SOURCES OF FARM CREDIT

The major part of credit extended to farmers in Kenya comes from Government Institutions. There are a number involved. They interlock in a complex fashion, operate a number of different programmes with different ends in view and rely heavily on outside funds for their operations.

#### 1.2.1 The Agricultural Finance Corporation

The Agricultural Finance Corporation (AFC) is a statutory body and is the main source of funds, both long-term and short-term, for farmers who are not involved in settlement schemes. It has been a highly centralised organisation, but has recently strengthened its field establishment. It now has 34 branches and sub-branches and its ratio of headquarters staff to total staff has declined to 160 out of 340 at the beginning of 1973 to 160 out of 400 in late 1976. Although this marks a distinct improvement,

AFC is still not well equipped to make loan servicing arrangements on an individual basis other than for the large farmers. This is an important limitation.

The lending of AFC is divided under four heads. Firstly, there are three large-scale schemes and three small schemes funded mainly, though not entirely, from outside Kenya; in all cases AFC acts as principal in the lending-recovery operations. It is intended that, in future, there will be a Commercial Farming Project to continue IBRD/IDA funding of smallholders and larger farmers and to make credit available for a wide range of land reclamation and investment activities. Secondly, there is the Guaranteed Minimum Return (GMR) scheme for providing credit for seasonal inputs for maize and wheat growing; in this case AFC acts as agent only, the funds being provided until 1975 from the Government's Cereals and Sugar Finance Corporation. Thirdly, there is the IBRD-financed Group Farm Rehabilitation Project (GFRP), which is described in Annex I. Lastly, there are smaller scale, multi-sectoral type schemes, some of an experimental nature which operate as Special Rural Development Projects. The Integrated Agricultural Development Programme (IADP) is a development and continuation of these, and is aimed at the smaller farmers.

Table 1.1 shows the overall disposition of AFC funds, in terms of balances at the end of March between 1971 and 1976.

Table 1.1 AFC's Portfolio (K£ million)

Balances at March 31st <sup>1</sup>	1971	1972	1973	1974	1975	1976
1. For large-scale farming						
AFC large-scale	8.36	8.60	9.33	9.68	10.95	12.41
IDA 129 livestock credit	.09	.57	1.09	1.50	2.43	3.03
KFW large-scale <sup>2</sup>	.05	.08	.08	.06	.06	.10
	8.50	9.25	10.50	11.24	13.44	15.54
2. For small-scale farming						
AFC small-scale	.36	.35	.31	.26	.24	.28
IDA 105 Kenya agricultural credit	.64	.97	1.21	1.39	2.07	4.05
KFW small-scale	.02	.08	.15	.20	.26	.41
ICA	.05	.05	.05	.05	.05	.05
Vihiga	—	—	.01	.02	.02	.02
Crop loans	—	—	—	—	—	.29
	1.07	1.45	1.73	1.92	2.64	5.10

<sup>1</sup> Principal and interest not yet due and principal and interest in arrears less prepayments of instalments.

<sup>2</sup> KFW = Kreditanstalt für Wiederaufbau, the main West German overseas aid financing agency.

Table 1.1 illustrates clearly the AFC's concentration on the Large Farm Sector, particularly when account is taken of the GMR Scheme and the recently-started Group Farms Rehabilitation Project. As late as the early 1970's a mere 150,000 loans per year were being granted by AFC and other institutions to small farmers outside the settlement; thus less than 10 per cent of the total farming population were receiving institutional credit. Nevertheless, AFC has become increasingly involved with the smallholder sector in recent years.

Table 1.2 shows the net arrears position for AFC funds since 1971.

Table 1.2 AFC Arrears Position (K£ million)

	1971	1972	1973	1974	1975	1976
<b>1. Large-scale farming</b>						
Arrears	1.20	1.30	1.68	1.75	1.37	1.61
Prepayments	—	—	.10	.18	.20	.21
<b>Net arrears</b>	<b>1.20</b>	<b>1.30</b>	<b>1.58</b>	<b>1.57</b>	<b>1.17</b>	<b>1.40</b>
<b>2. Small-scale farming</b>						
Arrears	.24	.34	.52	.62	.67	1.19
Prepayments	—	—	.05	.05	.06	.08
<b>Net arrears</b>	<b>.24</b>	<b>.34</b>	<b>.47</b>	<b>.57</b>	<b>.61</b>	<b>1.11</b>
<b>3. Total net arrears</b>	<b>1.44</b>	<b>1.64</b>	<b>2.05</b>	<b>2.14</b>	<b>1.78</b>	<b>2.51</b>

In 1976 the total net arrears were about K£ 2.5 million. Arrears have been consistently higher on loans to small farmers than those to large-scale farmers. Whereas over the last six years, the ratio of arrears to total funds outstanding has remained around one fifth for small-scale schemes the corresponding figure for large-scale schemes has improved from about one-seventh to about one-eleventh over the same time period.

The annual statistics of instalments falling due and the amounts actually collected in recent years show a consistent improvement for all AFC schemes, except for GMR (see below) and the USAID Crop Loan Scheme, which has operated only since 1975. Excluding the two schemes just mentioned, of the remaining six large scale as well as small scale schemes administered in 1975-76 by AFC, only two had collections which fell much behind instalments, the IDA Small Scale Scheme (IDA 105) and the AFC Large Scale Scheme. Three of the four remaining schemes showed collections in excess of instalments. The indications are that this improvement is being continued into 1977 and that AFC's policy in recent years of concentrating on collecting debts is proving effective.

The AFC Large Scale Scheme is the most important source of medium and long-term credit funds to farms in the mixed large farm sub-sector. An analysis of information provided by the AFC on loans to farms served by the Kitale, Eldoret, Kericho, Nakuru and Molo offices, showed that at the end of 1976 a total of 657 loans had been granted, the average size of the loans being KShs 135,600. Some 450 farms (68 per cent of borrowers) were posted as having arrears at the end of 1976, the average level being KShs 17,600. Of these, 35 farms had amounts overdue exceeding KShs 50,000. The information on arrears, however, is misleading as it refers to the end of December, the date when repayments fell due. It is likely that many payments would be received shortly after the date on which they were due.

In the survey carried out by the Consultants, information on loan status was related to the level of management and the extent of subdivision. The results of the survey are given in detail in Section 3.8 of Annex II. In summary, it was found that the average to poorly-managed farms, still possessing a large scale area, had the highest proportion of farms with land loan arrears (37 per cent of farms with loans). On group farms that had already completely subdivided, about 32 per cent of farms with loans had repayments due. It should be pointed out, however, that less than half of the completely subdivided farms had current land loans. On the well-managed large scale farms, as expected, only a very low proportion (3 per cent) had land loan arrears.

The number of farms with medium-term development loans (5 to 15 year terms) was also investigated in the survey. Only 39 per cent of the sample farms had current loans, with an average repayment schedule of KShs 21,070. Of these, about 20 per cent reported they were behind with their

payments. Because of the small number of sample farms with development loans, it was not possible to analyse the data by level of management or degree of subdivision.

The GMR scheme which AFC operates combines crop insurance and seasonal finance on the basis of a set figure per ha. It is limited to farmers growing a minimum of 6 ha of maize or wheat. As at 30 November 1976 comparative figures for GMR operations in 1975 and 1976 were as shown in Table 1.3.

Table 1.3 GMR Operations in 1975 and 1976

	1975	1976
Number of advances	2,903	3,621
Maize (ha)	40,478	40,458
Wheat (ha)	65,670	75,382
Commitments (KShs million)	91.77	100.14

The scheme now involves some KShs 100 million of seasonal credit and is still expanding, especially for wheat. The individual amounts loaned are large; in the farm survey the average GMR advances per large farmer were found to be KShs 117,000. The scheme currently has many large-scale arrears, some of them of long standing. The performance of the GMR Scheme over the past 5 years is shown in Table 1.4, which gives the level of instalments and collections since 1971. The level of collections as a proportion of instalments varied between 67 and 95 per cent during this period, the lowest levels of repayments being in the last two years.

Table 1.4 GMR Loan Scheme, Summary of Instalments and collections (KShs Million)

	1971/72	1972/73	1973/74	1974/75	1975/76
Instalments	53.0	54.1	53.2	84.2	85.4
Collections	46.1	42.5	50.7	56.8	61.7

To a large extent the malfunctioning of this scheme is an internal AFC problem. Within individual branches sometimes from a third to a half of the sums outstanding are due to less than 10 per cent of borrowers. It is deplorable that such a situation should have been allowed to develop and firm steps towards recovery should be taken.

Some of the problems with GMR are, however, deeper-seated than this. Firstly, it has placed undue reliance on collection through stop-orders for crops for which a local market exists and for which outside sales and misrepresentation of the truth are easy. Secondly, credit schemes linked to specific crops on a standard loan basis are bound to lead to inefficiencies. The way this defect in the system reveals itself in the specific case of GMR is that farmers often grow the crop simply in order to finance general cultivations on relatively poor ground where wheat is not the best crop to grow but growing it is the only way to get funds for seasonal inputs.

The situation with the USAID crop loan scheme (the other major source of short-term credit) which began operating in 1975 appears to be extremely serious. Of 77 loans recently issued only 4 were repaid in full on the due date, and of the KShs 5.6 million loaned in 1975/76 only KShs 0.5 million was recovered. The reason for the very low level of repayments compared to those in the GMR Scheme is not immediately apparent.

The short term debt situation is by far the most serious of the debt burdens farmers have to service and repay. The farm survey demonstrated the extent of the problem, indicating that some 32 per cent of all farms in the sample had short-term arrears, and of the farms that had taken out loans in 1976, 26 per cent had arrears from 1975 or previous years, owing on average KShs 54,700 per farm. On individually owned farms, where no ready alternative source of working capital exists, the farmers must rely on a further GMR loan the following year. Even if the new short-term loan injection proves successful, the carrying forward of say the average of KShs 54,700 (equivalent to about KShs 110 per hectare) may leave the farm in an extremely vulnerable position. Recommendations and proposals regarding rescheduling of short-term debts are given in Section 3.1.

Improvements in the credit system could come about if some alterations are made in the way in which AFC itself operates. It has been criticised on the grounds that it has had little experience of individual borrower appraisal and is not well equipped to begin building up the sort of local knowledge that is required to assess credit worthiness especially where smallholders are involved. In 1973 Judith Heyer noted that 'The AFC loses in not knowing its clientele in smallholder areas, not being able to evaluate well the viability of investment propositions in specific local conditions, not being able to follow up loans that have been disbursed, and not being able to enforce repayments except through the cumbersome machinery of legal sanctions'. The slight improvement in the ratio of outside to headquarters staff in AFC suggests that only a relatively modest improvement in performance can be expected from improved local knowledge. On the other hand, the increased responsibility granted to managers can be expected to help reduce the strong tendency towards formula lending which is the inevitable accompaniment of a highly centralised lending institution.

AFC's performance in loan repayment collection, even where acting as principal, has not always been good. In part this has resulted from an over-indulgent attitude on the part of top management in earlier years. This has now been remedied and pressure is quickly brought to bear on clients in arrears.

To make AFC's operations more efficient at the farmer level, more of the work appraising credit-worthiness and advising would-be borrowers must be made the responsibility of the Extension Service. Appropriately trained staff will therefore be required to work closely with individuals and groups of farmers to advise them on technical and financial matters (but not to get involved with debt collection). It is the role of AFC and of other banking personnel to choose between competing applications for funds in the light of all the relevant individual circumstances of each case and of the balance of the institution's portfolio.

To be really effective, banking staff must be encouraged to keep in touch with local conditions. Moreover, if losses are to be avoided some high risk cases must be cut out from the start and others given more supervision, technical and marketing assistance than hitherto. Vasthoff, for example, concluded in a number of cases that he examined that only a little over one half of loans were justified both in the sense that the farmer could only have gone ahead through borrowing and also that a good investment opportunity existed in income-generating terms; he was also of the opinion that half again of those could have been expected to succeed only with proper supervision.

Valuable experience of the problems of lending to smallholders has been obtained from smaller-scale, crop-specific and Special Rural Development Project-type schemes. For example, the Vihiga Credit Scheme for maize input stockists provides a number of lessons for the future and serves to emphasise how difficult it is to bring small producers into a credit scheme of any sort and how difficult it is to design a scheme capable of linking farmers, extension, stockists and lending - loan recovery agency in an effective and simple way.

With the Vihiga scheme at the outset a three stage process was involved:

- (a) AAO's, Chiefs and AFC formed a vetting and disbursement committee;
- (b) authority to incur expenditure was given, up to KSh. 105 and limited by inputs;
- (c) stockists reclaimed against distribution records from the AFC.

In the second year (1973) wholesalers were to replace stocks at the primary supplier level and were to receive cash from AFC, thereby permitting economies of handling. A conflict then developed between the wholesalers who wanted to supply named goods only and stockists who wanted freedom to choose their own replacement stocks. Moreover, stockists also demanded cash from farmers, to compensate them for the delay in reimbursement/re-stocking. These types of difficulty are almost unavoidable with specific input supply schemes.

AFC made no special arrangements to facilitate repayment in spite of the fact that their nearest branch was 20 miles away, at Kakamega. The Agricultural Advisory Officer was therefore appointed loan collection officer in 1973 (a cardinal sin of involving extension workers in debt collection). Loans and repayment rates for the first four years of the Vihiga Scheme have been as follows:-

	Loans	Total Value (KSh.)	Recovery (%)
1971	63	17,062	82
1972	323	73,551	65.6
1973	920	248,557	27.6
1974	320	84,048	about 20

In commercial terms it has clearly not been successful. The evidence is that it has also been unsuccessful both in demonstration effect terms, since most of those getting help used hybrid seed and fertilisers anyway, and also in income distribution terms, since borrowers were usually the wealthier members of the community.

Another problem is that the scheme has placed too much emphasis on credit and too little on basic extension. Research on maize growing has shown that good results are the outcome of a number of inter-linked operations and that timeliness and good husbandry alone will go far to ensure a good performance; without them returns to purchased inputs will be poor. Given the high costs of fertilisers and the strong chance that in the hands of inexperienced smallholders they will not be applied correctly and at the right time, the prior need of a sound credit policy is a good extension programme.

### 1.2.2 The Agricultural Settlement Fund

The Agricultural Settlement Fund is a completely self-contained organisation within the Ministry of Lands and Settlement and handles all the credit for smallholdings on settlement schemes. Much of the credit issued is for land purchase and is relatively long-term, but the Fund also provides short and medium-term loans. Table 1.5 summarises the loans issued between 1971 and 1975.

Most of the lending by the Fund took place in the 1960's and early 1970's, the amount loaned since 1972 being relatively low. The present position is that a Settlement Fund of not more than KShs 16 million was voted by Government in 1974-75 to operate on a revolving loan basis. This will be drawn on as required and is expected to provide an annual fund of only KShs 1.2-2.0 million. The reasons for this virtual drying up of funds for agricultural settlement purposes can be related to the Fund's poor performance, as shown by the figures in Table 1.6, which shows the arrears position of the Fund in 1975.

**Table 1.5 Agricultural Settlement Fund Loans, 1971–1975 (KSh. million)**

Item	1971	1972	1973	1974	1975
1. Land purchase loans					
Smallholders	7.61	0.82	0.65	0.45	0.38
Large farms <sup>1</sup>	1.71	0.18	0.06	0.91	1.59
<b>Total</b>	<b>9.32</b>	<b>1.00</b>	<b>0.71</b>	<b>1.36</b>	<b>1.97</b>
2. Development loans					
Smallholders	2.85	1.18	0.57	0.29	0.20
Large farms <sup>1</sup>	3.09	1.61	0.78	1.82	1.88
<b>Total</b>	<b>5.94</b>	<b>2.79</b>	<b>1.35</b>	<b>2.11</b>	<b>2.08</b>
3. Total loans					
Annual total	15.26	3.79	2.06	3.47	4.05
Cumulative total	302.70	306.50	308.60	312.10	316.10

<sup>1</sup> These loans were for the purchase and development of large farms under the Shirika and other schemes.

**Table 1.6 Performance Factors for the Agricultural Settlement Fund (1971–1975)**

	1971	1972	1973	1974	1975
Collections as % of billings	41	35	39	42	48
Cumulative collections as % of cumulative billings	51	48	47	46	46
Loan repayments outstanding (KSh. million)	87.5	110.7	131.2	153.3	175.4
Loan repayments outstanding as % of portfolio	27	33	39	44	49

Although the collection rate has improved markedly in recent years, in 1975 still less than half the payments due were actually collected. As a result the outstanding debt rose continuously between 1971 and 1975, from KShs 87 million to KShs 175 million. Repayment performance was also poor in the 1960's and a two year moratorium was introduced in 1967. The unfortunate result is that some people — often larger farmers — have come to confuse credit with grants and the farming sector generally has not displayed that degree of financial and business competence required to attract the commercial banks to advance them funds.

### 1.2.3 Commercial Banks

Apart from schemes administered by bodies like the Kenya Tea Development Authority and the Pyrethrum Board, where there is a relatively straightforward extension input and where there is a single market outlet with no opportunity for local sales (which makes stop order procedures easy to operate effectively), the two other important credit institutions are the commercial banks and the cooperative societies. Cooperative societies are discussed in Section 1.2.4.

Government is currently urging the Banks to make at least 17 per cent of total advances to the agriculture sector and, as the figures below show, advances to agriculture have been increasing both in absolute and relative terms as a proportion of total advances by the banks. By mid-1976 total bank advances were some three times greater than in mid-1970 while advances to agriculture had increase rather more than that. Table 1.7 shows total advances by the commercial banks and their advances to agriculture, between 1971 and 1976.

Table 1.7 Commercial Bank Advances to Agriculture

Year	KSh. million	% to agriculture
1971 Agriculture	942	11
<b>Total</b>	<b>8,619</b>	
1972 Agriculture	968	10
<b>Total</b>	<b>9,656</b>	
1973 Agriculture	1,144	10
<b>Total</b>	<b>11,005</b>	
1974 Agriculture	1,519	10
<b>Total</b>	<b>15,475</b>	
1975 Agriculture	2,330	13
<b>Total</b>	<b>17,365</b>	
1976 Agriculture (1st half) <b>Total</b>	1,410 <b>9,869</b>	14

The increase in advances to agriculture relative to total bank advances dates from the third quarter of 1974. It is clear from discussions at the banks that the great bulk of these advances go to the marketing boards and similar agricultural institutions and to financing the processors of primary products, such as sugar. Only a relatively small part of total Commercial Bank advances to agriculture are in fact direct advances to farmers. Loans to individuals seldom exceed six months and must usually be repaid over that loan period. Advances for land and property purchase may be extended to three or even five years but are usually made against title or where the borrower's farming income is backed by income from other sources as well. The limited applicability of this sort of lending to farming is obvious. On the other hand, it is clear that at the time of the credit study (December 1976) the Banks had funds that they wished to lend short-term; some of these go to institutions like the AFC. However, this type of funding does not enable the AFC to have an excess of funds available for lending. On the contrary, as reports from the Loans Controller show, they are now at the point where new lending is dependent on the repayment on moneys already out with farmer borrowers.

It is highly desirable that all commercial farms, and especially the larger farms owned by individuals and small groups, should be encouraged to make as much use as possible of the commercial banks. It is also necessary for the commercial banks to modify their procedures to make this possible. Nevertheless, it will take time for the banks to begin direct lending on any scale, although they now tend to have trained agricultural officers on their staff, presumably with a view to future business.

In the meantime, and in addition to direct lending, the banks should be encouraged to lend through intermediaries like the Cooperative Department and the AFC who may have better local knowledge and connections. Also, since the banks already provide bill discounting facilities, even though they appear to be restricted entirely to the trade and commercial sectors at this stage they might, presumably, also be willing to finance supplies to farmers who grouped together and bulked up orders, even if only for the specific purpose of loan repayment. It is this sort of arrangement that the commercial banks might consider, in view of the extent of the funds they appear to have at this stage.

## 1.2.4 Cooperative Credit

Although not yet operating on a large scale it is the development of banking and farm lending activities by the cooperative movement that is the most encouraging feature of the financial scene in Kenya. It involves the local generation of savings, it reaches small-scale farmers and the institutional framework exists whereby it can be developed further.

The Kenya Cooperative Production Credit Scheme (CPCS) was set up in 1970 to provide short-term funds through the cooperatives and in response to the need to sort out the somewhat haphazard lending by societies to their members. Such lending had reached about K£ 1.3 million by the end of 1968. CPCS credit is available only to members of properly qualified societies and those societies in turn must belong to a qualifying District Cooperative Union. There is also a Cooperative Savings Scheme (CSS) which has led to the accumulation of funds in excess of those loaned out through CPCS. The good points about this scheme are that it is based on low minimum deposit requirements of members (KShs 40) and that members who borrow have their accounts credited, thereby broadening their experience of banking-type transactions.

By 1973 there were 9 qualifying unions and 83 participating societies and by June 1976, 20 unions were listed as receiving CPCS loans, of which seven had not yet started members' Savings Schemes. Much of this good performance is no doubt due to the recent prosperity in coffee, but pyrethrum, sugar and dairying have also helped. As the figures in Table 1.8 show, members' deposits have varied a good deal from year to year.

Table 1.8 Deposits received by the Cooperative Bank of Kenya from Members

Year	KShs million
1972	18.59
1973	65.66
1974	122.94
1975	59.39
1976	238.61

In 1976 loans and overdrafts included KShs 17.4 million for crop advances, KShs 26.0 million for the Cooperative Production Credit Scheme and KShs 11.2 million for farms. Due in part to the rapid increase in CSS funds the Cooperative Bank had KShs 174.2 million at call and short notice, and KShs 105.0 million out with the Cereals and Sugar Finance Corporation Ltd. This availability of funds for on-lending (as with the Banks) emphasises the scope there probably is for mobilising rural savings. It also emphasises how slowly actively sought, credit-worthy borrowing schemes grow. The Cooperative Bank advances under the CPCS amounted to KShs 29.9 million in 1975 (16 loans) and to KShs 26.2 million in 1976 (19 loans).

Average CPCS loans to farmers have grown from KShs 500 in 1970-71 to KShs 530 in 1972-73, KShs 790 in 1973-74 and to KShs 1,150 in 1974-75. Between 1970 and 1973 a total of some 60,000 loans were made, involving about KShs 31 million altogether. Repayment rates are high. The aims of the Ministry of Cooperative Development are to extend CPCS and savings schemes to over 300,000 members by 1978. It could be a major source of shorter-term funds for the proposed Category Two smallholders (see Chapter 9 of the Main Report) who would be the main recipients of the full extension-service-credit mix proposed by the Consultants.

### 1.3 CONCLUSIONS

From the viewpoint of the present study, the most important aspects of the present situation are as follows:-

- (a) The basic institutional framework required for the provision of credit to the Large Farm Sector and smallholdings resulting from the subdivision of large farms is already available, although there are substantial problems and the small farmer is not yet adequately catered for.
- (b) The AFC is and will continue to be the main source of institutional credit to farmers. Recently its performance has been improving, but its arrears position is still not good, the number and geographical spread of its field offices is inadequate and it has insufficient contact with conditions in the field. Closer contact with the Extension Service is required, particularly as regards the assessment of farmers' credit-worthiness. The GMR Scheme, which is run but not funded by AFC, has very heavy loan arrears. Its operation needs to be tightened up to reduce the considerable abuse of GMR funds which now occurs.
- (c) Cooperative credit appears to be fairly successful and could be important in the financing of smallholders on subdivided large farms.
- (d) Although they are increasing their lending to the agricultural sector, at present the commercial banks do not finance many farmers and are unlikely to play a major role in the provision of farm credit in the immediate future.
- (e) In theory, the Agricultural Settlement Fund could be suitable as a vehicle for credit to smallholders on subdivided large farms, but with its very bad arrears situation and the fact that provision of new finance has been severely curtailed, it has little to offer.
- (f) Generally there appear to be adequate funds available for farm credit, although at present AFC is somewhat short of finance. The problem is more one of ensuring that they are disbursed and used efficiently. Given the growing availability of funds from the CPCS, the IBRD-financed scheme (IADP, Group Farms Rehabilitation Project, Second Live-stock Project, Commercial Farming Project) and other sources, there is not at present a need for major new injections of finance for agricultural credit.

# 2

## Recommendations

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### 2.1 POSSIBLE MODIFICATIONS TO THE PRESENT SYSTEM

The review of the credit system, described in Chapter 1, has indicated some general improvements which appear to be necessary.

The first requirement is to improve the geographical coverage of the system, which at present reaches only a limited proportion of the nation's farmers. One way of achieving this would be to increase the number of AFC and other branches, but that would almost certainly prove too costly at this stage. Instead, more use should be made of one and two day a week banking from temporary premises staffed by small visiting teams and of visiting debt collectors (to those temporary premises at designated hours and to defaulters' premises as required). Schemes should be designed to allow closer cooperation between AFC and the Cooperative Societies and perhaps some integration in areas where AFC branch banking would clearly be uneconomic. Both need to spread their branches widely and to encourage both small savers and small borrowers.

Secondly, loan repayments must be tightened up. This will make additional funds available for further lending and should improve the effectiveness of credit utilisation, since if farmers know that they have little chance of avoiding their repayment obligations they will be more likely to ensure that the investment is worthwhile in the first place. AFC have already made progress in improving their arrears position. Apart from continuing this process, the most important objective should now be to increase the efficiency of the GMR Scheme, particularly as regards more careful vetting of applications.

Thirdly, the range of lending operations needs to be widened beyond the relatively narrow range of schemes that are operated at present. This would require a widening of the skills of AFC personnel and also better cooperation with and better services from extension personnel, both of which would take time to develop. When such a system is operating properly it would leave a great deal of decision-making to local personnel and the farmer concerned and rely little on lending according to precisely laid-down rules from headquarters (as with GMR at present). To this end, as soon as the experience of extension staff allows it, farmers who cooperate with them should be able to discuss investment proposals with extension workers and use such discussions in presenting their case for borrowing to the relevant banking authority. This would not in any way involve the extension staff in making formal guarantees of credit worthiness nor of asset ownership.

Credit arrangements in Kenya are to some extent lop-sided, in that they are savings-deficient. At present the system has limited internal potential for growth, although to date this difficulty has been overcome by the provision of large loans from IBRD and other overseas sources. To correct this situation, savings should be increased by making it easier and more profitable for people to make deposits and also gradually to make bonds more readily available for purchase. The first step in this programme of mobilising savings requires that interest rates be allowed to rise so as to encourage savers. This will also lead to higher costs of borrowing and introduce a greater degree of reliance on credit rationing through price.

Evidence from a number of sources supports the need for this radical departure in official policy. First, there is successful spread of cooperative banking and the Cooperative Savings Scheme. Second, seed distributing firms in Kenya have already operated commercially without granting credit. Third, Vasthoff's enquiries have shown that many borrowers could in fact have financed their own operations, thereby increasing the proportion of lower priority investments and depriving others of the opportunity to borrow. Fourth, as Vasthoff and others have shown, returns can be high from farming providing the high risk cases are handled properly. Borrowers should be able to meet the full market costs of savers and lending agency together. Fifth, the team's survey makes it clear that, where borrowers are motivated to secure full land title quickly, local funds can be mobilised. Indeed in some cases it seems likely that repayment of land purchase loans has been so accelerated as to restrict the short-term funds available to meet seasonal needs.

None of these recommendations can be expected to bring about dramatic changes in the short-term; in the long run, however, they should lead to the development of a better balanced and more efficient system.

## 2.2 SPECIFIC RECOMMENDATIONS

The institutions and funds needed for the provision of credit to the three categories of farm identified in the Study are already available. Major innovations are not considered to be necessary. The main recommendations are as follows:-

### Credit agencies for the different categories of farm

#### Category 1 farms

These constitute 55 per cent of the large mixed farms and are those that are expected to continue operating as large farms. They should continue to obtain their seasonal and longer-term credit from AFC. It is recommended that the scope for AFC's existing Group Farms Rehabilitation Project should be widened to take in all large farms which require such assistance and are interested in joining.

If this proposal is accepted, credit and management assistance would be provided on a similar basis as for group-owned mixed farms at present. The main difference should be that large farms not owned by groups (i.e. those owned by individuals, small partnerships and small companies) should be provided with management advice as opposed to a new resident manager. They would only be supplied with an AFC-approved manager where the owner is unwilling to manage the farm and a suitable manager is not already employed. These AFC-approved managers, however, would only be recruited through AFC, but would not be employed by them. If such farms are not prepared to employ good managers on their own behalf or to ensure that the owner(s) undertook the management, they should not be considered eligible for the Project. A defect of the present GFRP is the somewhat optimistic enterprise budgeting on some farms and a tendency towards over-investment. This is discussed in Annex I. Clearly, it is essential to draw up the farm plan on a realistic basis and to avoid imposing too heavy a debt burden.

The accumulation of short-term credit debts, which was discussed in Section 1, can prove an almost impossible financial strain on a farm's operations. It may be necessary in such cases to consider rescheduling these debts during the early years of a farm's development following its inclusion into the programme. Budgets have been prepared for the three major farm systems in Category 1, (Annex VII). These are based on the present performance of Category 1 farms with average to poor management, i.e. those requiring rehabilitation. These budgets (which were drawn up using long-term prices) showed that badly managed farms in the wheat/dairy system gave a negative net return to management of KShs 31 per hectare (before any loan obligations were met), maize/dairy gave KShs 175 per hectare and the high altitude system a negative return of KShs 123. Once incorporated into the development programme these

farms would inevitably take several years to develop to their full potential under improved management. Given the low and in two cases negative net return, it is most unlikely that these farms would be in a position to repay a debt in the first year of operation, of, for example, KShs 110 per hectare which was the average level of short-term arrears identified in the farm survey. Even if it were possible, it would in any case reduce the farm's working capital to an unacceptably low level.

The most appropriate solution, therefore, where a farm faces short-term arrears of this magnitude, would be to reschedule the debts over a five year period. This period could be extended according to a farm's particular circumstances. Over a five year period an initial debt of KShs 110 per hectare could be reduced to an annual repayment of approximately KShs 29, which would allow for a gradual build up in the farm's performance.

### Category 2 farms

These farms make up 29 per cent of the 1,800 large mixed farms. At present approximately 65 per cent of these farms are already unofficially subdivided and are not theoretically eligible for institutional credit. Under the proposed programme such subdivision would be officially recognised and credit would become available.

The possible organisational framework for these subdivided former large mixed farms is discussed in Annex V. Where the smallholders successfully form one of the proposed Smallholder Land Use Societies or Cooperatives, credit could probably best be supplied under the existing Cooperative Production Credit Scheme (CPCS). As noted in Section 1.2.4, on the whole these have proved fairly successful. For the provision of credit existing CPCS procedures would be followed. Each Land Use Society would join its local District Cooperative Union, to become eligible for the scheme.

The possibility of rescheduling short-term arrears as suggested for Category 1 farms could again be considered for farms in Category 2. Members on these farms, however, have greater access to unofficial credit (family loans, etc.), and often receive income from various types of off-farm employment. In these cases every effort should be made to clear the debt prior to a farm's acceptance into the programme. If this proves impossible, then consideration should be given to the recommendations for debt collection as set out in the Institutions Annex V, Chapter 4, the debt being rescheduled over a 5 year period.

Where the smallholders on a former large farm did not form a Land Use Society or other type of cooperative, the appropriate source of credit would continue to be AFC, as part of its normal function of giving loans to smallholders. Considerable care would, however, need to be exercised in ensuring that the smallholders were fully credit-worthy. Inability or unwillingness to form a cooperative could pose operational problems for the smallholders, because of the need for certain communal services like cattle dips. It may well indicate an unhelpful and uncooperative attitude on the part of the farmers, which might also mean that they were less willing to listen to advice or meet their repayment obligations.

### Category 3 farms

Category 3 farms are those which if subdivided would give each member little more than a small subsistence plot, but of too small a size to allow the farmer to undertake commercial farming. These make up 16 per cent of the total of 1,800 large mixed farms. As recommended in Annex V, these should be provided with credit and extension under the existing Integrated Agricultural Development Project (IADP), in the same way as small farmers elsewhere in Kenya.

# References

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AUTHOR	DATE	TITLE	SOURCE
Heyer J.	1973	Smallholder Credit in Kenya Agriculture	IDS Working Paper 85. University of Nairobi
Vasthoff J.	1968	Small Farm Credit and Development	Afrika Studien, Munich
Von Pischke J.D.	1972-73	A Survey of Major Agricultural Credit Programmes and Institutions Operating in Kenya	
Von Pischke J.D.	1973	Farm Credit in Kenya: the Poor Farmer Paradox	University of Nairobi. Institute of Development Studies

Annex VII

Farm Budgets

# Farm Budgets

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Detailed farm budgets have been produced for both Category 1 and Category 2 farms to compare their present financial situation with their status after development. These cover the three main farm systems practised in Nakuru, Uasin Gishu and Trans Nzoia Districts.

Budgets for farms in Category 1, (Tables 1.1 - 3.5) that is, farms with an average size of about 500 hectares and owned either by an individual or a small group, have been completed for the present situation using current yields and levels of production on average or poorly managed large farms. The technical coefficients used were mainly derived from those established in the farm management survey. The budgets representing the present situation on poor to average farms have been compared with a farm model showing the farm's potential under good management. The technical coefficients for these (after development) models were in this case taken from the performance levels established for the well managed farms in the Districts involved. The budgets are shown on a per 100 hectare basis, and are applicable to the range of farm sizes found in the sector. The details of the assumptions used in the construction of these budgets are in each case listed below the appropriate table.

The farm's production potential is expected to be realised mainly through improvement in management as a result of the development programme. It is not anticipated that funds will be required for on-farm capital investment on all farms, although some improvement in buildings, fencing and water supply, up to a maximum of about KShs 100,000 on a 500 hectare farm may in some cases be necessary. On almost all farms development loans will be required to finance the purchase of replacement machinery and in some cases livestock. In the early stages the most important loan and main contributor to farm development is likely to be short term working capital. The borrowing requirement for this type of loan will increase sharply by as much as 100 per cent on some farms. It is anticipated that as a result of improved management, farms would reach their full potential after a 5 year period, input/output levels during the development period would therefore be somewhere between the two extremes shown in the models.

The prices of products and farm inputs have been projected to cover the long-term programme period, utilising prices at a 1976/77 base. This projection has mainly affected the fertiliser price (which is assumed to rise by 50 per cent compared to other farm costs) and the price of some commodities, namely wheat, beef and sheep products, as detailed in Annex IV.

Models representing Category 2 farms (Tables 4.1 - 6.5) have been produced for group farms which are already completely subdivided into small commercial sized holdings. The model is based on the typical situation of a 500 hectare farm owned by a group of 40 members, each resident on 12.5 hectares. The budget showing the present situation was where possible derived from parameters established for the subdivided farms in the farm survey, supplemented by information from the average to poorly managed large farms. The budgets giving the 'with project' situation are based on the yield and production levels already attained on the better managed large farms and not the subdivided farms, as output on the latter was almost invariably well below the potential.

A small amount of on-farm investment may be required on some subdivided farms, for example, a communal cattle dip or farm road re-construction which has not been allowed for in the 'with project' models, but assuming a long-term investment of say KShs 50,000 on the farm as a whole, this would represent an annualised cost of some KShs 11 per hectare or about KShs 140 for each subdivided holding.

Tables 7.1-7.9 give the detailed budgets showing product and input unit costs, enterprise input/output values and the assumptions used in the preparation of the farm models.

**Table 1.1 Large Farm Category 1, Wheat/Dairy System. Summary Budget**

Item	KShs/100 ha Unit per Year		Increment
	Before Development	After Development	
<b>Revenue</b>			
Crops	90,200	133,390	43,190
Livestock	20,180	44,360	24,180
<b>Total Revenue</b>	<b>110,380</b>	<b>177,750</b>	<b>67,370</b>
<b>Costs<sup>1</sup></b>			
Crops	42,410	50,370	7,960
Livestock	4,700	17,820	13,120
Machinery	50,630	52,590	1,960
Labour	8,750	9,300	550
Buildings and overheads	7,000	11,330	4,230
<b>Total Costs</b>	<b>113,490</b>	<b>141,410</b>	<b>27,920</b>
<b>Return to management</b>	<b>(3,110)<sup>2</sup></b>	<b>36,340</b>	<b>39,450</b>

<sup>1</sup> Land loan and GMR repayments not included.

<sup>2</sup> ( ) indicates negative amount.

Table 1.2 Large Farm Category 1, Wheat/Dairy System. Physical Data

Item	100 ha Unit					
	Before Development		After Development			
Land Use (ha) <sup>1</sup>	Cultivable	65	65			
	Rough Grazing	20	20			
	Unusable <sup>2</sup>	15	15			
		100	100			
Crop Enterprise Data (ha) <sup>3</sup>	Wheat <sup>4</sup>	41	38			
	Maize	2	2			
	Ley <sup>5</sup>	7	25			
	Total Cultivated	50	65			
	Permanent pasture (cultivable)	15	nil			
	Total cultivable	65	65			
Yields (kg/ha) <sup>6</sup>	Wheat	1,420	2,300			
	Maize	3,080	3,320			
Livestock Technical Coefficients <sup>7</sup>	Calving %	50	80			
	Calving interval (month)	24	15			
	Mortality (calf) %	20	15			
	Mortality (other) %	11	3			
	Culling rate %	10	16			
	Age at calving (month)	36	36			
	Stocking rate	96	100			
Livestock Number and LSU <sup>8</sup>		No.	LSU	No.	LSU	
	Bulls	( 0.4)	( 0.4)	( 0.4)	( 0.4)	
	Cows	19	19	20	20	
	Calves 0-1 year	9	5	16	6	
	Steers/heifer 1-2 years	8	6	13	10	
	Steers/heifer 2-3 years	7	5	13	10	
	Total No./LSU	43	34	62	46	
	Potential LSU from grazing		34		46	
	Livestock Sales Physical (annual)	Cull bulls	—	—		
		Cull cows	2	—	3	—
Surplus heifers		—	—	3	—	
Steers		2	—	6	—	
Bull calves		—	—	—	—	
Livestock Purchases (annual equivalent)	Bulls	0.1	—	0.1	—	

Table 1.2 (Continued)

Item	100 ha Unit	
	Before Development	After Development
Milk production (kg per year)		
Milk per cow per year	904	1,600
Total milk production	17,176	32,000
Total milk sales <sup>9</sup>	14,214	27,238

- <sup>1</sup> Farm management survey, all districts.
- <sup>2</sup> Includes land set aside for Labours' plots.
- <sup>3</sup> Farm management survey, average/poor farms in System 1 in 'before' situation, good farms in 'after' project situation.
- <sup>4</sup> In the sample about 30 per cent of the area shown as wheat was in barley.
- <sup>5</sup> Rotation is based on a 4-5 year cash crop and 3 year ley.
- <sup>6</sup> Large farm survey.
- <sup>7</sup> Farm management survey and Consultants' estimate.
- <sup>8</sup> Hectares per LSU are rangeland and natural grazing, 3; leys, 1; wheat residue, 3.
- <sup>9</sup> Calf rearing 252 kg milk per calf (GAT handbook) plus home consumption.

Item	Before Development	After Development
Stocking rate	26	36
Agri. cattle (cows)	10	11
Agri. cattle (bulls)	17	25
Agri. cattle (total)	27	36
Agri. sheep	10	10
Agri. goats	10	10
Agri. pigs	10	10
Agri. poultry	10	10
Agri. other	10	10
Agri. total	100	100
Range	10	10
Residue	10	10
Total	120	120

Table 1.3 Large Farm, Category 1, Wheat/Dairy System Revenue and Variable Costs

Enterprise	KShs/100 ha Unit per year		Increment
	Before Development	After Development	
<b>Cash Revenue</b>			
<b>Crops</b>			
Wheat	85,410	128,220	
Maize	4,790	5,170	
<b>Sub-Total</b>	<b>90,200</b>	<b>133,390</b>	<b>43,190</b>
<b>Livestock</b>			
Cull cows	1,250	1,880	
Surplus heifers	nil	2,850	
Steers	2,580	8,310	
Milk	16,350	31,320	
<b>Sub-Total</b>	<b>20,180</b>	<b>44,360</b>	<b>24,180</b>
<b>Variable Costs</b>			
<b>Crops</b>			
Wheat	41,000	48,640	
Maize	1,410	1,730	
<b>Sub-Total</b>	<b>42,410</b>	<b>50,370</b>	<b>7,960</b>
<b>Livestock</b>			
Dairy cows	1,710	6,200	
Calves	360	2,240	
Heifers	300	1,105	
Steers	190	650	
Replacements	200	200	
<b>Forage Costs</b>			
Establishment/maintenance per annum equivalent	2,140	7,625	
<b>Sub-Total</b>	<b>4,700</b>	<b>17,820</b>	<b>13,120</b>

Table 1.4 Large Farm, Category 1, Wheat/Dairy System – Annual Machinery Costs<sup>1</sup>

Cost Item	Equipment	Initial Unit Cost (KShs)	Write off period years	No./Cost per Tractor Unit/Yr.		Cost per 100 ha Unit/Yr.		
				No.	(KShs)	Before Development	After Development	
Depreciation and Interest	tractor 60-70 hp	82,400	8	1	15,490	13,010	12,080	
	plough	9,400	12	1	1,380	1,160	1,080	
	harrow	14,500	12	1	2,130	1,790	1,660	
	cultivator	5,300	12	0.5	390	330	610	
	combine drill	36,060	9	0.25	1,580	1,330	2,460	
	maize planter	10,170	11	—	—	—	300	
	crop sprayer	11,800	9	—	—	—	410	
	trailer	12,940	12	0.25	480	400	740	
	pick-up	50,000	8	—	—	—	1,830	
	Sub-total				21,450	18,020	21,170	
	Repairs							
		tractor		10.5	1	8,650	7,270	6,750
		plough		11.0	1	1,030	870	800
harrow			11.0	1	1,600	1,340	1,250	
cultivator			8.0	0.5	210	180	330	
combine drill			7.5	0.25	680	570	1,050	
maize planter			4.0	—	—	—	80	
crop sprayer			5.5	—	—	—	120	
trailer			2.0	0.25	70	—	100	
pick-up			10.5	—	—	—	1,020	
Sub-total					12,240	10,230	11,500	

Table 1.4 (Continued)

Cost Item	Equipment	No./Cost per Tractor Unit/Yr.		Cost per 100 ha Unit/Yr.	
		Before Development	After Development	Before Development	After Development
		No.	(KShs)	No.	(KShs)
Fuel Oil	Tractor	1	15,900	1	15,900
	Pick-up	—	—	0.25	1,360
	Sub-total		15,900		17,260
	Total (on-farm) machinery cost				
Contractor	Crop spraying @ 100/- per ha (50% of crop)				2,050
	Combine harvesting @ 170/- per ha				6,970
	Sub-total				9,020
	Total machinery cost				50,630
	Per farm hectare				506
	Per cultivated hectare				1,013

1 See Table 7.5 for details.

Table 1.5 Large Farm, Category 1, Wheat/Dairy System – Labour Costs

Enterprise	KShs/100 ha Unit per year		Incremental Cost
	Before Development	After Development	
<b>Crops</b>			
Wheat	4,020	3,720	
Maize	840	840	
Sub-total	4,860	4,560	(300)
<b>Livestock</b>			
Dairy cows	2,930	3,080	
Calves	160	280	
Heifers	50	90	
Steers	50	90	
Forage crops	200	700	
Sub-total	3,390	4,240	850
General work	500	500	
Sub-total	500	500	nil
<b>Total labour cost</b>	<b>8,750</b>	<b>9,300</b>	<b>550</b>

<sup>1</sup> Refer to Table 7.6 for details.

Table 1.6 Large Farm, Category 1, All Farming Systems – Buildings and Equipment Costs and General Overheads

Item	KShs/100 ha Unit per Year	
	Before Development	After Development
Buildings, fence, water supply, milk cooler (Annual depreciation)	nil	1,550
Repairs	2,000	3,780
General overheads <sup>1</sup>	5,000	6,000
<b>Total</b>	<b>7,000</b>	<b>11,330</b>

<sup>1</sup> Does not include loan repayments.

Table 2.1 Large Farm, Category 1, Maize/Dairy System – Summary Budget

Item	KShs/100 ha Unit per Year		Increment
	Before Development	After Development	
<b>Revenue</b>			
Crops	84,960	152,800	67,840
Livestock	22,030	49,040	27,010
<b>Total Revenue</b>	<b>106,990</b>	<b>201,840</b>	<b>94,850</b>
<b>Costs<sup>1</sup></b>			
Crops	29,260	54,400	25,140
Livestock	4,700	20,730	16,030
Machinery	32,570	43,680	11,110
Labour	15,930	21,890	5,960
Buildings and overheads	7,000	11,330	4,330
<b>Total Costs</b>	<b>89,460</b>	<b>152,030</b>	<b>62,570</b>
Return to management	17,530	49,810	32,280

<sup>1</sup> Land loan and GMR repayments not included.

Table 2.2 Large Farm, Category 1, Maize/Dairy System – Physical Data

Item	100 ha Unit	
	Before Development	After Development
Land Use (ha) <sup>1</sup>	Cultivable	65
	Rough Grazing	20
	Unusable <sup>2</sup>	15
	<b>Total</b>	<b>100</b>
Crop Enterprise Data (ha) <sup>3</sup>	Maize <sup>4</sup>	28
	Ley <sup>5</sup>	5
	<b>Total cultivated</b>	<b>33</b>
	Permanent pasture (cultivable)	32
	<b>Total cultivable</b>	<b>65</b>
Yields (kg/ha) <sup>6</sup>	Maize	3,900
		4,910
Livestock Technical Coefficients <sup>7</sup>	Calving (%)	50
	Calving interval (months)	24
	Mortality (calf) %	20
	Mortality (other) %	11
	Culling rate (%)	10
	Age at calving (months)	36
	Stocking rate (%) <sup>8</sup>	96
		80

Table 2.2 (Continued)

		No.	LSU	No.	LSU
Livestock Number and LSU	Bulls	( 0.4)	( 0.4)	( 0.4)	( 0.4)
	Cows	21	21	22	22
	Calves 0-1 year	11	4	17	7
	Steers/heifer 1-2 years	9	7	15	11
	Steers/heifers 2-3 years	9	7	14	11
	Total No./LSU	50	39	68	51
	Potential LSU from grazing		40		51
Livestock Sales Physical (annual)	Cull bulls	—		—	
	Cull cows	2		3	
	Surplus heifers	—		3	
	Steers	2		7	
	Bull calves	—		—	
Livestock Purchases (annual equivalent)	Bulls	0.1		0.1	
Item	100 ha Unit				
		Before Development		After Development	
Milk Production (kg per year) <sup>9</sup>	Milk per cow per year		904	1,600	
	Total milk production		18,984	35,200	
	Total milk sales		15,824	30,093	

- <sup>1</sup> Farm management survey, all districts.
- <sup>2</sup> Includes land set aside for labours' plots.
- <sup>3</sup> Farm management survey, average/poor farms in System 2.
- <sup>4</sup> The sampled farms cultivated 3 hectares of 'other crops', which have been aggregated in the budget to give one crop enterprise. In the 'after' situation, 5 hectares of the maize enterprise might be 'other crops' e.g. sunflower.
- <sup>5</sup> Rotation is based on a 4-5 year cash crop and 3 year ley.
- <sup>6</sup> Large farm survey.
- <sup>7</sup> Large farm survey and Consultants' estimate.
- <sup>8</sup> Hectares per LSU are: rangeland and natural grazing, 2; leys, 0.9; maize residue, 3.
- <sup>9</sup> Calf rearing 252 kg milk per calf (GAT handbook) plus home consumption.

Table 2.3 Large Farm, Category 1, Maize/Dairy System – Revenue and Variable Costs

Enterprise	KShs/100 ha Unit per Year		Increment
	Before Development	After Development	
<b>Cash Revenue</b>			
<b>Crops</b>			
Maize	84,960	152,800	
<b>Sub-total</b>	<b>84,960</b>	<b>152,800</b>	<b>67,840</b>
<b>Livestock</b>			
Cull cows	1,250	1,880	
Surplus heifers	—	2,850	
Steers	2,580	9,700	
Milk	18,200	34,610	
<b>Sub-total</b>	<b>22,030</b>	<b>49,040</b>	<b>27,010</b>
<b>Variable Costs</b>			
<b>Crops</b>			
Maize	29,260	54,400	
<b>Sub-total</b>	<b>29,260</b>	<b>54,400</b>	<b>25,140</b>
<b>Livestock</b>			
Dairy cows	1,890	6,820	
Calves	400	2,380	
Heifers	680	2,440	
Steers	200	1,460	
Replacements	200	200	
<b>Forage Costs</b>			
Establishment/maintenance per annum equivalent	1,530	7,630	
<b>Sub-total</b>	<b>4,700</b>	<b>20,730</b>	<b>16,030</b>

Table 2.4 Large Farm, Category 1, Maize/Dairy System – Annual Machinery Costs<sup>1</sup>

Cost Item	Equipment	Initial Unit Cost (KShs)	Write off period, years	No./Cost per Tractor Unit/Yr.		Cost per 100 ha Unit/Yr.		
				Before Development	After Development	Before Development	After Development	
			No.	(KShs)	No.	(KShs)	(KShs)	
Depreciation and interest	tractor	82,400	8	1	15,490	1	15,490	
	plough	9,400	12	1	1,380	1	1,380	
	harrow	14,500	12	1	2,130	1	2,130	
	cultivator	5,300	12	0.5	390	1	780	
	maize planter	10,170	11	0.25	390	0.5	780	
	trailer	12,940	12	0.25	480	0.5	950	
	pick-up	50,000	8	—	—	0.25	2,350	
	<b>Sub-total</b>				<b>20,260</b>		<b>23,860</b>	
								<b>10,530</b>
								<b>12,390</b>
Repairs	tractor			1	8,650	1	8,650	
	plough			1	1,030	1	1,030	
	harrow			1	1,600	1	1,600	
	cultivator			0.5	210	1	420	
	maize planter			0.25	180	0.5	360	
	trailer			0.25	70	0.5	130	
	pick-up			—	—	0.25	1,310	
	<b>Sub-total</b>				<b>11,740</b>		<b>13,500</b>	
								<b>5,880</b>
								<b>6,920</b>
							<b>700</b>	
							<b>1,090</b>	
							<b>140</b>	
							<b>120</b>	
							<b>40</b>	
							<b>—</b>	
							<b>1,380</b>	
							<b>19,070</b>	
							<b>7,970</b>	
							<b>10,800</b>	

Estimated spares and repairs as percentage of purchase price

Table 2.4 (Continued)

Cost Item	Equipment	No./Cost per Tractor Unit/Yr.		Cost per 100 ha Unit/Yr.	
		No.	(KShs)	Before Development	After Development
Fuel oil	Tractor	1	15,900	10,800	12,720
	Pick-up		—	—	1,090
	Sub-total	—	15,900	10,810	13,810
	Total (on farm) machinery cost			32,570	43,680
Contractor	Nil				
	Total machinery cost			32,570	43,680
	Per farm hectare			326	437
	Per cultivated hectare			987	672

<sup>1</sup> See Table 7.5 for details.

Table 2.5 Large Farm, Category 1, Maize/Dairy System – Labour Costs

Enterprise	KShs/100 ha Unit per Year		Incremental Cost
	Before Development	After Development	
<b>Crops</b>			
Maize	11,760	16,800	
Sub-total	11,760	16,800	5,040
<b>Livestock</b>			
Dairy cows	3,230	3,390	
Calves	180	300	
Heifers	60	100	
Steers	60	100	
Forage crops	140	700	
Sub-total	3,670	4,590	920
General work	500	500	
Sub-total	500	500	nil
<b>Total labour costs</b>	<b>15,930</b>	<b>21,890</b>	<b>5,960</b>

<sup>1</sup> Refer to Table 7.6 for details.

<sup>2</sup> Maize/Dairy overhead costs – refer to Table 1.6.

**Table 3.1 Large Farm, Category 1, High Altitude System – Summary Budget**

Item	KShs/100 ha Unit per Year		Increment
	Before Development	After Development	
<b>Revenue</b>			
Crops	96,240	141,420	45,180
Livestock	16,950	34,910	17,960
<b>Total revenue</b>	<b>113,190</b>	<b>176,330</b>	<b>63,140</b>
<b>Costs<sup>1</sup></b>			
Crops	46,210	52,900	6,690
Livestock	6,830	18,640	11,810
Machinery	51,130	44,410	( 6,720)
Labour	14,350	22,270	7,920
Buildings and overheads	7,000	11,330	4,330
<b>Total costs</b>	<b>125,520</b>	<b>149,550</b>	<b>24,030</b>
Return to management	( 12,330) <sup>2</sup>	26,780	39,110

<sup>1</sup> Land loan and GMR repayments not included.

<sup>2</sup> ( ) indicates negative amount.

Table 3.2 Large Farm, Category 1, High Altitude System – Physical Data

Item	100 ha Unit				
	Before Development		After Development		
Land Use (ha) <sup>1</sup>	Cultivable	65	65		
	Rough Grazing	20	20		
	Unusable <sup>2</sup>	15	15		
		<b>100</b>	<b>100</b>		
Crop Enterprise Data (ha) <sup>3</sup>	Wheat <sup>4</sup>	43	30		
	Pyrethrum	3	10		
	Oats (fodder)	nil	2		
	Ley <sup>5</sup>	6	23		
	<b>Total cultivated</b>	<b>52</b>	<b>65</b>		
	Permanent pasture (cultivable)	13	nil		
	<b>Total cultivable</b>	<b>65</b>	<b>65</b>		
Yields (kg/ha) <sup>6</sup>	Wheat	1,420	2,300		
	Pyrethrum	370	670		
Livestock Technical Coefficients <sup>7</sup>	Lambing %	75	100		
	Mortality (lamb) %	25	20		
	Mortality (other) %	10	8		
	Culling %	20	20		
	Age at first lambing (year)	2	2		
	Stocking rate %	90	100		
Sheep Numbers <sup>8</sup>		No.	LSU	No.	LSU
	Rams	2	)	1	)
	Ewes	61	)12.6	46	) 9.4
	Lambs	46	2.3	46	2.3
		<b>109</b>	<b>14.9</b>	<b>93</b>	<b>11.7</b>
			Potential LSU from grazing <sup>9</sup>	15	12
Sheep Sales Physical (annual)	Cull rams	1		1	
	Cull ewes	12		9	
	Fat lambs	34		37	
Sheep Purchases Physical (annual)	Rams	1		1	
	Ewe replacements	20		14	

Table 3.2 (Continued)

Item		100 ha Unit			
		Before Development		After Development	
		No.	LSU	No.	LSU
Meat and Wool production	Kg per lamb dcw		16		18
	Weight of wool per adult kg		4		4
Dairy cattle numbers <sup>10</sup>	Bulls	(0.2)	—	(0.2)	—
	Cows	9	9	12	12
	Calves 0—1 year	4	3	10	4
	Steers/heifers 1—2 years	4	2	8	6
	Steers/heifers 2—3 years	3	2	8	6
	Total No./LSU	20	16	46	28
	Potential LSU from grazing		16		29
Cattle Sales Physical	Cull bulls	—	—	—	—
	Cull cows	1	—	2	—
	Surplus heifers	—	—	2	—
	Steers	1	—	4	—
	Bull calves	—	—	—	—
Cattle Purchases Physical (annual equivalent)	Bulls		0.1		0.1
Milk production (kg per year)	Milk per cow per year		904		1,600
	Total milk		8,140		19,200
	Total milk sales		6.800		16,240

<sup>1</sup> Farm management survey, all districts.

<sup>2</sup> Includes land set aside for labours' plots.

<sup>3</sup> Farm management survey, all farms in System 3.

<sup>4</sup> In the sample about 10 per cent of the area given as wheat was in barley and 8 per cent in other crops.

<sup>5</sup> Rotation based on 3—4 year cereal crop and 3 year pyrethrum and 3 year ley.

<sup>6</sup> Farm management survey, wheat yields as for System 1.

<sup>7</sup> Large farm survey and Consultants' estimate.

<sup>8</sup> Sheep grazing potential 'before' sheep assumed to graze 50 per cent of land, 'after' rough grazing and half of cereal residue.

<sup>9</sup> Hectares per LSU are wheat residue 3, leys 1; rangeland and natural grazing 3.

<sup>10</sup> Cattle grazing potential, 'before' cattle assumed to graze 50 per cent of land (and sheep the remainder), 'after' leys and oats plus half cereal residue.

Table 3.3 Large Farm, Category 1, High Altitude System Revenue and Variable Costs

	KShs/100 ha Unit per Year		
	Before Development	After Development	Increment
<b>Cash Revenue</b>			
<b>Crops</b>			
Wheat	89,580	101,220	
Pyrethrum	6,660	40,200	
<b>Sub-total</b>	<b>96,240</b>	<b>141,420</b>	<b>45,180</b>
<b>Livestock</b>			
Rams	130	130	
Ewes	1,200	900	
Lambs	4,420	5,400	
Wool	1,460	1,110	
<b>Sub-total</b>	<b>7,210</b>	<b>7,540</b>	<b>330</b>
Cull cows	630	1,250	
Surplus heifers	—	1,900	
Steers	1,290	5,540	
Milk	7,820	18,680	
<b>Sub-total</b>	<b>9,740</b>	<b>27,370</b>	<b>17,630</b>
<b>Variable Costs</b>			
<b>Crops</b>			
Wheat	43,000	38,400	
Pyrethrum	3,210	14,500	
<b>Sub-total</b>	<b>46,210</b>	<b>52,900</b>	<b>6,690</b>
<b>Livestock</b>			
<b>Sheep</b>			
Ewes/rams	510	380	
Replacements	3,250	2,350	
<b>Sub-total</b>	<b>3,760</b>	<b>2,730</b>	<b>(1,030)</b>
<b>Dairy cows</b>			
Calves	160	1,400	
Heifers	140	1,340	
Steers	90	810	
Replacements	200	200	
<b>Forage Costs</b>			
Establishment/maintenance per annum equivalent	1,830	8,440	
<b>Sub-total</b>	<b>3,070</b>	<b>15,910</b>	<b>12,840</b>

Table 3.4 Large Farm, Category 1, High Altitude System — Annual Machinery Costs

Cost Item	Equipment	Initial Unit Cost (KShs)	Write off period, years	No./Cost per Tractor Unit/Yr.		Cost per 100 ha Unit/Yr.	
				Before Development	After Development	Before Development	After Development
			No.	(KShs)	No.	(KShs)	(KShs)
tractor		82,400	8	1	15,490	1	13,010
plough		9,400	12	1	1,380	1	1,160
harrow		14,500	12	1	2,130	1	1,790
cultivator		5,300	12	0.5	390	1	330
combine drill		36,060	9	0.25	1,580	0.5	1,330
crop sprayer		11,800	9	—	—	0.25	—
trailer		12,940	12	0.25	480	0.5	400
pick-up		50,000	8	—	—	0.25	—
<b>Sub-total</b>					<b>21,450</b>		<b>18,020</b>
							<b>26,760</b>
							<b>15,490</b>
							<b>1,380</b>
							<b>2,130</b>
							<b>780</b>
							<b>3,160</b>
							<b>520</b>
							<b>350</b>
							<b>640</b>
							<b>1,570</b>
							<b>17,930</b>
							<b>8,650</b>
							<b>1,030</b>
							<b>1,600</b>
							<b>420</b>
							<b>1,350</b>
							<b>160</b>
							<b>130</b>
							<b>1,310</b>
							<b>14,650</b>
							<b>7,270</b>
							<b>870</b>
							<b>1,340</b>
							<b>180</b>
							<b>570</b>
							<b>110</b>
							<b>90</b>
							<b>880</b>
							<b>9,820</b>
							<b>5,800</b>
							<b>690</b>
							<b>1,070</b>
							<b>280</b>
							<b>900</b>
							<b>110</b>
							<b>90</b>
							<b>880</b>
							<b>9,820</b>
							<b>10,290</b>
							<b>10,290</b>

Estimated spares and repairs as percentage of purchase price

tractor	10.5
plough	11.0
harrow	11.0
cultivator	8.0
combine drill	7.5
crop sprayer	5.5
trailer	2.0
pick-up	10.5
<b>Sub-total</b>	

Table 3.4 (Continued)

Cost Item	Equipment	No./Cost per Tractor Unit/Yr.		Cost per 100 ha Unit/Yr.	
		No.	(KShs)	Before Development	After Development
Fuel/oil	Tractor	1	15,900	13,360	10,650
	Pick-up	—	—	—	910
	Sub-total	—	15,900	13,360	11,560
<b>Total (on farm) machinery cost</b>					
Contractor	Crop spraying @ 100/— per ha (50% of crop)	—	—	2,150	—
	Combine @ 170/— per ha	—	—	7,310	5,100
	Sub-total	—	—	9,460	5,100
<b>Total machinery cost</b>					
Per farm hectare					
Per cultivated hectare					
				51,130	44,410
				511	444
				983	683

<sup>1</sup> See Table 7.5 for details.

Table 3.5 Large Farm, Category 1, High Altitude System – Labour Costs

Enterprise	KShs/100 ha Unit per Year		Incremental Cost
	Before Development	After Development	
<b>Crops</b>			
Wheat	4,210	2,940	
Pyrethrum	2,850	12,000	
Sub-total	7,060	14,940	7,880
<b>Livestock</b>			
Sheep	5,120	3,860	
Dairy cow	1,390	1,850	
Calves	70	180	
Heifers	20	60	
Steers	20	60	
Forage Crops	170	820	
Sub-total	6,790	6,830	40
General Work	500	500	nil
Sub-total	500	500	
<b>Total Labour Cost</b>	<b>14,350</b>	<b>22,270</b>	<b>7,920</b>

<sup>1</sup> Refer to Table 7.6 for details.

<sup>2</sup> High Altitude System overhead costs – refer Table 1.6.

Table 4.1 Subdivided Group Farm, Category 2, Wheat/Dairy (Maize) System – Summary Budget

Item	Per 100 ha/Yr. <sup>1</sup>		Increment	Per Member, 12.5 ha/Yr.	
	Before Development	After Development		Before Development	After Development
<b>Revenue</b>					
Crops	95,100	127,050	31,950	11,880	15,880
Livestock	17,490	42,390	24,900	2,190	5,310
<b>Sub-total</b>	<b>112,590</b>	<b>169,440</b>	<b>56,850</b>	<b>14,070</b>	<b>21,190</b>
<b>Costs</b>					
Crops	40,760	47,050	6,290	5,100	5,880
Livestock	2,350	19,310	16,960	300	2,410
Machinery	36,940	38,160	1,220	4,620	4,770
Labour	500	550	50	60	70
Overheads	3,700	3,700	—	460	460
Loan repayment	6,300	6,300	—	790	790
<b>Sub-total</b>	<b>90,550</b>	<b>115,070</b>	<b>24,520</b>	<b>11,330</b>	<b>14,380</b>
Return to management and family labour	22,040	54,370	32,380	2,740	6,810
Return per hectare	220	544	324		

<sup>1</sup> Represents an area occupied by 8 farm families

Table 4.2 Subdivided Group Farm, Category 2, Wheat/Dairy System — Physical Data

Item		per 100 ha		per member 12.5 ha					
		Before Development	After Development	Before Development	After Development				
Land <sup>1</sup> Use (ha)	Cultivable	65	65	8.1	8.1				
	Rough grazing	20	20	2.5	2.5				
	Unusable	15	15	1.9	1.9				
		100	100	12.5	12.5				
Crop <sup>2</sup> Enterprise (ha)	Wheat	33	30	4.1	3.8				
	Maize	11	10	1.4	1.2				
	Ley <sup>4</sup>	nil	25	nil	3.1				
	Total cultivated	44	65	5.5	8.1				
	Permanent pasture (cultivable)	21	nil	2.6	nil				
	Total cultivable	65	65	8.1	8.1				
Yields <sup>3</sup> kg/ha	Wheat	1,420	2,300						
	Maize	3,080	3,320						
Livestock Technical Coefficients <sup>5</sup>	Calving %	50	80						
	Calving interval (months)	24	15						
	Mortality (calves) %	9	13						
	Mortality (other)	20	15						
	Culling rate (%)	11	5						
	Age at calving (months)	36	36						
	Stocking rate (%)	96	100						
Livestock Number		No.	LSU	No.	LSU	(Approx.) No.	LSU	(Approx.) No.	LSU
	Bulls	(0.3)	(0.3)	(0.4)	(0.4)				
	Cows	16	16	19	19	2		2	
	Calves 0-1 yr.	8	3	15	6	1		2	
	Steers/heifers 1-2 yr.	6	5	13	10	1		2	
	Steers/heifers 2-3 yr.	6	4	13	10	1		2	
	Total No./LSU	36	28	60	45	5	3.5	8	5.6
	Potential carrying capacity LSU		29		45		3.6		5.6

Table 4.2 (Continued)

Item		per 100 ha		per member 12.5 ha	
		Before Development	After Development	Before Development	After Development
Livestock	Cull bulls	—	—	—	—
Sales physical (annual)	Cull cows	2	3	0.25	0.4
	Surplus heifers	—	3	—	0.4
	Steers	2	6	0.25	0.8
	Bull calves	—	—	—	—
Livestock Purchase physical (annual equivalent)	Bull	0.1	0.1	—	—
Milk production (kg per year)	Milk per cow per year	904	1,600		
	Total milk production	14,460	30,400	1,810	3,800
	Total milk sales <sup>6</sup>	11,880	25,930	1,485	3,240

<sup>1</sup> Farm management survey, all districts.

<sup>2</sup> Farm management survey, subdivided farms.

<sup>3</sup> Farm management survey, mean yields on average and poor farms (before situation) and good farms (after situation).

<sup>4</sup> Rotation based on 4–5 year cash crop and 3 year ley.

<sup>5</sup> Farm management survey.

<sup>6</sup> Calf rearing 252 kg milk per calf. (GAT handbook) plus home consumption.

Table 4.3 Subdivided Group Farm, Category 2, Wheat/Dairy System – Revenue and Variable Costs (KShs per year)

Enterprise	100 ha		per member 12.5 ha	
	Before Development	After Development	Before Development	After Development
<b>Cash Revenue</b>				
<b>Crops</b>				
Wheat	68,740	101,220	8,590	12,650
Maize	26,360	25,830	3,290	3,230
<b>Sub-total</b>	<b>95,100</b>	<b>127,050</b>	<b>11,880</b>	<b>15,880</b>
<b>Livestock</b>				
Cull cows	1,250	1,880	160	240
Surplus heifers	—	2,380	—	300
Steers	2,580	8,310	320	1,040
Milk	13,660	29,820	1,710	3,730
<b>Sub-total</b>	<b>17,490</b>	<b>42,390</b>	<b>2,190</b>	<b>5,310</b>
<b>Variable Costs</b>				
<b>Crops</b>				
Wheat	33,000	38,400	4,130	4,800
Maize	7,760	8,650	970	1,080
<b>Sub-total</b>	<b>40,760</b>	<b>47,050</b>	<b>5,100</b>	<b>5,880</b>
<b>Livestock</b>				
Dairy cows	1,440	5,890	180	740
Calves	320	2,100	40	260
Heifers	240	2,180	30	270
Steers	150	1,310	20	160
Replacements	200	200	30	30
<b>Forage Costs</b>				
Sub-total	—	7,630	—	950
<b>Sub-total</b>	<b>2,350</b>	<b>19,310</b>	<b>300</b>	<b>2,410</b>

Table 4.4 Subdivided Group Farm, Category 2, Wheat/Dairy System – Annual Machinery (contract) cost

Crops	No. of Operations	100 ha (KShs)		per member 12.5 ha (KShs)	
		Before Development	After Development	Before Development	After Development
<b>Wheat</b>					
Plough	1	7,590	6,900		
Harrow	2	10,560	9,600		
Combine drill	1	3,630	3,300		
Crop spray	0.5	990	900		
Combine harvest	1	5,610	5,100		
Transport (on farm)	1	1,320	1,200		
<b>Sub-total</b>		<b>29,700</b>	<b>27,000</b>	<b>3,710</b>	<b>3,380</b>
<b>Maize</b>					
Plough	1	2,530	2,300		
Harrow	2	3,520	3,200		
Planting	1	—	—		
Transport (on farm)	1	440	400		
Shelling	1	750	730		
<b>Sub-total</b>		<b>7,240</b>	<b>6,630</b>	<b>910</b>	<b>830</b>
<b>Grass ley</b>					
Plough	0.3 <sup>1</sup>	—	1,730		
Harrow	0.7	—	2,800		
<b>Sub-total</b>		<b>—</b>	<b>4,530</b>		
<b>Total machinery</b>		<b>36,940</b>	<b>38,160</b>	<b>4,620</b>	<b>4,770</b>

<sup>1</sup> After Development only.

<sup>2</sup> Refer to Table 7.8 for details.

Table 4.5 Subdivided Group Farm, Category 2, Wheat/Dairy System – Labour Requirement and Hired Labour Cost per Year

Enterprise	100 ha		12.5 ha			
	Total (and hired) Labour Use Man Days		Hired Labour Cost (KShs)			
	Before	After	Before	After	Before	After
Wheat	170(-)	180(-)	-	-	-	-
Maize	480(100)	530(110)	500	550	60	70
Cows	370(-)	530(-)	-	-	-	-
General	300(-)	400(-)	-	-	-	-
<b>Total</b>	<b>1,320(100)</b>	<b>1,640(110)</b>	<b>500</b>	<b>550</b>	<b>600</b>	<b>70</b>

<sup>1</sup> Refer to Table 7.9 for details.

Table 4.6 Subdivided Group Farms (all Systems) – Overheads and Loan Repayments (per hectare)

Item	Principle KShs/ha	Interest (%)	Period (years)	Repayment/overheads (per hectare)
Land loan	500	6.5	20	45
Development loan	120	8	10	18
General overheads (approx.)				37
				<b>100</b>

Table 5.1 Subdivided Group Farm, Category 2, Maize/Dairy System – Summary Budget

Item	per 100 ha/yr. <sup>1</sup>			per member, 12.5 ha/yr.	
	Before Development	After Development	Increment	Before Development	After Development
<b>Revenue</b>					
Crops	133,500	152,800	19,300	16,690	19,100
Livestock	20,180	49,680	29,500	2,520	6,210
<b>Sub-total</b>	<b>153,680</b>	<b>202,480</b>	<b>48,800</b>	<b>19,210</b>	<b>25,310</b>
<b>Costs</b>					
Crops	45,980	54,400	8,420	5,750	6,800
Livestock	2,740	20,960	18,220	350	2,630
Machinery	34,580	32,320	(2,260)	4,320	4,040
Labour	3,950	4,400	450	490	550
Overheads	3,700	3,700	—	460	460
Loan repayment	6,300	6,300	—	790	790
<b>Sub-total</b>	<b>97,250</b>	<b>122,080</b>	<b>24,830</b>	<b>12,160</b>	<b>15,270</b>
Return to management and family labour	56,430	80,800	24,370	7,050	10,040
Return per hectare	564	808			

<sup>1</sup> Represents an area occupied by 8 farm families.

Table 5.2 Subdivided Group Farm, Category 2, Maize/Dairy System – Physical Data

Item		100 ha		per member 12.5 ha	
		Before Development	After Development	Before Development	After Development
Land <sup>1</sup> Use (ha)	Cultivable	65	65	8.1	8.1
	Rough grazing	20	20	2.5	2.5
	Unusable	15	15	1.9	1.9
	<b>Sub-total</b>	<b>100</b>	<b>100</b>	<b>12.5</b>	<b>12.5</b>
Crop <sup>2</sup> Enterprise Date (ha)	Maize	44	40	5.5	5.0
	Ley <sup>3</sup>	nil	25	nil	3.1
	<b>Total cultivated</b>	<b>44</b>	<b>65</b>	<b>5.5</b>	<b>8.1</b>
	Permanent pasture (cultivable)	21	nil	2.6	nil
	<b>Total cultivable</b>	<b>65</b>	<b>65</b>	<b>8.1</b>	<b>8.1</b>
Yields <sup>4</sup> kg/ha	Maize	3,900	4,910		
Livestock Technical Coefficients <sup>5</sup>	Calving %	50	80		
	Calving interval (months)	24	15		
	Mortality (calf)	9	18		
	Mortality (other)	20	15		
	Culling rate (%)	11	5		
	Age at calving (months)	10	20		
	Stocking rate (%)	96	100		

		No.	LSU	No.	LSU	Approx. No.	Approx. No.	
Livestock Numbers	Bulls	(0.4)	(0.4)	(0.4)	(0.4)			
	Cows	19	19	22	22	3	2	
	Calves 0-1 yr.	9	4	17	7	2	1	
	Steers/heifer 1-2 yr.	8	6	15	11	2	1	
	Steers/heifer 2-3 yr.	6	5	14	11	2	1	
	<b>Total No./LSU</b>	<b>42</b>	<b>34</b>	<b>68</b>	<b>51</b>	<b>9</b>	<b>4.2</b>	<b>5</b> <b>6.3</b>
	Potential LSU <sup>1</sup> from grazing		35		51		4.4	6.3

Table 5.2 (Continued)

Item	100 ha		per member 12.5 ha	
	Before Development	After Development	Before Development	After Development
Livestock				
Sales physical (annual)				
	Cull bulls	—	—	
	Cull cows	2	4	
	Surplus heifers	—	3	
	Steers	2	7	
	Bull calves	—	—	
Livestock Purchases Physical (annual equivalent)	Bull	0.1	0.1	
Milk Production (kg per year)	Milk per cow per year	904	1,600	
	Total milk production	17,180	35,200	2,150
	Milk sales <sup>7</sup>	14,220	30,110	1,780
				4,400
				3,760

<sup>1</sup> Farm management survey, all districts.

<sup>2</sup> Farm management survey, subdivided farms.

<sup>3</sup> Rotation based on 4–5 year cash crop and 3 year ley.

<sup>4</sup> Farm management survey on average/poor farms.

<sup>5</sup> Farm management survey and Consultants' estimate.

<sup>6</sup> Hectares per LSU are: Rangeland and natural grazing, 3; Leys, 0.9; Maize residue, 3.

<sup>7</sup> Calf rearing 252 kg milk per calf (GAT handbook) plus home consumption.

Table 5.3 Subdivided Group Farms, Category 2, Maize/Dairy System – Revenue and Variable Costs (KShs per year)

Enterprise	100 ha		per member 12.5 ha	
	Before Development	After Development	Before Development	After Development
<b>Cash Revenue</b>				
<b>Crops</b>				
Maize	133,500	152,800	16,690	19,100
<b>Sub-total</b>	<b>133,500</b>	<b>152,800</b>	<b>16,690</b>	<b>19,100</b>
<b>Livestock</b>				
Cull cow	1,250	2,500	160	310
Surplus heifers	—	2,850	—	360
Steers	2,580	9,700	320	1,210
Milk	16,350	34,630	2,040	4,330
<b>Sub-total</b>	<b>20,180</b>	<b>49,685</b>	<b>2,520</b>	<b>6,210</b>
<b>Variable Costs</b>				
<b>Crops</b>				
Maize	45,980	54,400	5,750	6,800
<b>Sub-total</b>	<b>45,980</b>	<b>54,400</b>	<b>5,750</b>	<b>6,800</b>
<b>Livestock</b>				
Dairy cows	1,710	6,820	210	850
Calves	360	2,380	50	300
Heifers	320	2,520	40	320
Steers	150	1,410	20	180
Replacements	200	200	30	30
<b>Forage Costs</b>	<b>—</b>	<b>7,630</b>	<b>—</b>	<b>950</b>
<b>Sub-total</b>	<b>2,740</b>	<b>20,960</b>	<b>350</b>	<b>2,630</b>

Table 5.4 Subdivided Group Farm, Category 2, Maize/Dairy System - Annual Machinery (contract) Costs

Machinery	No. of Operations	100 ha (KShs)		per member 12.5 ha (KShs)	
		Before Development	After Development	Before Development	After Development
<b>Crops</b>					
Maize	1	10,120	9,200		
Plough	2	14,080	12,800		
Harrow	1	4,840	4,400		
Planting	1	1,760	1,600		
Transport (on farm)	1	3,780	4,320	4,320	4,040
Shelling	1	34,580	32,320		
<b>Sub-total</b>				4,320	4,040
<b>Grass ley</b>					
Plough	0.3 <sup>1</sup>	-	1,730		570
Harrow	0.7	-	2,800		
<b>Sub-total</b>			4,530	-	570
<b>Total machinery</b>		34,580	36,850	4,320	4,610

1 After Development only.

2 Refer to Table 7.8 for details.

Table 5.5 Subdivided Group Farm, Category 2, Maize/Dairy System – Labour Requirement and Hired Labour Cost per Year

Enterprise	100 ha		12.5 ha			
	Total (and hired) Labour Use Man Days		Hired Labour Cost (KShs)			
	Before	After	Before	After	Before	After
Maize	1,936(790)	2,120(880)	3,950	4,400	490	550
Cows	440(-)	510(-)	-	-	-	-
General	300(-)	400(-)	-	-	-	-
<b>Total</b>	<b>2,676(790)</b>	<b>3,030(880)</b>	<b>3,950</b>	<b>4,400</b>	<b>490</b>	<b>550</b>

<sup>1</sup> Refer to Table 7.9 for details.

<sup>2</sup> Overhead costs and loan repayments are given in Table 4.6.

Table 6.1 Subdivided Group Farm, Category 2, High Altitude System – Summary Budget

Item	per 100 ha/yr <sup>1</sup>		Increment	per member, 12.5 ha/yr	
	Before Development	After Development		Before Development	After Development
<b>Revenue</b>					
Crops	97,760	156,840	59,080	12,220	19,610
Livestock	15,160	49,390	34,230	1,890	6,170
<b>Sub-total</b>	<b>112,920</b>	<b>206,230</b>	<b>93,310</b>	<b>14,110</b>	<b>25,780</b>
<b>Costs</b>					
Crops	29,840	56,850	27,010	3,730	7,110
Livestock	2,110	24,540	22,430	280	3,090
Machinery	28,160	30,940	2,780	3,520	3,870
Labour	4,650	12,550	7,900	580	1,570
Overheads	3,700	3,700	-	460	460
Loan repayment	6,300	6,300	-	790	790
<b>Sub-total</b>	<b>74,760</b>	<b>134,880</b>	<b>60,120</b>	<b>9,360</b>	<b>16,890</b>
Return to management and family labour	38,160	71,350	33,190	4,750	8,890
Return per hectare	388	727			

<sup>1</sup> Represents an area occupied by 8 farm families.

Table 6.2 Subdivided Group Farm, Category 2, High Altitude System — Physical Data

Item	100 ha				per member 12.5 ha				
	Before Development		After Development		Before Development		After Development		
Land Use <sup>1</sup> (ha)	Cultivable	65	65	8.1	8.1				
	Rough grazing	20	20	2.5	2.5				
	Unusable	15	15	1.9	1.9				
	<b>Total</b>	<b>100</b>	<b>100</b>	<b>12.5</b>	<b>12.5</b>				
Crop <sup>2</sup> Enterprise Data (ha)	Wheat	20	15	2.5	1.9				
	Maize	16	10	2.0	1.2				
	Pyrethrum	8	20	1.0	2.5				
	Oats (fodder)	nil	12	nil	1.5				
	Ley	nil	8	nil	1.0				
	<b>Total cultivated</b>	<b>44</b>	<b>65</b>	<b>5.5</b>	<b>8.1</b>				
	Permanent pasture (cultivable)	21	nil	2.6	nil				
<b>Total cultivable</b>	<b>65</b>	<b>65</b>	<b>8.1</b>	<b>8.1</b>					
Yields <sup>3</sup> kg/ha	Wheat	1,420	2,300						
	Maize	3,080	3,320						
	Pyrethrum	370	670						
Livestock Technical Coefficients	(as for Category 1, high altitude system)								
		No.	LSU	No.	LSU	(Approx.) No.	(Approx.) LSU		
Livestock Numbers	Bulls	(0.3)	(0.3)	(0.4)	(0.4)	—	—		
	Cows	14	14	22	22	2	3		
	Calves 0-1 yr	7	3	18	7	1	2		
	Steers/heifer 1-2 yr	6	4	15	11	1	2		
	Steers/heifer 2-3 yr	5	4	15	11	1	2		
	<b>Total No./LSU</b>	<b>32</b>	<b>25</b>	<b>70</b>	<b>51</b>	<b>5</b>	<b>3.1</b>	<b>9</b>	<b>6.4</b>
	Potential LSU from grazing		26		52		3.3	6.5	

Table 6.2 (Continued)

Item		100 ha		per member 12.5 ha	
		Before Development	After Development	Before Development	After Development
Livestock Sales	Cull bulls	—	—		
	Cull cows	1	4		
	Surplus heifers	—	3		
	Steers	2	7		
	Bull calves	—	—		
Livestock purchases	Bulls	0.1	0.1		
Milk <sup>4</sup> production (kg)	Milk per cow per year	904	1,600		
	Total milk production	12,660	35,200	1,580	4,400
	Milk sales (total)	10,390	29,860	1,300	3,730

- 1 Farm management survey, all districts.
- 2 Farm management survey, subdivided farms.
- 3 Farm management survey, mean yields on average and poor farms (before situation) and good farms (after situation).
- 4 Calf rearing 252 kg milk per calf. (GAT handbook) plus home consumption.

**Table 6.3 Subdivided Group Farm, Category 2, High Altitude System – Revenue and Variable Costs (KShs per Year)**

Enterprise	100 ha		per member 12.5 ha	
	Before Development	After Development	Before Development	After Development
<b>Cash Revenue</b>				
<b>Crops</b>				
Wheat	41,660	50,610	5,210	6,330
Maize	38,340	25,830	4,790	3,230
Pyrethrum	17,760	80,400	2,220	10,050
<b>Sub-total</b>	<b>97,760</b>	<b>156,840</b>	<b>12,220</b>	<b>19,610</b>
<b>Livestock</b>				
Cull cows	630	2,500	80	310
Surplus heifers	—	2,850	—	360
Steers	2,580	9,700	320	1,210
Milk	11,950	34,340	1,490	4,290
<b>Sub-total</b>	<b>15,160</b>	<b>49,390</b>	<b>1,890</b>	<b>6,170</b>
<b>Variable Costs</b>				
<b>Crops</b>				
Wheat	10,000	19,200	1,250	2,400
Maize	11,280	8,650	1,410	1,080
Pyrethrum	8,560	29,000	1,070	3,630
<b>Sub-total</b>	<b>29,840</b>	<b>56,850</b>	<b>3,730</b>	<b>7,110</b>
<b>Livestock</b>				
Dairy cows	1,260	6,820	160	850
Calves	280	2,520	40	320
Heifers	240	2,520	30	320
Steers	130	1,520	20	190
Replacements	200	200	30	30
<b>Forage Costs</b>				
<b>Sub-total</b>	<b>2,110</b>	<b>10,960</b>	<b>—</b>	<b>1,380</b>
		<b>24,540</b>	<b>280</b>	<b>3,090</b>

Table 6.4 Subdivided Group Farm, Category 2, High Altitude System – Machinery (contract) Costs

Operation	No. of Operations	100 ha (KShs)		per member 12.5 ha (KShs)	
		Before Development	After Development	Before Development	After Development
<b>Wheat</b>					
Plough	1	4,600	3,450		
Harrow	2	6,400	4,800		
Combine drill	—	—	—		
Crop spray	0.5	600	450		
Combine harvest	1	3,400	2,550		
Transport (on farm)	1	800	600	1,980	1,480
<b>Sub-total</b>		<b>15,800</b>	<b>11,850</b>		
<b>Maize</b>					
Plough	1	3,680	2,300		
Harrow	2	5,120	3,200		
Planting	—	—	—		
Transport (on farm)	1	640	400		
Shelling	1	1,080	730	1,320	830
<b>Sub-total</b>		<b>10,520</b>	<b>6,630</b>		
<b>Pyrethrum</b>					
Plough	0.3	640	1,380		
Harrow	0.7	880	2,240		
Transport (on farm)	1	320	800	230	550
<b>Sub-total</b>		<b>1,840</b>	<b>4,420</b>		
<b>Oats</b>					
Plough	1	—	2,760		
Harrow	2	—	3,840		830
<b>Sub-total</b>			<b>6,600</b>		
<b>Grass ley</b>					
Plough	0.3 <sup>1</sup>	—	550		
Harrow	0.7	—	890		180
<b>Sub-total</b>			<b>1,440</b>		

<sup>1</sup> After Development only.

<sup>2</sup> Refer to Table 7.8 for details.

Table 6.5 Subdivided Group Farm, Category 2, High Altitude System. Labour Requirement and Hired Labour Cost per Year

Enterprise	100 ha		12.5 ha			
	Total (and hired) Labour use man-days		Hired labour cost (KShs)			
	Before	After	Before	After	Before	After
Wheat	100(-)	75(-)	-	-	-	-
Maize	700(150)	530(110)	750	550	90	70
Pyrethrum	1,400(780)	4,680(2,400)	3,900	12,000	490	1,500
Cows	320(-)	620(-)	-	-	-	-
General	300(-)	400(-)	-	-	-	-
<b>Total</b>	<b>2,860(930)</b>	<b>6,305(2,510)</b>	<b>4,650</b>	<b>12,550</b>	<b>580</b>	<b>1,570</b>

<sup>1</sup> Refer to Table 7.9 for details.

<sup>2</sup> Overhead costs and loan repayments are given in Table 4.6.

Table 7.1 Product Unit Prices

	Unit	Price per Unit <sup>1</sup> (KShs)
<b>Crops</b>		
Wheat	tonne	1,467
Maize	tonne	778
Pyrethrum	kg	6
<b>Livestock/products</b>		
Milk	litre	1.15
Beef (FAQ)	kg (CDW)	7.10 <sup>2</sup>
Cull cows	per cow	625
Heifer	per heifer	950
Bulls	per bull	2,000
Fat lamb (grade A)	kg	8.10
Cull ewes	per ewe	100
Ewes (replacement)	per ewe	150
Cull rams	per ram	130
Rams (replacement)	per ram	250

<sup>1</sup> Crop and livestock product prices are based on long-term projected levels covering the planning period, and are ex-farm (that is, net of transport cost from farm to purchasing agent).

<sup>2</sup> Assumes a CDW of 182 kg per head before development and a CDW of 195 kg per head after development.

Table 7.2 Crop Variable Costs

1) Wheat (all zones) KShs per hectare

Item	Before Development	After Development
Seed <sup>1</sup>	325	325
Fertiliser <sup>2</sup>	580	860
Herbicide <sup>3</sup>	75	75
Insecticide	—	—
Miscellaneous	20	20
<b>Total</b>	<b>1,000</b>	<b>1,280</b>

<sup>1</sup> 125 kg/ha at KShs 2.60 per kg.

<sup>2</sup> 'before' 125 kg of 15.45.0 (KShs 233 per 50 kg),  
'after' 185 kg 15.45.0.

<sup>3</sup> MCPA 3.5 l/ha at KShs 21.0/l.

2) Maize (KShs per hectare)

Item	(In Wheat Area)		(In Maize Area)	
	Before Development	After Development	Before Development	After Development
Seed <sup>1</sup>	90	90	90	90
Fertiliser <sup>2</sup>				
Basic	580	580	580	380
Top dressing	—	160	340	945
Herbicide	—	—	—	—
Insecticide <sup>3</sup>	15	15	15	15
Miscellaneous	20	20	20	20
<b>Total</b>	<b>705</b>	<b>865</b>	<b>1,045</b>	<b>1,360</b>

<sup>1</sup> 25 kg/ha at KShs 3.5 per kg.

<sup>2</sup> Basic: Wheat zone, 'before' 125 kg 15.45.0; (KShs 233 per 50 kg), 'after' 125 kg 15.45.0.

Top dressing: 'before' nil, 'after' 60 kg Calcium Ammonium Nitrate (CAN) KShs 135 per 50 kg.

Basic: Maize zone 'before' 125 kg 15.45.0, 'after' 100 kg Triple Superphosphate (KShs 188 per 50 kg).

Top dressing: 'before' 125 kg CAN, 'after' 350 kg CAN.

<sup>3</sup> DDT 6 kg of 5%.

Table 7.2 (Continued)

3) Pyrethrum<sup>1</sup> (Before Development) KShs per hectare

Item	Year 1	Year 2	Year 3	Mean
Splits <sup>2</sup>	1,750	—	—	580
Fertiliser <sup>3</sup>	120	—	—	40
Insecticide	—	—	—	—
Gunnies <sup>5</sup>	10	10	10	10
Drying <sup>6</sup>	440	440	440	440
<b>Total</b>	<b>2,320</b>	<b>450</b>	<b>450</b>	<b>1,070</b>

3a) Pyrethrum<sup>1</sup> (After Development) KShs per hectare

Item	Year 1	Year 2	Year 3	Mean
Splits <sup>2</sup>	1,750	—	—	580
Fertiliser <sup>3</sup>	235	—	—	80
Insecticide <sup>4</sup>	30	30	30	30
Gunnies <sup>5</sup>	20	20	20	20
Drying <sup>6</sup>	740	740	740	740
<b>Total</b>	<b>2,775</b>	<b>790</b>	<b>790</b>	<b>1,450</b>

<sup>1</sup> Excludes all labour costs.

<sup>2</sup> Assumed that half the area planted is from existing farm stock, KShs 120 per hectare, the remainder is planted using nursery stock at rate of 9,880 plants (4 splits) per hectare at 34 cents per plant.

<sup>3</sup> 'Before', 60 kg Triple Superphosphate, 'after' 125 kg of Triple Superphosphate per hectare.

<sup>4</sup> Insecticide Rogar 'E' applied at 0.5 l/hectare, at KShs 60.0 per litre.

<sup>5</sup> Net cost of KShs 1.0 per bag.

<sup>6</sup> Drying includes capital depreciation, fuel and oil, at KShs 1.2 per kg dried.

4) Grass Ley (establishment) KShs per hectare

Item	Before Development	After Development
Seed <sup>1</sup>	265	265
Fertiliser <sup>2</sup>	640	640
Miscellaneous	10	10
<b>Total</b>	<b>915</b>	<b>915</b>

Average cost per year (3 year life) KShs 305 per hectare.

<sup>1</sup> Rate 11 kg/ha KShs 24.0 per kg.

<sup>2</sup> Compound (11-55-0) applied at rate of 125 kg/ha, KShs 254 per 50 kg.; no top dressing given in years 2 and 3.

Table 7.2 (Continued)

5) Forage Oats (KShs per hectare)

Item	Before Development	After Development
Seed <sup>1</sup>	110	110
Fertiliser <sup>2</sup>	580	580
Miscellaneous	20	20
<b>Total</b>	<b>710</b>	<b>710</b>

<sup>1</sup> Seed rate 100 kg/ha at KShs 1.10 per kg.

<sup>2</sup> Compound (15-45-0) applied at rate of 125 kg/ha, KShs 233.0 per 50 kg.

Table 7.3 Livestock Variable Costs (KShs)

1) Dairy Cow (per cow/annum)

Item	Before Development	After Development
Concentrates <sup>1</sup>	10	150
Minerals <sup>2</sup>	20	30
Veterinary and dip <sup>3</sup>	30	65
Milk cooling <sup>4</sup>	—	35
Miscellaneous <sup>5</sup>	30	30
<b>Total</b>	<b>90</b>	<b>310</b>

<sup>1</sup> 'After', home mixed concentrates at 65 cents/kg, 230 kg per cow.

<sup>2</sup> 'Before' 12 kg minerals, 'after' 20 kg at average KShs 1.50 per kg. GAT survey.

<sup>3</sup> GAT survey.

<sup>4</sup> Variable costs only.

<sup>5</sup> Troughs, small tools/equipment.

2) Other Stock (per head/annum)

Item	Calf (0-1 year)		Heifer (1-3 year)		Steer (1-3 year)	
	Before <sup>1</sup>	After <sup>2</sup>	Before	After	Before	After
Concentrates	20	100	10	100	10	65
Veterinary and dip	20	40	30	70	15	35
<b>Total</b>	<b>40</b>	<b>140</b>	<b>40</b>	<b>170</b>	<b>25</b>	<b>100</b>

<sup>1</sup> Consultants estimates.

<sup>2</sup> GAT survey.

**Table 7.4 Dairy Herd and Sheep Flock Composition**

**1) Dairy Herd Composition and Disposal**

Item	Numbers of animals (per 100 cow herd)	
	Before Development	After Development
Bull	2	2
Cows	100 (11) Cull 11	100 (3) Cull 16
Calves (0-1 year)	50 (10)	80 (12)
Steers/heifers (1-2 years)	40 (4)	68 (2)
Steers/heifers (2-3 years)	36 (4)	66 (2)
Sales	11 (steers)	32 (steers), 13 (heifers)
Own replacements	21 (heifers)	19 (heifers)

Notes:— Figures in brackets indicate deaths.

Livestock Units (LSU) per animal are as follows: Bulls and cows 1.0; Calves 0-1 year 0.4; Steers/heifers 1-3 years 0.75.

**2) Sheep Flock Composition and Disposal (per 100 ewe flock)**

Item	Before Development	After Development
Rams	3	3
Ewes	100 (10) Cull 20	100 (8) Cull 20
Lambs	75 (18)	100 (20)
Sales (lambs)	57	80
Buy-in replacements	32	30

Notes:— Figures in brackets indicate deaths.;

Livestock Units (LSU) per animal are as follows: Rams and ewes 0.2; Lambs 0.05.

**3) Sheep (KSHs per ewe)**

Item <sup>1</sup>	Before Development	After Development
Shearing	0.50	0.50
Wool classing	0.40	0.40
Drenching	2.00	2.00
Dipping	3.00	3.00
Miscellaneous	2.20	2.20
<b>Total</b>	<b>8.10</b>	<b>8.10</b>

<sup>1</sup> Derived from Sheep and Goat Development Project (FAO) Production Economics Note No.3.

Table 7.5 Machinery Requirements for Category 1 Large Farms

1) Tractor hours per annum

Crops	hours per hectare	
	Before Development	After Development
Wheat	13.0	10.5
Maize	12.5	10.0
Pyrethrum	4.0	3.0
Ley	4.0	3.0
<b>Livestock</b>	<b>hours per head</b>	
Dairy cows	10.0	8.0
Other cattle	6.0	5.0
Sheep (per ewe)	2.0	1.5

Note:— Tractor usage will obviously vary widely depending on a number of factors, particularly management, condition of machinery and the skill of the operator. The rates shown in the table have been derived from a number of sources and are approximate.

Based on the tractor hours required per hectare and per livestock head, the total tractor hours required on the three systems: Wheat/dairy, Maize/dairy and High altitude crops, before and after development are given for a 100 hectare unit as shown in 2) below.

2) Tractor hours per annum per 100 hectare unit on Category 1 farms

Item	System 1 (Wheat/Dairy)		System 2 (Maize/Dairy)		System 3 (High Altitude Crops)	
	Before	After	Before	After	Before	After
Crops	561	494	370	475	595	436
Livestock/general	280	290	306	320	246	237
<b>Sub-total</b>	<b>841</b>	<b>784</b>	<b>676</b>	<b>795</b>	<b>841</b>	<b>673</b>
Hours per tractor <sup>1</sup>	1,000					
No. of tractors per 100 ha	0.84	0.78	0.68	0.80	0.84	0.67
No. of cultivated ha per tractor	60	83	49	81	62	97

<sup>1</sup> Tractors are assumed to operate for an average of 1,000 hours per year under all systems before and after development.

Table 7.5 (Continued)

3) Implements and equipment required per tractor<sup>1</sup>

System	System 1 (Wheat/Dairy)		System 2 (Maize/Dairy)		System 3 (High Altitude Crops)	
	Before	After	Before	After	Before	After
Equipment per tractor (Nos.)						
Plough	1	1	1	1	1	1
Harrow	1	1	1	1	1	1
Cultivator	0.5	1	0.5	1	0.5	1
Combine drill	0.25	0.5	—	—	0.25	0.5
Maize planter	—	0.25	0.25	0.5	—	—
Crop sprayer	—	0.25	—	—	—	0.25
Trailer	0.25	0.5	0.25	0.5	0.25	0.5
Pick-up	—	0.25	—	0.25	—	0.25

<sup>1</sup> This calculation assumes a farm size of approximately 500 hectares, requiring (according to system and stage of development) about 4 tractor units. Crop spraying (before development) is assumed to be done on contract and combine harvesting is in all cases on contract.

Table 7.6 Labour requirements on Large Farms, Category 1 (Man days per hectare)

Enterprise	Man days/ha
<b>Crops</b>	
Wheat	14
Maize	60
Pyrethrum	190 (240) <sup>1</sup>
Forage oats	12
Grass Ley	4
<b>Livestock</b>	
Dairy Cows	22
Calves	2.5
Heifers	1
Steers	1
Sheep (per ewe)	12
<b>General farm work</b>	5

Notes:— Rates per man day assumed is KShs 7.0 to include housing and food allowance except for pyrethrum (mainly casual labour) which is given a rate of KShs 5.0 per man day.

<sup>1</sup> Figure in brackets refers to 'after development' situation, all other crops have same requirements.

In the before-project situation, buildings and fixed equipment are assumed to have been written-off, incurring only an annual repair and maintenance charge. The with-project situation assumes the following investment in medium and long-term capital items; buildings, fencing, water supply and milk cooler (detailed in Table 7.7). The capital costs have been annualised (depreciation and interest column in the table).

Table 7.7 Buildings, Equipment and General Overheads

1) Long and medium term capital investment with development

Item	Unit Cost (KShs)	per 100 ha	
		Number	Amount (KShs)
Buildings	20,000	0.2	4,000
Fencing (per km)	2,200	2.5	5,500
Water supply (per 500 ha)	50,000	0.2	10,000
Milk cooler (per 500 ha)	15,000	0.2	3,000
<b>Total</b>			<b>22,500</b>

2) Annualised cost of investment (depreciation and repairs and maintenance)

Item	per 100 ha	
	Before Development	After Development
<b>Depreciation<sup>1</sup></b>		
Buildings )		
Fencing )		
Water supply )	nil	2,400
Milk cooler )		
Repairs and maintenance <sup>2</sup>	2,000	2,930
General overheads <sup>3</sup>	5,000	6,000
<b>Total</b>	<b>7,000</b>	<b>11,330</b>

<sup>1</sup> Annualised at 10 per cent over 30 years.

<sup>2</sup> Estimated KShs 2,000 on remaining capital; maintenance of new investment calculated at 5 per cent of initial cost.

<sup>3</sup> KShs 50 per hectare rising to KShs 60 per hectare at full development.

Table 7.8 Machinery Contract Work – Rates per Hectare on Subdivided Group Farms

Operation	Rate (KShs per hectare)
Ploughing	230
Harrowing	160
Combine drilling	110
Maize planting	110
Crop spraying	60
Combine harvesting	170
Transport (on farm)	40
Shelling (per tonne shelled)	22

Table 7.9 Subdivided Group Farms, Category 2 – Labour Requirements

Enterprise	Operation	Family Labour Total No. man days/ha	Hired Labour man days/ha	
			System 2 (maize area)	System 1/3 (wheat area)
Crop	Wheat	10		nil
	Sub-total	10 (14)		nil
Maize	Planting	4	)	)
	Weeding	20	)	)
	Stooking	15	)	)
	Picking	8	)	18
	General	5		18
	Sub-total	52 (61)		18 (22)
Pyrethrum	Planting	17		)
	Weeding	98		)
	Picking	62		)
	Ridging	7		)
	Sub-total	180 (240)		12 (84) (97) (120)
	Livestock	Dairy (per cow)	23 (28)	-
General farm work		3 (4)	-	-

- Figures without brackets indicate labour requirements in the 'before development' situation, figures in brackets refer to 'after development' situation.
- Casual labour rate is KShs 5 per man day.