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EXPERIMENTAL SMALLHOLDINGS FOR MANAGEMENT AND EXTENSION USE:
the KABANYOLO EXAMPLE.

M. Hall.

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Note: Rural Development Research Papers are written as a basis for discussion in the Makerere Economic Research Seminars. They are not publications and are subject to revision.

I. INTRODUCTION.

The paper is primarily a report on the first year of activities on the experimental smallholding which has been developed by the Department of Rural Economy, Makerere College. It attempts to be more than just an annual report, however, as the aims of the smallholding and the problems encountered in deciding on the form of organisation to adopt are examined. The experimental smallholding approach has been adopted in many parts of the developing world, particularly since it was publicised by Jolly in his writings on the five 'unit farms' which were developed in Trinidad in the 1950s. The general results, however, have been disappointing and very often the holding has been abandoned after failing to realize its aims. While the shortcoming of the approach should be clearly realized, it is still felt that it has certain unique advantages over other methods of obtaining insights into the problems of peasant farm development. The first year of operation on the departmental smallholding has provided several examples to confirm this belief and the experiment has been successful enough to consider seriously the case for an expansion in the numbers and types of holding.

2. AIMS and ORGANISATION.

A perusal of the histories of several experimental smallholdings uncovers a wide range of types reflecting different emphases and organisational structures. At one extreme is the holding which is designed simply to duplicate the agriculture of the neighbouring area and at the other is the one designed primarily to test new enterprises and production techniques with little regard to operational constraints. These extremes, which might be reflected in many cases as a choice between purely subsistence output and a uniquely cash cropping system;

each have serious drawbacks. The holding which simply attempts to duplicate the current situation suffers from two main defects. It is not possible to create an identical unit to the modal type in the area if a holding has to be purposively created, for even if an existing holding is adopted the holder's motivation is invariably altered as well as his access to productive resources. In addition, the duplication of an existing situation could add very little to the knowledge of farm improvement problems which can not be gathered on a more statistically reliable basis by farm survey techniques. On the other hand, a holding consisting entirely of a collection of innovations would be in serious danger of losing any identity with actual improvement problems as perceived by an ordinary farmer. It could also lose the characteristics of a smallholding farmed as a single entity. This problem would be exacerbated if it proved necessary to hire specially trained workers to run such a series of enterprises.

These organisational extremes and weaknesses probably arose because of the lack of a clear conception of the purpose of the holding and the methods to be adopted in its running and development. A clear set of decisions had therefore to be made in planning for the Kabanyolo holding. The purpose of the holding was defined as 'to maximize returns to available farm resources by the provision of management advice and of capital derived from commercial credit sources'. This basic aim of approximating an idealized improvement situation on a typical peasant farm is not dissimilar from that formulated by Jolly which was, 'to find whether it is possible to develop a system of farming that will provide full-time employment and a reasonable standard of living'¹. The underlying assumptions differ quite markedly however. Jolly stipulated a situation where the farmer was an employee whose management decisions were taken for him, required capital was automatically forthcoming including working capital and marketing was carried out for the farmer who was paid an incentive bonus at the end of each financial year. Employment of outside labour was not normally permitted and family labour also received wages. It was considered that these arrangements destroyed any attempt to approximate a realistic improvement situation by substituting a completely artificial motivational framework and by radically altering actual improvement constraints while imposing others which are not encountered by the majority of farmers.

1. Jolly, A.L. The Unit Farm as a Tool in Farm Management Research.
J. of Farm Economics Aug. 1957.

It was therefore decided to attempt to create a situation where the holder was normally motivated to improve while simultaneously providing the means to raise technical and economic efficiency in such a way that these inputs were not too different from those potentially available to the majority of smallholders dealing with the government extension service. The chosen organisation was therefore based on a farm family working on a full-time basis, retaining the output of the holding, responsible for all the marketing and providing all its own working capital. Investment capital was available on the same terms as government sponsored agricultural loans and although the farmer was to be responsible ultimately for farm business decisions, the farm was to be observed closely and continuously and advice constantly offered. It was felt that these conditions provided a much more realistic basis for studying the improvement process at farm level than the majority of the previous arrangements. The result of these decisions was that the smallholding was almost certain to lie somewhere between the two extremes previously discussed. It could not be a facsimile of the typical peasant farm as it was intended to exploit any potential for development and supplement productive resources where necessary and it could not be a series of disjointed innovations as it would be a family farm essentially moulded by family decisions.

Within the basic aims and structure, a series of more detailed decisions had to be made by the committee formed to initiate the holding. These decisions were concerned with former selection, farm size and location, the actual decision making structure, details of resource provision, the type of records to be kept and the method of recording and the phasing of improvements. One of the more important of this series of choices was the appointment of the smallholder himself. There were some arguments for the selection of a typical, poorly educated, peasant smallholder together with his holding, but it was decided that the holder should be able to speak some English in order to facilitate communication with the staff and students of the Faculty of Agriculture. The final choice of holder was a man who had received eight years of education, who was essentially a farmer with a better than average holding and whose only employment had been to work for two years as an enumerator on a farm management survey. The choice has proved to be very successful as the man is enthusiastic, responsive to innovations, yet has received no professional training in agriculture while at the same time he is conversant with the problems of keeping good

records. In addition, the farmer has a wife who helps him on the holding and a young family. The family on the smallholding is therefore representative of large numbers of young couples with little education and a young family who are forced to make their living in agriculture. The farmer is allowed to hire additional labour when he thinks this is necessary, although his attention is constantly drawn to the possibility that in some cases he may be trading income for liesure

The size of the smallholding was an important variable which was determined by the fact that it was considered desirable to obtain a holding which was the modal size for the area. This was available through the results of the FAO. Census carried out in Uganda during 1963. The modal size of holdings in Buganda was found to be in the range 2.48 - 4.96 acres as shown in Table One below, whereas the median and mean sizes were 4.6 acres and 6.3 acres respectively.

Table I. Size Distribution of Holdings: Buganda

HOLDING acres	BUGANDA		WEST MENGO		EAST MENGO		MUBENDE		MASAKA	
	No.	%	No.	%	No.	%	No.	%	No.	%
0- 1.24	28,000	7.9	10,000	8.0	11,000	8.7	1,000	4.7	6,000	7.4
1.24- 2.48	49,000	13.7	17,000	13.6	14,000	11.0	3,000	14.4	15,000	18.5
2.48- 4.96	126,000	35.3	45,000	36.0	44,000	34.6	7,000	28.7	30,000	37.0
4.96- 7.44	72,000	20.2	26,000	20.8	28,000	22.1	5,000	20.3	13,000	16.1
7.44- 9.92	33,000	9.2	11,000	8.8	14,000	11.0	2,000	8.1	6,000	7.4
9.92-12.40	24,000	6.7	8,000	6.4	9,000	7.1	3,000	10.9	4,000	4.9
12.40-24.80	19,000	5.3	6,000	4.8	6,000	4.7	3,000	11.9	4,000	5.0
24.80+	6,000	1.7	2,000	1.6	1,000	0.8	7	1.0	3,000	3.7
TOTAL	357,000	100.0	125,000	100.0	127,000	100.0	24,000	100.0	81,000	100.0

Source:- FAO. Census of Agriculture

Since it was intended to approximate a typical improvement situation it was important to decide on the rate at which capital would be injected into the business. The aim of approximating to a feasible situation was here in potential conflict with the desire to establish quickly a holding which exhibited enough changes to distinguish it from the neighbouring, unimproved farms. No really satisfactory formula was evolved to cover this dilemma and the actual decisions with regard to the issue were really subjective

compromises. It was decided, however, that the farmer should provide his own working capital just as soon as he started to receive a regular stream of farm income. Investment capital was provided from the research funds of the Department of Rural Economy but, after a one year moratorium, they were to be reimbursed on an equivalent basis to the medium term loans available from the government Department of Agriculture.

It was further decided that the farmer should pay a rent to the Department of Rural Economy based on the value of the house and the current rental value of the holding. Unlike the farm equipment and building improvements, the actual improvement costs of the dwelling house were not charged in the loan repayments as the house was below the standard of the farmers own dwelling and it was therefore improved to this level. As the holder would generally be expected to be strongly influenced by the advice he received and this was anticipated to include investments of a long term nature, it was decided that some form of guarantee should be provided to ensure the compensation of the farmer for farm improvements should he leave or be caused to leave the holding. An agreement is therefore in the process of being drawn up which will provide for security of tenure as long as certain conditions are complied with, but which in the case of expulsion from the holding will provide compensation for capital improvements made. In such a case the farmer's outstanding capital debts would be taken over by the Department which would adjust the compensation figure accordingly. This compensation arrangement is an essential precondition for adequate motivation and it was decided to supplement this arrangement with one which allowed the farmer to benefit directly from the results of his efforts by retaining the revenue and permitting full use of all his farm produce as long as current loan obligations were met. Any other system of reward would have little advantage over the use of a group of hired labourers. They would be satisfactory from the viewpoint of evolving a technically sound system but would ignore the equally complex problems of motivation, risk aversion, time preference and even individual likes and dislikes.

If the above factors were to be considered seriously, it was also necessary to be very careful about the agreed decision making structure. Peasant farmers make most of their production within the family, but the progressive men tend to co-operate with extension advisors. The structure which was aimed at was more akin to this model than the one evolved in Trinidad where

all decisions were taken by Faculty members. The general policy advice was to be generated by a committee representative of the Departments of Animal Production, Crop Production and Rural Economy, the management of the Faculty Farm and representatives of the government departments of Agriculture and Veterinary Services. The actual contact with the farmer was to be mainly through the lecturer in Agricultural Extension and his field assistant. This assistant was to work in liaison with the local agricultural and veterinary assistants although this was meant as an informal arrangement. General guidelines have been formulated but most of the operational decisions have been taken by the farmer in consultation with this extension assistant. The underlying policy has been to build up those enterprises considered to be capable of producing high net returns and to fit them into a technically satisfactory system which was also agreeable to the holder and his family. Given this decision it was felt to be pointless to stipulate a target income and efforts were concentrated on maximizing returns to the available resources which were supplemented where necessary (given realistic capital constraints) so as to produce the optimum income for the farm family when marketed and consumed produce were totalled together. The question of the subsistence cash enterprise balance proved to be an easy one to solve as the two most profitable enterprises, bananas and milk, also made up a considerable percentage of family food needs. If this had not been the case, the farmer would probably have been allowed to make the final decisions; the opportunity cost of these being calculated and pointed out to him.

The decisions made were in accordance with the basic aims of the smallholding and did not conflict with the supplementary aims which were as follows.

- i. To serve as a visual aid to farmers in the area of:-
 - a. the potential for expansion of output with limited resources.
 - b. a number of possible approaches to farming in Buganda which could be combined in different ways in other circumstances (when other holdings were initiated)
 - c. the way in which small areas of valley soul could be used profitably for dry season vegetable production.
- ii. To assist in the teaching of undergraduate, post-graduate and refresher course students by:-
 - a. helping to orientate students' ideas towards small-scale farming conditions.

- b. giving practice in farm planning.
 - c. provide a location for method demonstrations as long as these could be arranged to cause no disturbance to the normal commercial running of the farm.
- iii. To give Makerere staff practice and experience in:-
- a. the use of local channels of credit, subsidies and marketing.
 - b. the supply of high level managerial inputs at the peasant farm level.
 - c. the use of local sources of cash inputs such as fertilizers, sprays etc.

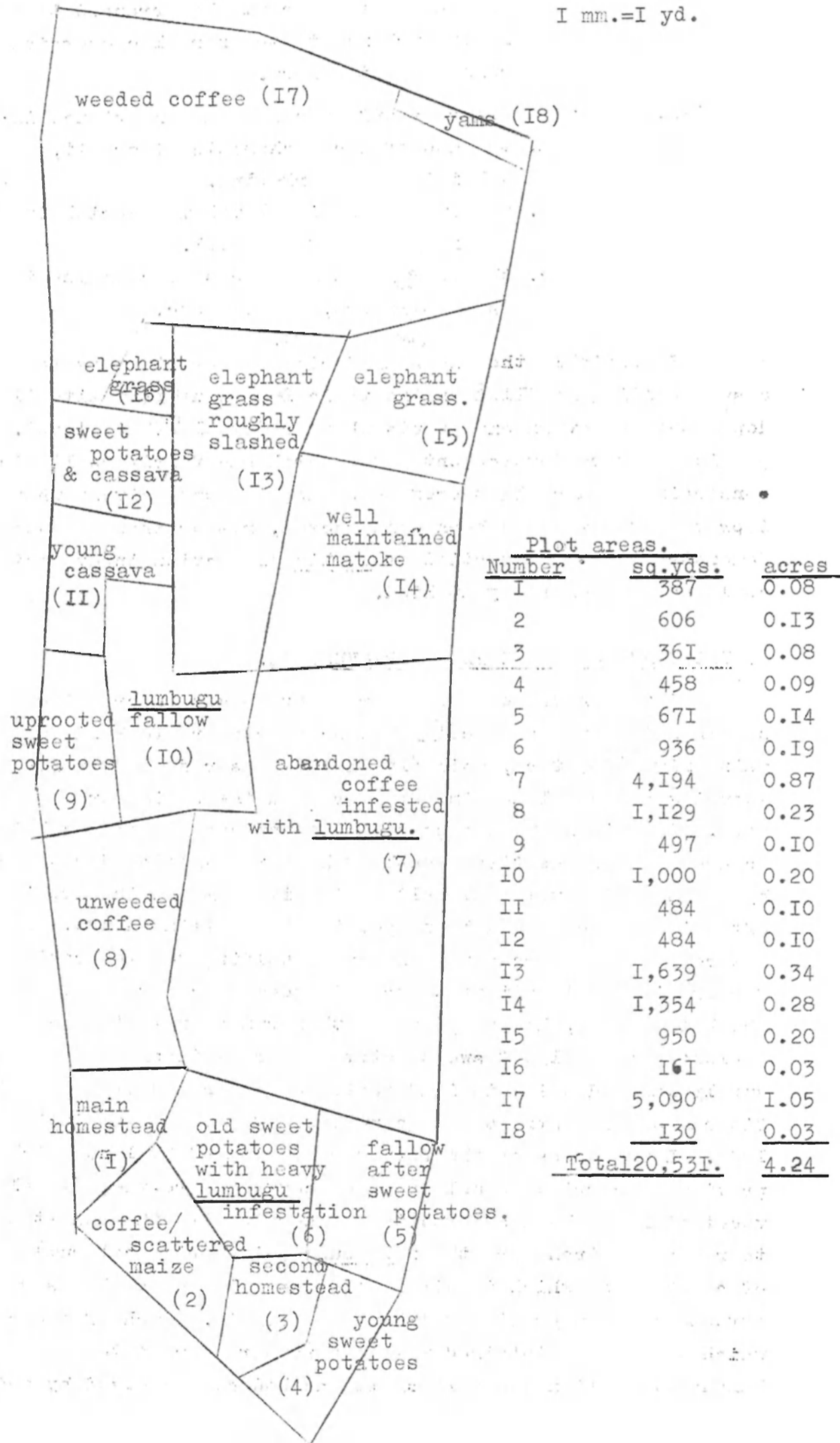
Essentially the planning decisions were such as to evolve a smallholding modelled on the typical peasant farm situation dependant on government inputs whether actual or simulated. This provided a farm development model which had fairly realistic constraints and could therefore be applied extensively when improvement paths had been constructed, rather than a model demonstrating the potential of ad lib production inputs but which could not be generally applied.

3. THE PHASING OF THE FARM IMPROVEMENTS.

Although there were several advantages in creating a smallholding from a parcel of unencumbered arable land on the main University farm, this alternative was rejected in favour of securing an actual holding not far from the perimeter of the farm. Late in 1967 an opportunity to purchase such a holding occurred and in the first month of 1968 the smallholder selected by the Experimental Smallholding Committee moved into residence after improvements had been made to the dwelling house. One of the reasons for purchasing an actual holding was to provide the farmer with an immediate source of income and a ready food supply. The holding was, however, in a rather run down state and although a plentiful supply of sweet potatoes was available the matoke supply was and still is inadequate for the needs of the family. Diagram One illustrates the condition of the holding in January 1968. Large areas of the farm were dominated by land which had previously carried annual crops or coffee where, the natural vegetation had been allowed to regenerate with the result that there was a strong growth of lumbugu (*digitaria scalarum*) a form of couch grass which is difficult to eradicate and has serious effects on crop growth if allowed to remain. Much of the coffee which had been maintained was in a rather poor state and the banana plantation was very small and had been damaged by thieves.

Diagram One. Original Layout at the beginning of
1968.

1 mm.=1 yd.



The gross output of such a poorly maintained holding is very low; somewhere in the region of Shs.584. was calculated for this particular holding made up of the following contributions;

i. 1 acre of coffee giving 500 pounds of dried cherry @ 40 cts per pound	Shs.200	Shs.200
ii. one quarter acre of sweet potatoes giving nine bags of potatoes @ Shs.12 per bag		Shs. 84
iii. one quarter of an acre of matoke giving eighty bunches @ Shs.3 per bunch		Shs.240
iv. miscellaneous other crops such as cassava, cocoyams and vegetables		Shs. 60
	TOTAL	<u>584</u>

On the other hand the holding was near to the main farm, it was a suitable size for the purpose required (4.2 acres) and it was of the typical Buganda farm layout being long and narrow and running down a hillside into a swamp. In addition it was estimated that even such a small neglected farm could, within the space of a year or so be made to yield a comfortable living relative to the unskilled wage rates paid in urban areas of Uganda. The following tentative estimates were made for farm income once the holding was running at full capacity.

i. <u>Exotic Cattle</u> : purchase price Shs.800 (productive life 4 years) selling price Shs.400 therefore depreciation	Shs.100 -
Calf Sales <u>weaned heifer + day old male = $\frac{400+10}{2}$</u>	205 +
Milk Sales 400 gals. @ Shs.4	1,600 +
	Gross Output Sh. 1,705

Variable Costs of Milk Production

Calf Pencils x $\frac{1}{2}$	Shs.125
Concentrates + Minerals (30 cents per gal)	240
Vets. and Medecine	50
Miscellaneous + Equipment Depreciation	30

Total variable costs Shs. 445

Gross Margin per Cow= Shs.1,705 - 445= Shs.1,260

Two cows could be kept on the holding giving

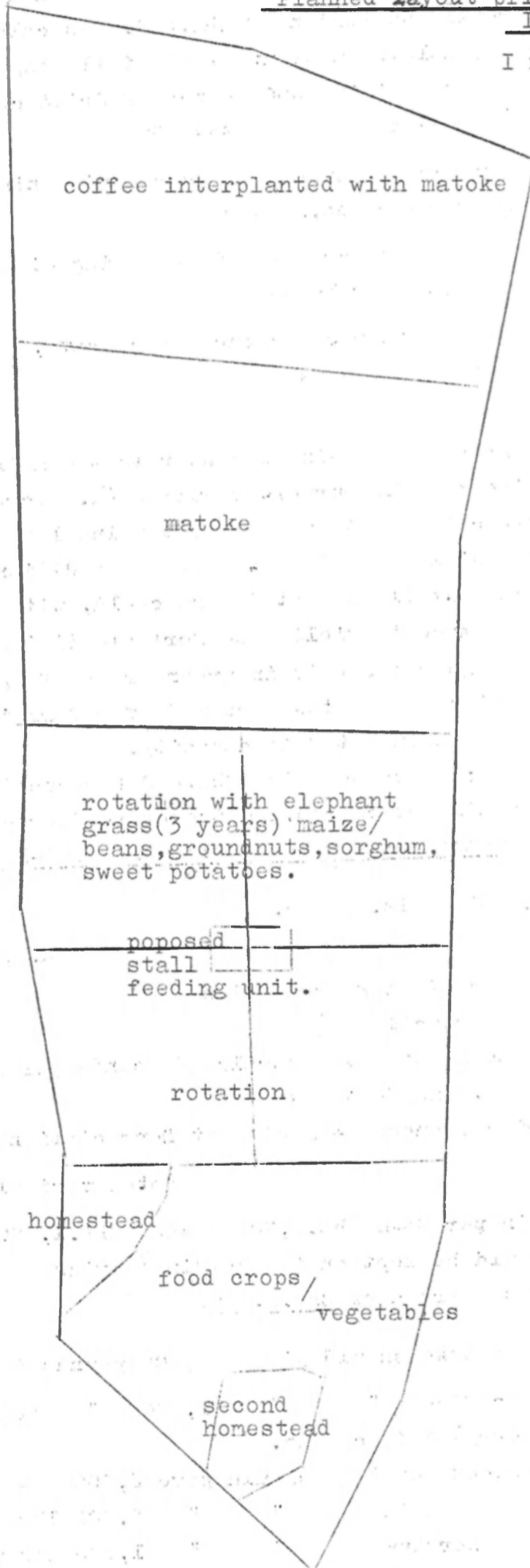
a total gross margin of Shs.2,520. Shs.2,520

ii. One acre of matoke should yield 16,000 pounds @ 8 cts/lb	1,280
iii. " " " coffee " " 1,800 " of kiboko (dried cherry) @ 40 cts/lb.	720
iv. $\frac{1}{2}$ acre of sweet potatoes should give 5,000 lbs @ 7cts/lb	350
v. $\frac{1}{2}$ " " maize " " 2,000 lbs @ 10cts/lb	200
vi. $\frac{1}{2}$ " " sorghum " " 1,000 lbs @ 15cts/lb	150
Approximate Total Gross Margin	<u>Shs. 5,220</u>

Diagram Two.

Planned Layout prior to Field Inspection.

1 mm.=1 yd.



It was therefore felt that the farm should be capable of providing cash and subsistence production net of direct cash inputs of well over Shs.400 per month if loan repayment were disregarded.

Diagram Two shows the layout which was originally intended to accompany this farming system. The farmer had not been long in residence, however, before it was felt necessary to alter the layout on his advice. The two major alterations concerned the location of the stall feeding unit which on the farmer's advice was planned much nearer the homestead to safeguard the cattle against theft and the proposed interplanting of the coffee at the bottom end of the farm near the swamp with matoke because of potential monkey damage. Both these necessary modifications would have been overlooked by working in isolation from the actual farm situation.

In February the farmer concentrated on uprooting the really neglected, lumbugu infested coffee which covered about $\frac{3}{4}$ acre (Plot 7 on Diagram One). After a considerable delay, during which time the really suitable desiccating weather had almost finished, the lower part of the plot covering about $\frac{1}{2}$ acre was ploughed by a tractor from the government hire service with the aim of securing a partial kill of the lumbugu. Money was paid in advance and the tractor was requested to come at the earliest possible time yet the delay amounted to several weeks. It seems that these delays are common and are no doubt partly responsible for the limited demand for government hire services. When the ploughing had been completed in March, enough time was given for the weeds to sprout vigorously aided by the coming of the first rains and then the plot was sprayed with downpon which almost eradicated the lumbugu. This plot was planted with elephant grass in May and by November this was yielding quite satisfactorily.

In March the farmer purchased a local Nganda cow which was intended primarily to attract any ticks on the grazing areas of the farm. Tick eradication could then be gradually carried out by spraying the cow at regular intervals with an acaricide with the result that the farm would be virtually tick-free on the arrival of the first exotic cow later in the year. Other areas of the farm which were ploughed in the first rains were planted with sweet potatoes, cassava, maize and beans. Diagram Three shows the progress of farm development by the second half of the first rains. The area of coffee at the bottom of the farm had been reduced by the removal of three rows at the top end which were in a particularly poor state and the remaining trees

Diagram Three

Smallholding Plan: First Rains.

1968.

1 mm.=1 yd.

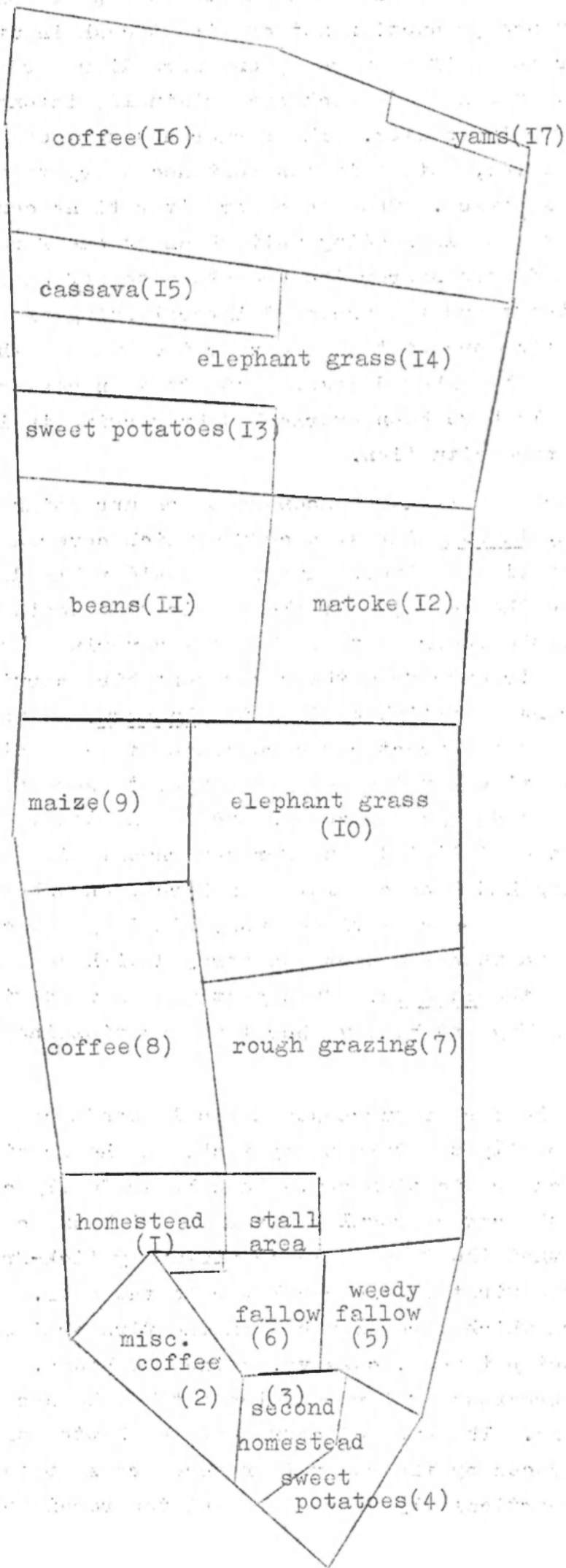


DIAGRAM FOUR

swamp

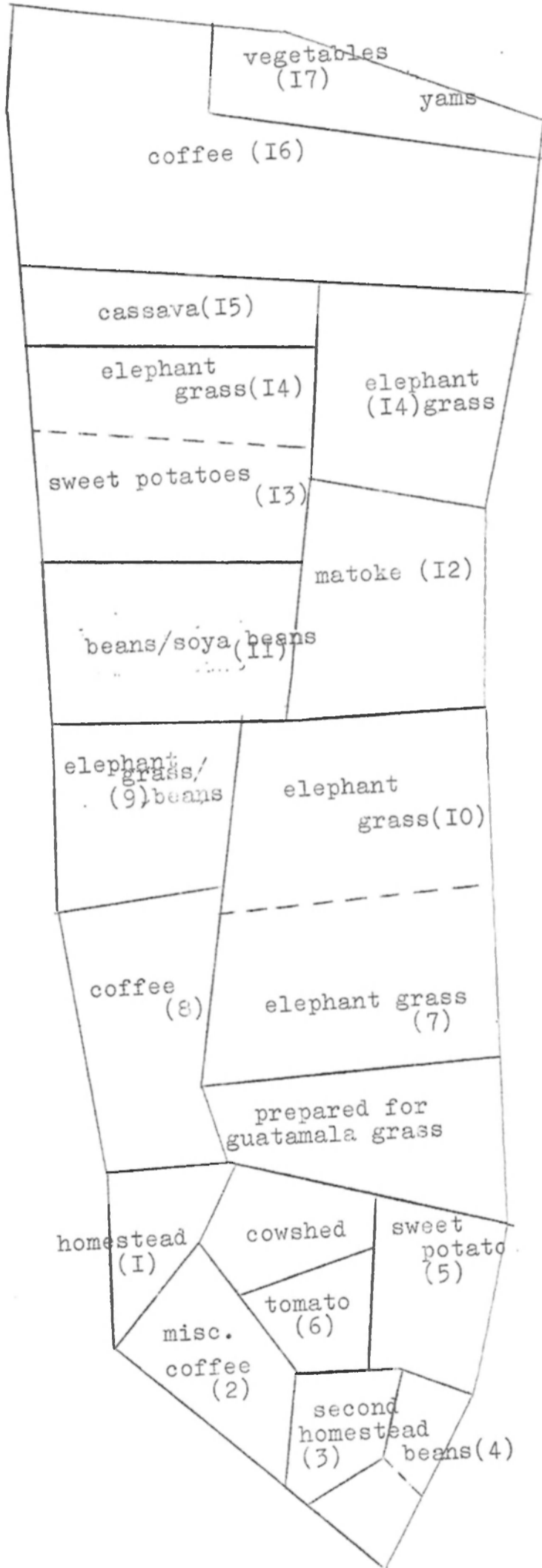
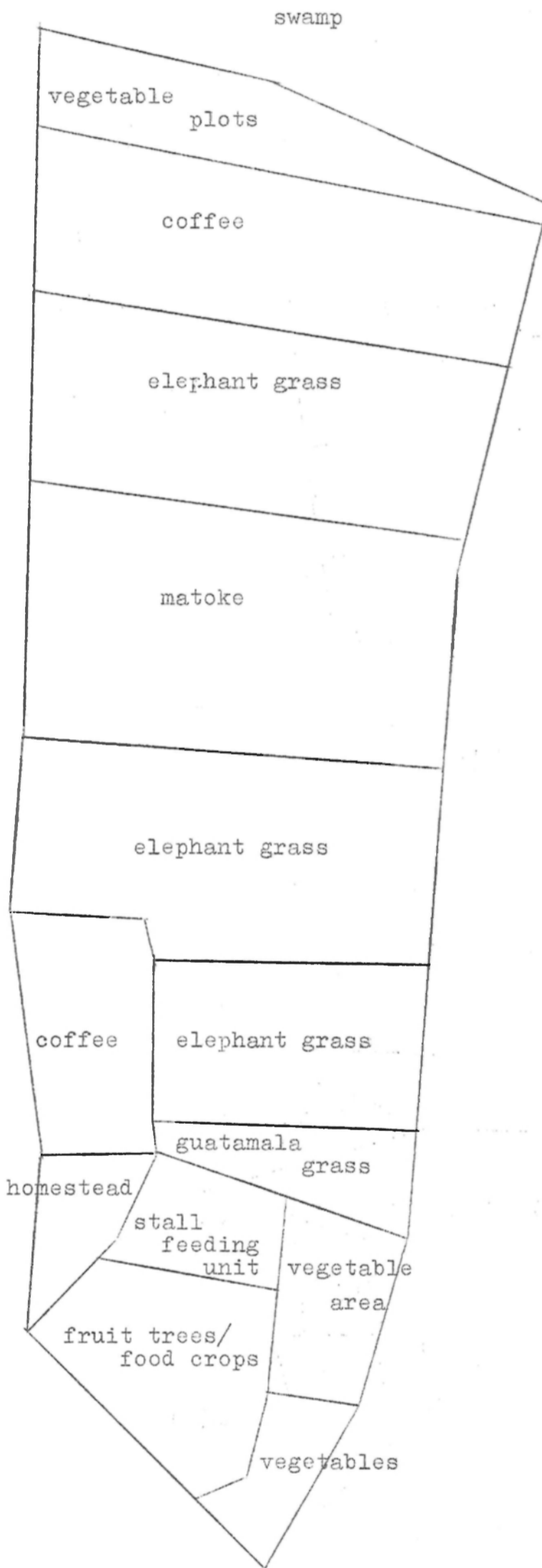


Diagram Five Final Smallholding Layout. Imm.=I yd.



had been pruned fairly drastically. The area released from coffee had been planted ^{with} cassava or elephant grass as the farmer was keen to establish a famine reserve and the rest of the area was incorporated into Plot 15 (Diagram Three) which was retained as a fodder crop because of the rocky outcrop running through its middle and across the width of the farm. The matoke plot had been pruned, mulched with elephant grass and split banana stems and had been twice weeded.

In May the farmer's family moved into residence and his dependence on hired labour was much reduced but his food problems were intensified although lessened in June when the Nganda cow calved and gave three pints of milk per day. By July the stall feeding unit had been built mainly using the farmer's own labour (costs given in Appendix) and the dairy equipment purchased. At the beginning of the second rains in September the maize plot (plot 9, Diagram Three) was ploughed and planted with elephant grass with beans sown between the rows. The area at the top of the farm which had been cleared of coffee but not planted to elephant grass was ploughed twice, as it was badly infested with lumbugu, and planted to elephant grass intersown with maize. This meant that a large area of the farm was now planted to elephant grass, although most of this was at an immature stage. However, when the first exotic cow was purchased in November enough grass was available to support both the new arrival and the Nganda which was only sold in December after the grass supply became poor after a spell of dry weather. (See Figure One for Kabanyolo Rainfall Data 1968) At the end of the year almost two acres of elephant grass had been planted, enough to allow for the purchase of a second exotic cow at the beginning of the first rains in 1969. Diagram Four shows the position of the farm at the end of the year including the new vegetable area at the bottom of the farm. This grew a good crop of lettuces and cabbages in the second rains and will be expanded along the width of the farm by further uprooting the rather poor coffee growing in the swamp fringe area. This vegetable plot will be developed to produce dry season vegetables. Dry season production will be concentrated on the land above the staff feeding unit as the area is well placed to build up fertility with cow dung. The matoke plot will be extended for a few yards downhill to the edge of the rocky outcrop and across the breadth of the farm (sweet potatoe and soyabean plots in Diagram Four). It is anticipated that there will be an excess of elephant grass available to mulch the perennial crops toward the end of each wet season and that the

Figure One.

Mainfall Record for Kabonolo University Farm 1968.

in hrs. by 10 day periods each month.

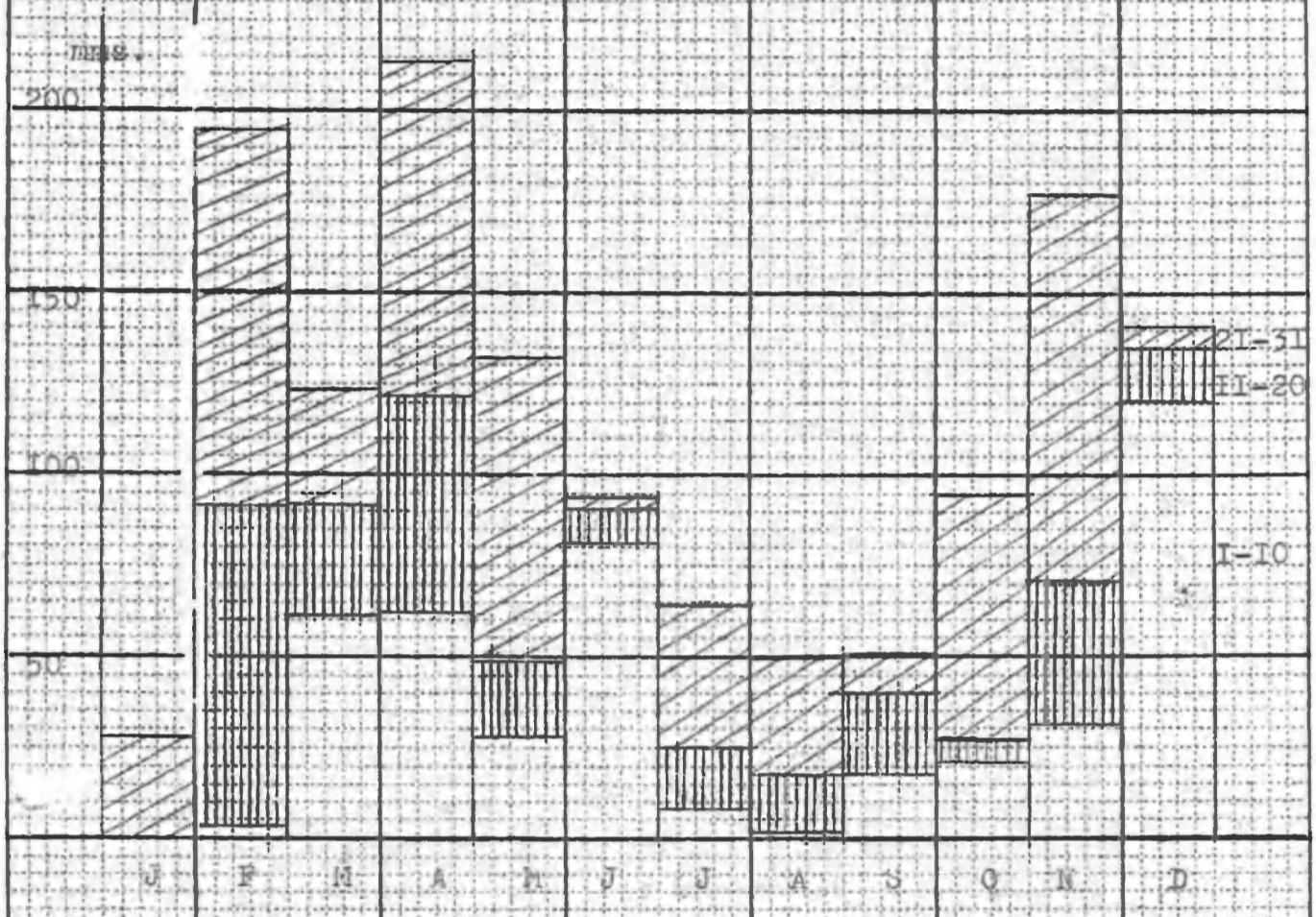
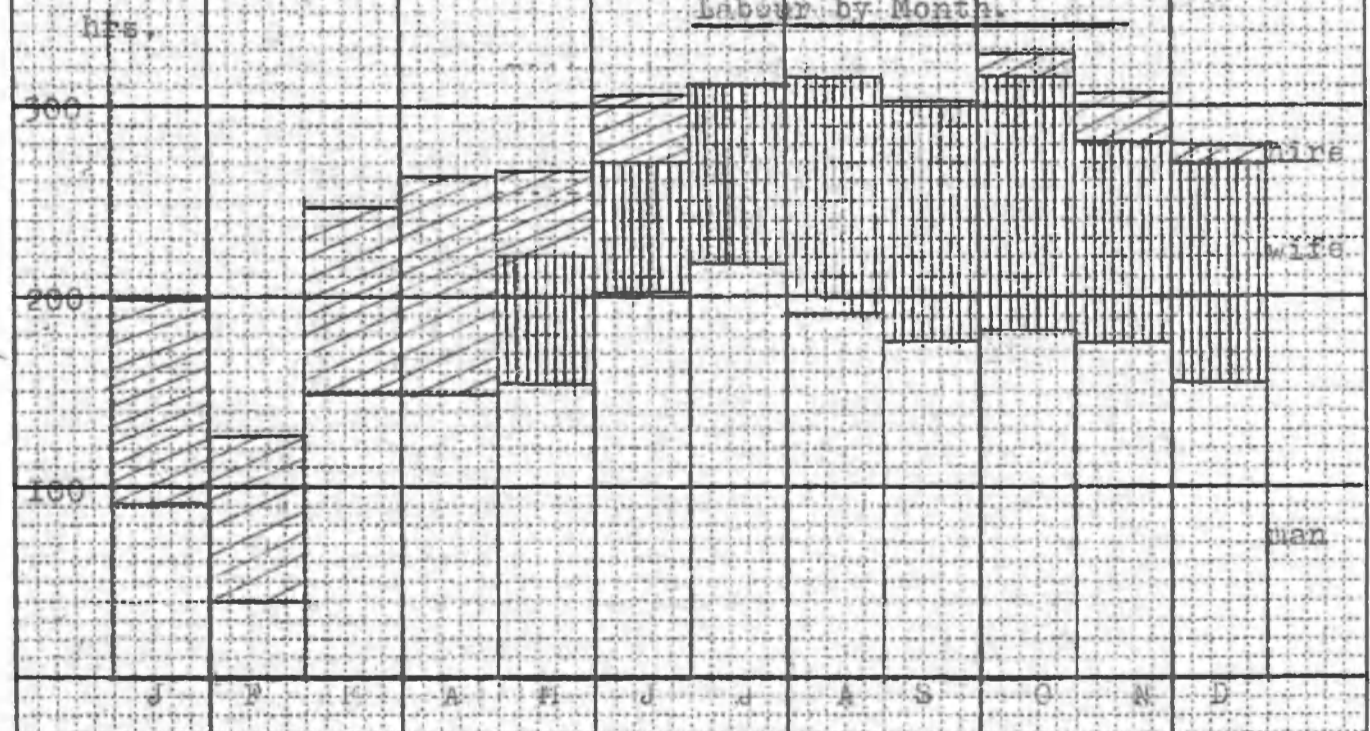


Figure Two.

Labour Inputs in hours of Farmer, wife and Hired

Labour by Month.



grass plots will last three or four years before rotavation and replanting, perhaps after a sweet potato crop. Diagram Five indicates the final farm layout which should be achieved during the first rains of 1969.

4. PHYSICAL AND FINANCIAL RECORDS FOR 1968.

Two main forms of recording were used during the year, although the types of data gathered were the same. The labour and time allocation recording forms shown in Appendices One and Two were used until August and then replaced by the recording form shown in Appendix Three. This form includes all the time allocation information on one sheet and forces the recorder to think harder about the exact utilization of time during the twelve daylight hours than does the other type of recording sheet. The latter type has the advantage, however; that the information is entered in a semi-summarized form whereas the single recording sheet required a lengthy summary process. If the recorder is experienced and trustworthy, it is preferable, therefore, to utilize the semi-summarized sheets and henceforth these are to be used exclusively on the **smallholding**. The recording sheets for entering harvested produce were also changed in August and again the original sheet, shown in Appendix Four, was found to be better. The other form of harvest record, shown in Appendix Five, differed from the former in the length of recording period and in its format as it was designed to enter data for a period of a few days only and was not easily summarized into plot records.

Two types of recording sheet were also tried for farm expenditures, household expenditures, and disposal of produce. In each case the type utilizing a format involving itemized columns was preferred to the ones using the method involving the entry of unitemized information for short time periods. The better type for each category of information is shown in Appendices Six, Seven and Eight.

Labour inputs for the farmer, his wife and hired labour broken down by month are given in Table Two below and further illustrated in Figure Two. Some of the data is best interpreted in the light of information on the total time allocation data of the farmer and his wife given in Table Three.

Table Two
Hours of Labour Input each month of 1968 by the Farmer,
his Wife and Hired Labour.

Month	Farmer	Wife	Hired	Total
January	91.5	-	106.0	197.5
February	40.0	-	88.0	128.0
March	149.5	-	97.0	246.5
April	149.0	-	114.0	263.0
May	154.5	77.0	47.5	279.0
June	202.0	78.0	37.0	317.0
July	217.5	94.5	-	312.0
August	190.5	124.5	-	315.0
September	176.5	125.0	-	301.5
October	182.5	134.0	12.0	328.5
November	177.5	107.0	25.0	309.5
<u>December</u>	<u>154.0</u>	<u>115.0</u>	<u>10.0</u>	<u>279.0</u>
<u>Total</u>	<u>1,885.0</u>	<u>855.0</u>	<u>536.5</u>	<u>3,275.5</u>

When the farmer first took possession of the farm in January he was limited by the dry weather preceding the first rains and the first two months were spent uprooting derelict coffee, contacting government field workers and equipment dealers (see Table Three, Other Activities column). The farmer was also living off the farm during this period. With the coming of the rains and the arrival of the government tractor to eradicate lumbugu, the tempo of work speeded up and the farmer started to devote much more of his time to farm work. Coffee and banana plots were pruned and weeded and sweet potato and cassava plots were prepared. In addition, the first plot of elephant grass was planted on some of the land cleared of poor coffee and lumbugu and two other small plots were sown to maize and to beans. All these new plots were prepared with the aid of a hired tractor as it was considered that the subsidized government hire rates provided a cheaper means of opening up new land than hiring casual labour even at the current local rate of 30-40 cents per hour. (2 ploughings=Shs.85 as opposed to 600+ hours of casual labour)

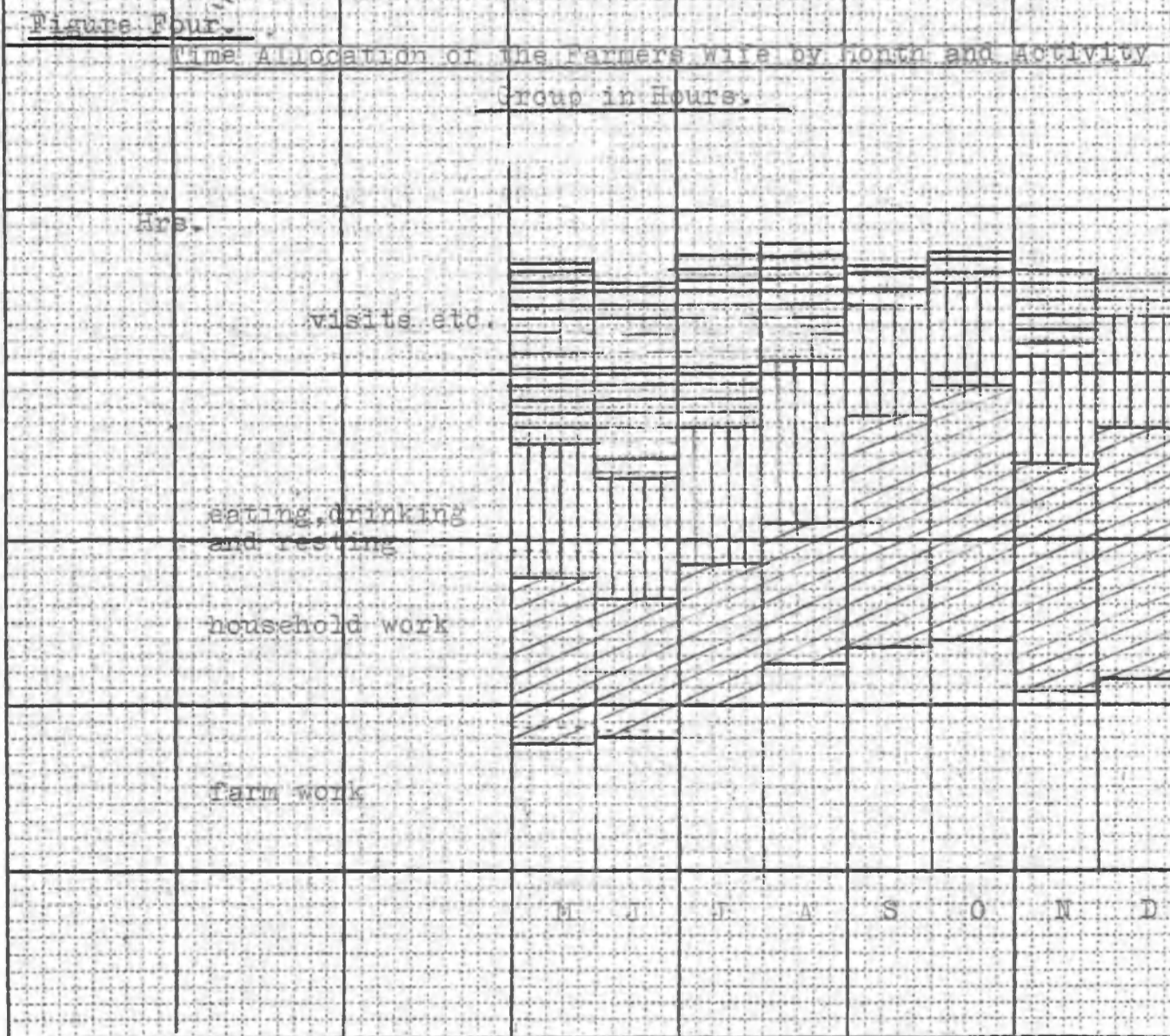
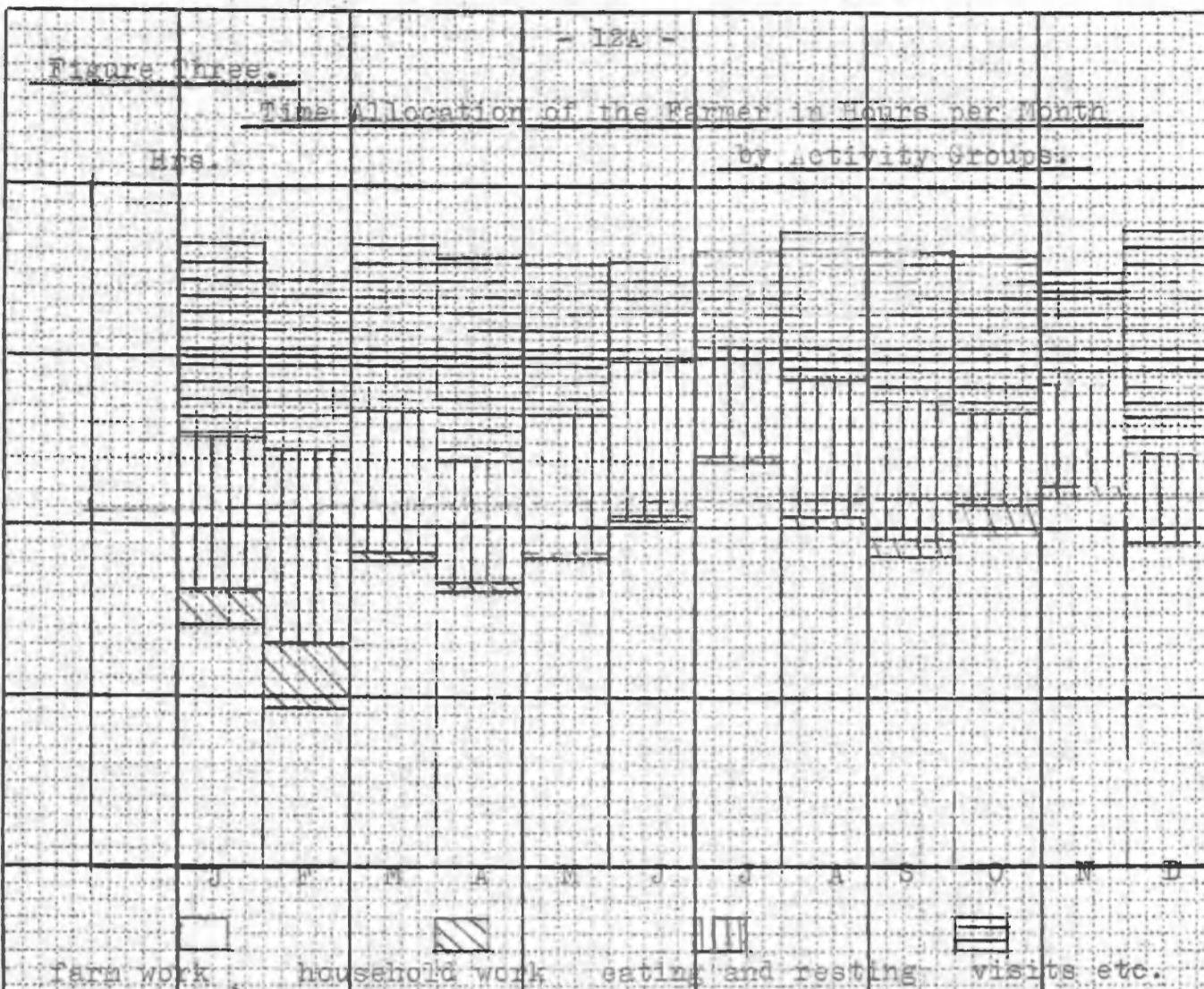
On the arrival of the farmer's wife and family at the beginning of May the hiring of labour was sharply diminished. Two factors seem to account for this; the fact that the wife was able to contribute a substantial amount of farm labour and the release of some of the farmer's time from household tasks which

TABLE THREE.

ALL DAYLIGHT ACTIVITIES OF HEAD OF HOUSEHOLD AND HIS WIFE

(in hours per month)

Month	Marketing		Washing Clothes Cleaning or Re- pairing house.		Preparing Food		Eating Drinking or Resting		Visiting Friends or Relatives		Visiting Duka or Co- operative		Meetings or Ceremonies		Medical visits or Illness		Other Activities (describe)		Farm Daily Work Totals	
	F	W	F	W	F	W	F	W	F	W	F	W	F	W	F	W	F	W	F	W
Jan.			5	-	15	-	90	-	49	-	40	-	8	-	19	-	51	-	92	-
Feb.			27	-	10	-	114	-	36	-	36	-	26	-	4	-	54	-	40	-
Mar.			5	-	-	-	83	-	51	-	33	-	7	-	7	-	30	-	150	-
April			3	-	2	-	72	-	64	-	46	-	-	-	9	-	13	-	149	-
May			2	20	-	85	81	64	15	136	-	6	14	-	7	36	27	-	155	88
June			3	13	-	71	94	72	50	109	7	-	-	-	-	8	-	2	202	78
July			2	15	-	71	63	82	47	-	7	-	-	-	3	104	22	-	218	100
Aug.			-	9	6	77	82	98	45	60	8	-	12	12	20	-	10	-	191	125
Sept.			7	33	3	105	80	66	75	14	12	-	-	-	8	-	6	11	177	125
Oct.			-	34	14	118	55	61	68	12	24	-	-	-	6	-	16	6	183	134
Nov.	30	-	-	30	4	107	61	65	39	12	14	-	2	24	-	16	22	-	178	107
Dec.	20	-	-	36	-	115	53	68	57	5	9	-	-	4	64	12	17	-	154	115
TOTALS	F	W	F	W	F	W	F	W	F	W	F	W	F	W	F	W	F	W	F	W
	50	0	54	189	54	748	928	575	596	348	236	6	69	40	133	190	268	19	1889	871



enabled him to work longer hours on the development of the farm. Labour was again hired in the last three months of the year to help with coffee picking even though it can be seen from Table Two that both the farmer and his wife were cutting down on their farm labour at this time. It seems that the hiring of labour for this task is an accepted arrangement in this part of Buganda, one which is seen as a worthwhile way of purchasing liesure.

Table Three illustrates the diminishing amount of time spent by the farmer on visits to dukas as the year progressed and building improvements etc. were gradually completed. (See also Figures Three and Four). This is also reflected in the decreased amount of time spent on 'other activities' in the second part of the year, although time spent conducting visitors around the holding and on such tasks as coffee drying ensures a continuous use of some time on this series of activities. A new allocation of time arising from milk marketing can be seen in November and December. The farmers wife is seen to spend a growing amount of her time preparing food and doing housework, probably as a result of the house becoming better equipped (see the Household Expenditure Column of Table Four below). She also simultaneously managed to increase her farmwork contribution as her ties with her original holding were gradually cut as illustrated by the drop in hours spent visiting. An illness in July almost certainly prevented her from increasing her input of farmwork during this and earlier months.

Table Four. Household Expenditure 1968

Month	Food		Household goods		Fees, Taxes, Fares		Loans/Debts		Clothing Bedding		Misc.	
	Shs	Ct.	Shs	Ct.	Shs	Ct.	Shs	Ct.	Shs	Ct.	Shs	Ct.
Jan.	46	10	9	00	69	30	16	35	134	00	15	15
Feb.	50	45	35	00	39	00	-		31	00	4	00
Mar.	44	85	16	50	50	00	37	50	21	00	-	50
April	84	95	22	00	43	80	23	00	5	00	-	80
May	48	10	14	50	191	00	--		62	00	7	15
June	43	00	2	00	--		--		17	00	18	80
July	44	30	12	00	--		--		--		7	75
Aug.	55	10	120	00	18	50	--		18	00	7	00
Sept.	64	20	26	00	13	00	--		78	00	10	00
Oct.	44	20	20	00	5	00	--		88	00	7	00
Nov.	118	40	50	00	14	00	--		75	00	5	00
Dec.	120	50	--		40	00	--		95	00	6	00
Total	764	50	291	50	483	60	76	85	624	50	89	15

The proportions of the time spent on various activities by the farmer and his wife are shown in Diagram Six below. There is an interesting contrast between the way the farmer and his wife distribute their time. By far the largest proportion of the farmer's time is spent on farm work while the time spent on this work by his wife is almost equalled by the time she spends preparing meals. The farmer's next largest allocation of daylight time is for eating, drinking and resting followed by visits to friends and relatives. While the wife spent very little time on 'other activities', the farmer spent a significant percentage of his on this group of activities which include such things as household improvements, contacting officials, conducting visitors around the farm and supervision of the labour used to erect buildings etc.

Diagram Six.

Proportion of Daylight Time Allocated by the Farmer and his Wife to various Uses.

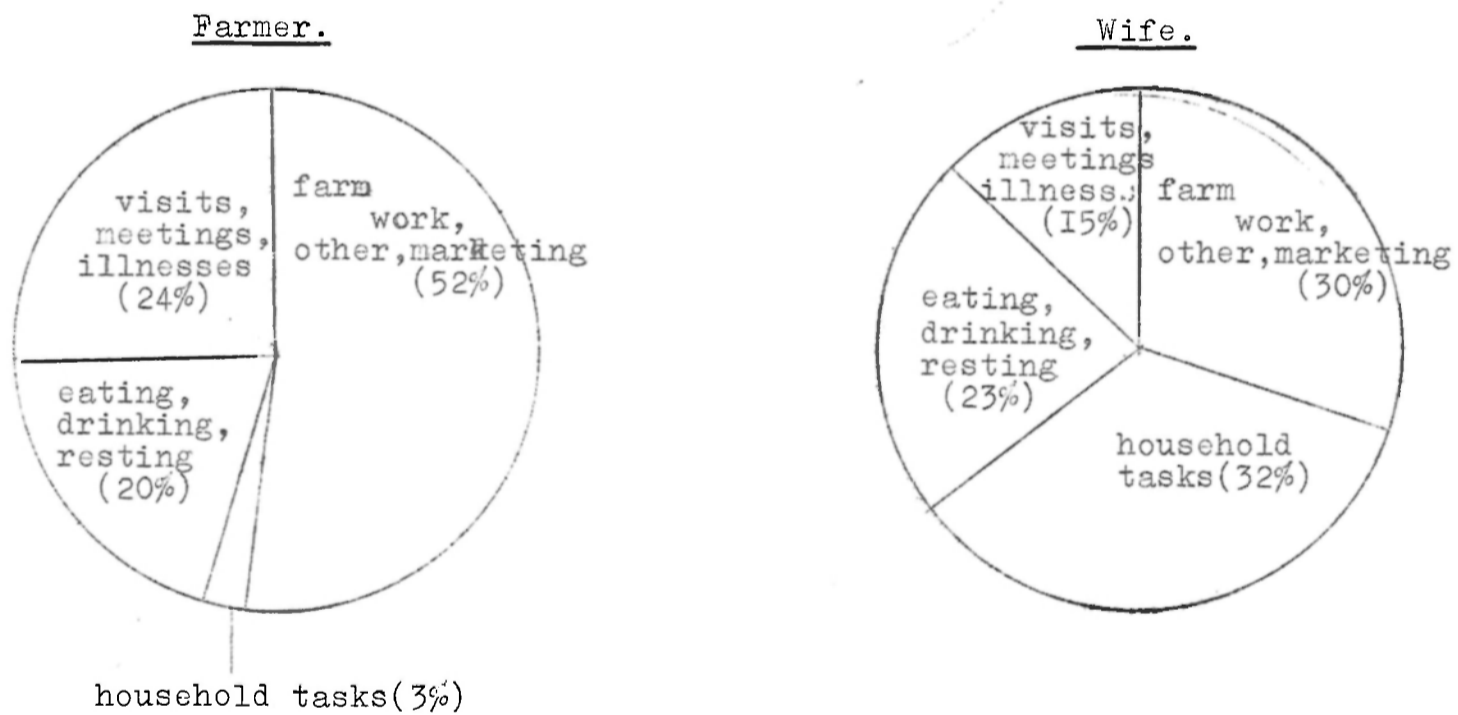
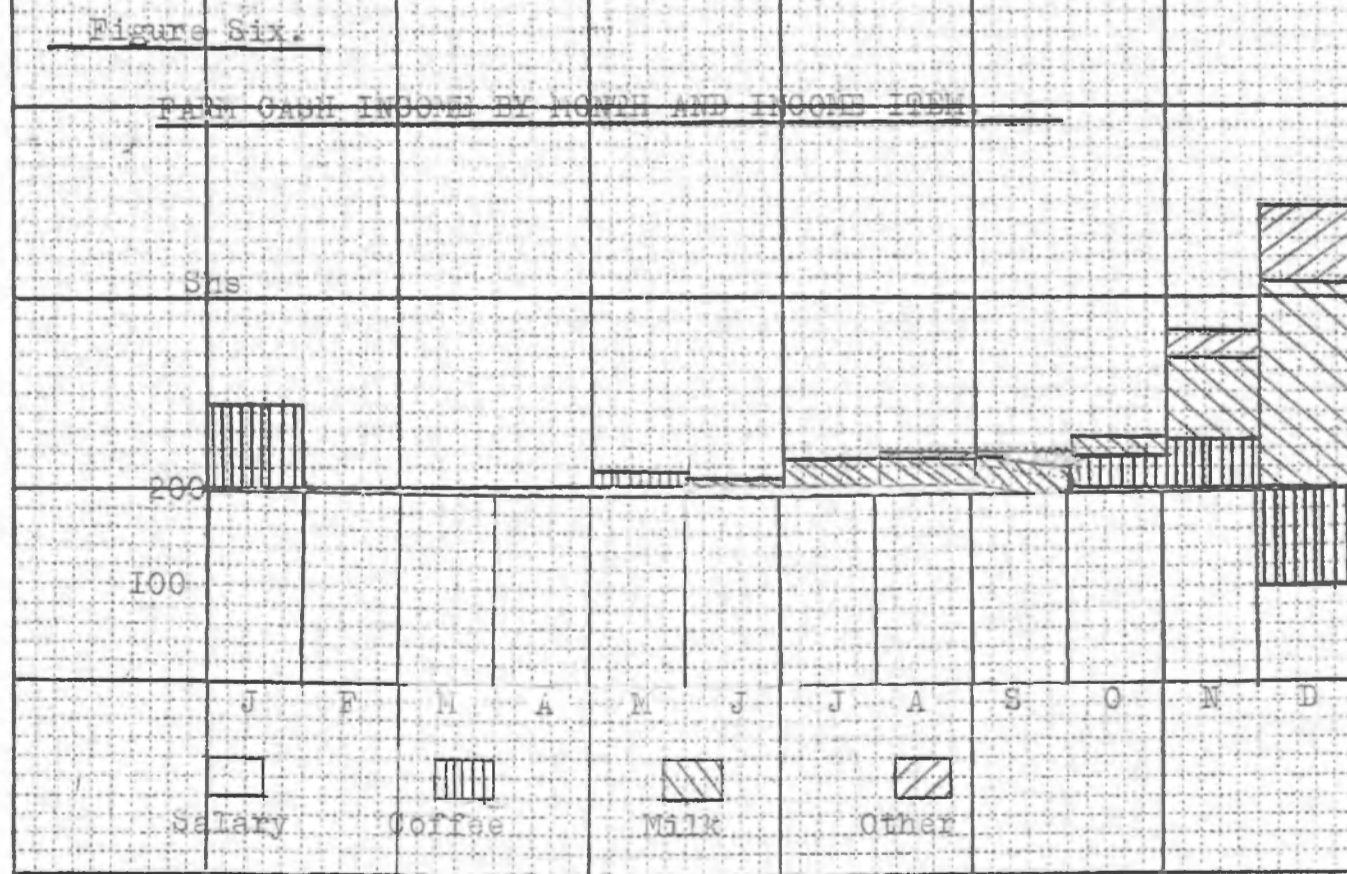
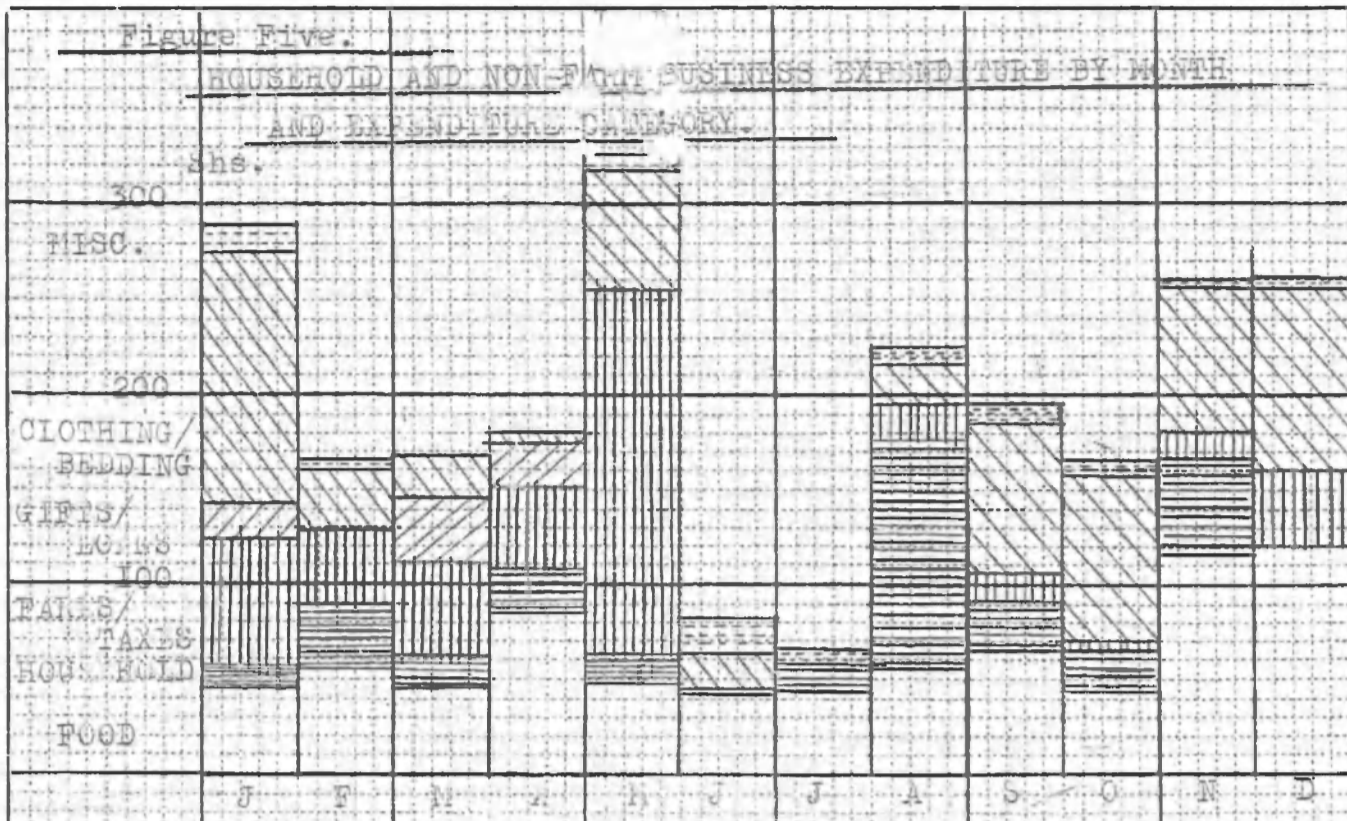


Table Five gives a summary of crop operations during 1968. This was compiled from individual crop summary sheets and example of which may be seen in Appendix Nine. This type of information sheet is essential for keeping an efficient summary of the information concerning husbandly techniques, the timing intensity and type of labour operations and details of crop yields from each plot. The information in the summary table is expressed in

Table Five Summary of Crop Operations 1968.
(labour and tractor inputs in hours per acre).

Crop/Plot	Land Preparation		Planting Labour	Manure/ Mulching Labour	Pruning Labour	Weeding Labour	Spraying Labour	Harvest- ing Labour
	L	T						
Coffee(8)	-	-	-	-	37	255	-	150
" (16)	-	-	-	6	48	165	6	175
Banana(12)	-	-	-	107	97	577	-	-
Cassava(15)	-	7.6	36	-	-	121	-	-
S.Potatoe(13)	-	6.6	100	-	-	53	-	53
E. Grass(10)	219	4.7	228	18	-	125	16	-
<u>1st Rains Crops.</u>								
Maize (9)	90	5.0	60	-	-	55	5	25
Beans (11)	-	2.6	36	-	-	-	8	16
<u>2nd Rains Crops.</u>								
E. Grass/Maize								
Beans (9)	30	2.5	75	-	-	50	-	5
Beans/ S.Beans(11)	-	-	58	-	-	108	-	-
National E. Grass/ Beans (14)	-	1.1	34	-	-	27	-	11
S.Potatoes(5)	-	7.6	210	-	-	-	-	-
E.Grass/ Maize (7)	216	6.2	157	-	-	94	-	-
Veget- ables(17)	936	-	210	-	-	372	72	60



per acre terms. The very high labour expenditure involved in re-habilitating the moderately neglected banana plot should be noted. The vegetable plot at the swamp edge consumed even more labour per acre over a much shorter span of time. Most of this was probably a once and for all development expenditure, but the high weeding inputs suggest that the production and marketing of vegetables needs to be very carefully studied and planned in order to produce an attractive return to the labour involved. The elephant grass (pennisetum purpureum) established after neglected coffee in Plot 10 (in the first rains and Plot 7 in the second rains took an average of 217 hours of labour and two tractor operations per acre to prepare the ground for planting and the planting operation required an average of 193 hours of labour per acre. The labour inputs for other crops may be slightly misleading as the method of husbandry employed seems to be dictated by the farmer's future plans for the plot. Examples of this are afforded by details of Plots 9 and 11 where the labour inputs on the maize and bean crops are very low indeed, the beans were not even weeded. Both plots were subsequently planted to elephant grass in the second rains and it would seem that the first rains crops were grown as catch crops after the late arrival of the tractor had precluded the growing of really good crops and the ground was not considered to be free enough from weeds to plant elephant grass. The same considerations often apply to different operations carried out on separate plots of the same crop. For example the two sweet potato plots 13 and 5 show a wide divergence in the input of planting labour, but a glance at the subsequent weeding figures shows that the more intensively prepared plot was not weeded whereas the other was (it could be argued that this was caused by the longer time period of this plot but weeding should only be necessary before the foliage spreads). Returns to labour for the majority of the crops grown would have little meaning as most of the labour was of a long term developmental nature, some crops were only catch crops and the sweet potatoes and cassava plots have not been fully harvested. The input data will be very valuable, however, in making assessments of the profitability of the holding and the individual enterprises after these have matured.

Tables Six and Seven and Eight give details of the household and farm expenditure of the smallholding and information on farm and other sources of income. Figure Six illustrates the build-up of income as the year progressed. During the first few months, the Shs.200 paid to the farmer was almost his sole source of monthly income. When income rose at the end of the year, the

Table Six.

Cash Income from all sources:-January- December 1968.

Month	Coffee	Vegetables	Other crops	Milk	Salary	Gifts	Total
	Shs.	Shs.	Shs.	Shs.	Shs.	Shs.	Shs.
Jan.	85	-	-	-	200	4	289
Feb.	-	-	-	-	200	-	200
March	-	-	-	-	200	-	200
April	-	-	-	-	200	-	200
May	15	-	-	-	200	-	215
June	-	-	-	6	200	-	206
July	-	-	-	30	200	-	230
August	-	-	9	30	200	5	244
Sept.	6	-	-	33	200	-	239
Oct.	38	-	-	19	200	-	257
Nov.	54	25	-	76	200	-	355
Dec.	<u>100</u>	<u>75</u>	<u>-</u>	<u>216</u>	<u>100</u>	<u>-</u>	<u>491</u>
Total:	<u>298</u>	<u>100</u>	<u>9</u>	<u>410</u>	<u>2,300</u>	<u>9</u>	<u>3,026</u>

Table Seven.

Development Expenditure.(Money Provided on a Loan Basis).1968.

Item.	Shs.	Cts.
Cowshed(materials + labour)	611	80
Crush " "	30	00
Fencing " "	400	00
Clearing couch(lumbugu)tractor/labour	400	00
Miscellaneous Tools & Equipment	267	00
Water Tank	450	00
Cow Transport	70	00
Cow Concentrates	38	00
Purchase of Nganda/Jersey Cow	<u>700</u>	<u>00</u>
Total	<u>2,926</u>	<u>00</u>

Table Eight.

Farm Expenditure Incurred by the Farmer. 1968.

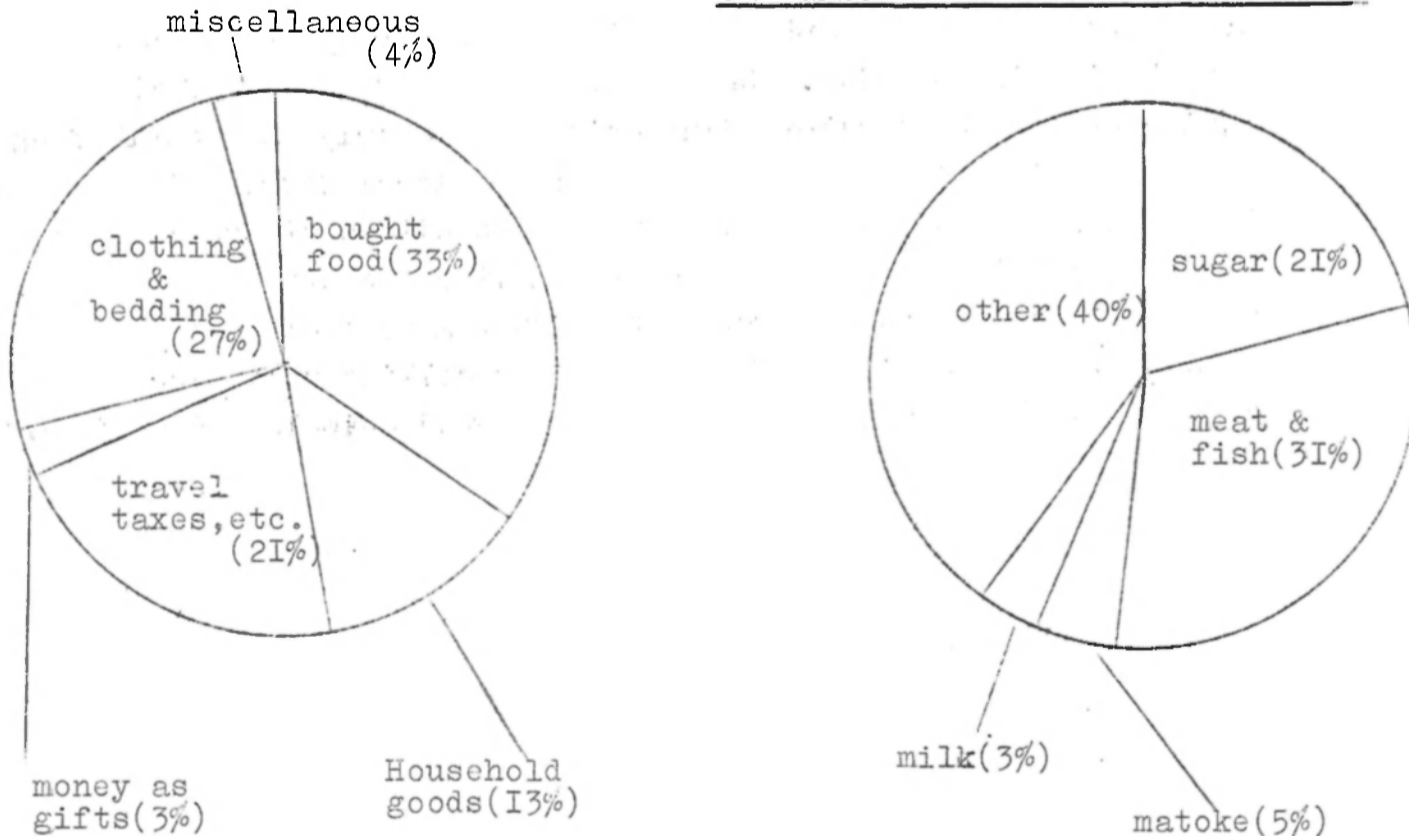
Item	Shs.	Cts.
Dairy Feed	85	00
Poultry Feed	24	00
Hired Labour	<u>243</u>	<u>00</u>
Total	<u>362</u>	<u>00</u>

payment was reduced to Shs.100 per month and will be further reduced to Shs.50 on the arrival of the second dairy cow in the first rains of 1969. The remaining payment is not a subsidy but rather a wage paid to the farmer for keeping detailed records. On the arrival of the second cow it is hoped that net monthly income will average around Shs.500 per month and it is hoped eventually to keep three cows on the one and a half acres of elephant grass. This would have to be intensively managed with heavy dressings of a compound fertilizer in addition to applications of **nitrogen** and if the area proved to be too small, consideration would be given to uprooting most of the coffee below the home-stead or to utilizing some of the food crop land. Vegetable sales will form an increasingly important part of farm income and coffee yields should rise dramatically in the coming year.

Although the planned increase in matoke acreage will have little effect on cash income, it will cut down on food purchases which can be seen in the ^{diagram below} to account for a substantial amount of cash expenditure.

Diagram Seven.

Proportion of Total Household Expenditure Allocated to various items and Proportions of Food Expenditure on various Classes of Foodstuffs.



A large proportion of the total household expenditure shown in Table Four should disappear in future as it was made up of food purchases and expenses incurred in setting up a new house.

Similarly the farm expenditure should be reduced and its pattern altered as much of the development expenditure will have been incurred. It is important to note however that most of the development expenditure was incurred by the Department of Rural Economy on behalf of the farmer and that this will be translated in the form of a loan to take effect in early 1969 after a one year moratorium. This will entail the farmer paying about Shs.35 interest in the first month and 1% per month (12% per annum) thereafter in interest on the diminishing balance of the loan. A greater expenditure on cow concentrates and fertilizers is also to be anticipated. It is felt that the expenditure figures concerning the setting - up of the dairy enterprise are particularly valuable as details are now available on the timing and level of cash and labour expenditures concerned with initiating an enterprise which, at least in the short run, forms the most attractive avenue for farm diversification in the area. The timing can, of course, be altered as some farmers would prefer to commence with pure Nganda cows and upgrade their herd slowly through the use of the government A.I. service and exotic semen. The purchase of the water-tank could also be criticized as premature, and an item which might best be acquired when income was flowing in steadily. On the other hand, the rest of the equipment and the stall-feeding unit could fairly be described as low cost and well within the range of the local farmer with access to credit. The total development expenditure of Shs.3,000 is not an excessive amount to grant to limited numbers of able farmers in the region and it is felt that many could raise a substantial proportion of this amount by selling their local stock before embarking on the purchase of improved animals and equipment.

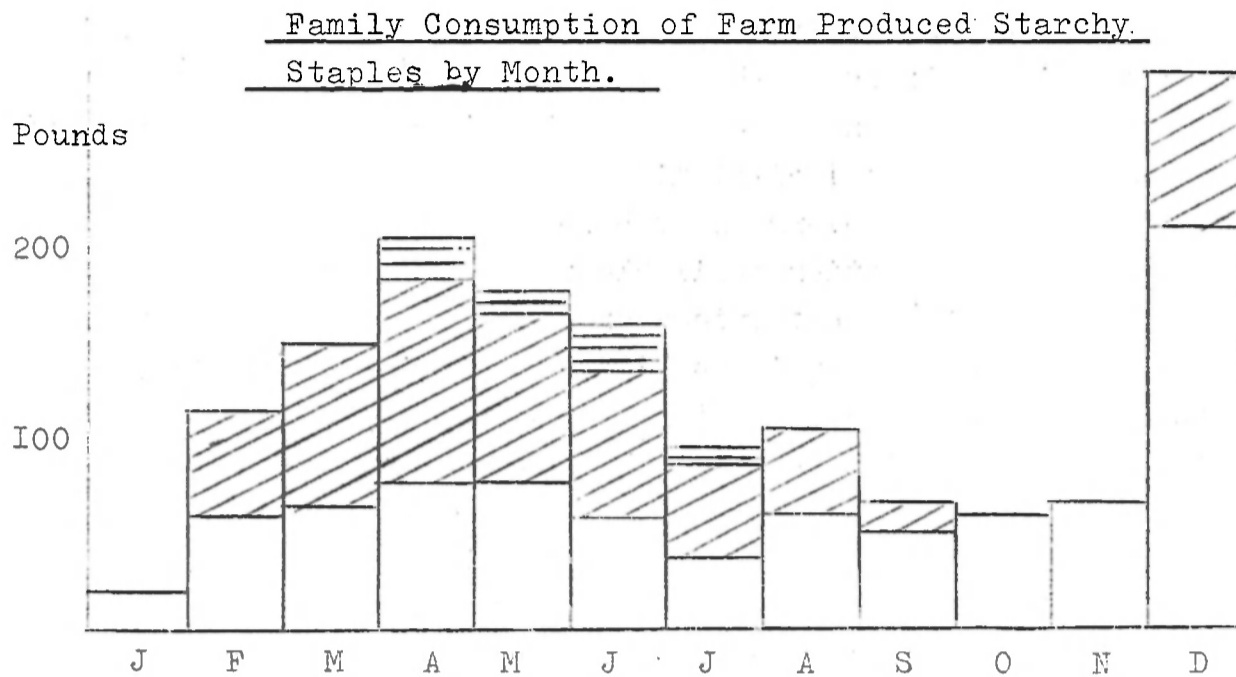


Figure Five illustrates the monthly consumption of home produced starchy foods during 1968. Sweet potatoes, already planted when the holding was taken over, dominated farm-food consumption over most of the year, but only during the first rains does available food supply seem to have been anything like sufficient. The large supply of matoke in December may herald a recovery of the banana plantation and a cessation of the stealing which has been responsible for crop losses, but it may simply reflect the premature harvesting of large amounts for Xmas. In the 1969 records, the contribution of farm produced food to the family diet will no doubt be much enhanced and the amounts of matoke, sweet potatoe and yams eaten will increase and be supplemented by cassava.

4. Conclusion.

The experience of one year is too short to draw any substantive conclusions from the development of the smallholding but several indications of the value of the experiment have already been noted. The problems of the first year of development have focussed on several difficult areas including that of marketing, obtaining government subsidies and credit, the poor quality of the information available from the lower cadres of the government extension services and the heterogeneity of farm level variables such as soil quality, weed infestation etc. It has also forced a much greater awareness of the present flimsy empirical basis for farm planning. It was realized from the outset that information was very inadequate on returns to labour and land in the peasant farm situation, but the dearth of actual technical data was perhaps underestimated. It is now realized that fertilizer recommendations are based on incomplete data and that current fertilizer rates in use on nearby institutional farms are based more on guesswork than on experimental results. In the absence of adequate research it is almost impossible to decide on optimum fertilizer rates, let alone make decisions regarding the best level and timing of labour inputs. Another technical decision which is vital to the development of the smallholding but which must be made without the benefit of scientific evidence is that concerning the choice of rotation. At present the inclination is to rotavate the elephant grass stubble after about three years of cropping and to replant immediately. This sequence is often followed on sugar estates and should be feasible with elephant grass. The revitalization of such perennial crops as bananas and coffee is a further topic of extreme importance to the improvement of agriculture in the area but one which has been virtually ignored by research workers. It was decided by the smallholding committee to improve the run-down banana plot and the better coffee, but the best method for renovation in the circumstances encountered had to be chosen on a very shaky basis of guesswork and experience and it might turn out that it would have been better to eradicate the neglected crops and to start from scratch.

The huge gaps in the necessary scientific data for farm planning create a temptation to experiment on the smallholding. While many farmers carry out limited trials, it is necessary to refrain from turning the smallholding into a miniature and highly deficient research station. A better approach would seem to lie in the direction of interesting all the disciplines represented in the Faculty of Agriculture in the problems of smallholding

development in the area and to draw vigorous attention to the present defective research position.

One other dilemma associated with the future development and use of the smallholding is that connected with its extension function. It is extremely important to make the fullest use of every facility available for agricultural development and it is extremely tempting to advocate the use of the smallholding for all-out extension purposes. Several dangers are courted by this approach however. The most important of these is that the holding will lose its identity as a unified business designed to give the best possible living to the farm family and that the farmer will increasingly take on the primary role of extension agent. It is suggested that the major extension function of the farm is to demonstrate, as an entity, the improvement path which can feasibly be followed by a large proportion of ordinary farmers in the neighbourhood. A limited number of demonstrations could be carried out on the holding as long as they did not interfere with the day to day running of the farm, nor damage its identity as a family business unit, but the main purpose of the smallholding should remain to demonstrate a continuous process of improvement through superior management and other improved inputs.

The research and extension dilemmas could be ameliorated by the organisation of a further number of smallholdings where different methods of running the same enterprises and different combinations of enterprises can be inaugurated. A later stage in the programme could consist of the initiation of 'Borgo type', extension efforts based on the findings of a series of matured, well recorded and adequately analysed smallholdings. It is, perhaps, premature to talk of such plans which must depend on the successful evolution of a series of smallholding embodying different resource situations such as limitations on credit, various land: labour ratios etc. At the present stage it should be stressed that the holding is designed not so much to evolve orthodox planning data as to illuminate the constraints which are so often overlooked by the desk planner. However the most immediate constraint seems to be the lack of even the most elementary managerial or technical planning data. The initial development of the smallholding has truly been an example of planning without facts. It remains to be seen whether, when the holding is theoretically re-planned with the benefit of management data which should shortly be available from survey results, the planners in the dark stumbled very far from the correct path.

APPENDIX I.

	Date	
	Plot	
	OPERATION	
	Time	
	Wife (Wives)	FAMILY
	Other Adult Males	
	Other Adult Females	
	Children	
	Regular	HIRED
	Casual	

APPENDIX 7.

F.F.M. NUMBER

HOUSEHOLD AND NON - FARM BUSINESS

EXPENDITURE

Week

Month

Year

Food bought for family use. (Plus fuel, milk, sugar salt, etc.)		Drink & Tobacco (manufactured of local give type)		Produce bought for resale e.g. sugar, & posho for brewing. Purchases connected with other business		1. Household goods. 2. Building improvements.		School fees, taxes fines, dowry, medical expenses taxi & bus fares, social payments & church fees		Money lent to others. Debts repaid. Cash gifts to others (state to whom & for what purpose.)		Clothing Purchases & Bedding		Miscellaneous	
ITEM	\$s ct.	ITEM	\$s ct.	ITEM	\$s ct.	ITEM	\$s ct.	ITEM	\$s ct.	ITEM	\$s ct.	ITEM	\$s ct.	ITEM	\$s ct.

TOTAL

APPENDIX 9.

Labour and Harvesting Record (Actual Inputs)

F = Hrs of Family Labour H = Hrs of hired (or communal) labour
 O = Hrs worked by an Ox-Team T = Hrs worked by a Tractor

Operat- ion Month	LAND PREPARATION												Yield (Describe Crop and Condition)									
	Clearing Bush			1st Digging (or plough- ing)			Planting or Sowing		Pruning		Manure Mulching Fertilizer			Weeding Thinning		Spraying	Harvesting		Sorting Shelling		Marketing	
	F	H	T	F	H	T	F	H	F	H	F	H		F	H	T	F	H	F	H	F	H
Jan.																						
Feb.																						
March																						
April																						
May																						
June																						
July																						
Aug.																						
Sept.																						
Oct.																						
Nov.																						
Dec.																						
Total																						

Harvesting Condition, Must be Entered with a Code Letter(s):- W = Wet Fresh etc. e.g. Matoke, S. Potatoes, Coffe Cherry etc.

Comments on Plot Mention any Crop Failure, Disease, Pests etc. also any thefts etc.

D = Dried e.g. Dried Cassava, Kiboko etc.
 U.S = Unshelled or In head e.g. Beans in Pods, Sorghum in Head, Maize on Cob, etc. You can have W/U.S. wet unshelled or D/U.S. Dry Unshelled.
 S = Shelled or Threshed. You can also have W/S and D/S.

Cash Costs:	Item	Shs.	Cts.
1)			
2)			
3)			
4)			
	TOTAL		

APPENDIX 9 (Continued)

i)
Crop(s) ii)
iii)

Plot Summary Sheet

Rains ← First
 ← Second
 ← Whole Year

Farmer's name: _____

Date: _____

- 1) Number of Plot
- 2) Area (sq. yds.)
- 3) Main Soil Type (In Vernacular)
- 4) Number of years cropped since Rest or Virgin Forest (circle which one) ____ years
- 5) If after Rest, how many years was land rested _____ years.
- 6) Enter the crops grown in the previous 3 years in this plot (if mixture give all components).

1st Rains

2nd Rains

196

196

196

7) Crop(s) 1)

2)

3)

8) State amount of seed used for each crop (1) _____ lbs. (2) _____ lbs.
(3) _____ lbs.

9) Was the seed sown in lines or broadcast.

10) If in lines what spacing was used _____ feet between rows and _____ inches between plants.

11) If Sweet Potatoes or a perennial(s), how many plants/trees in the plot. (Give variety and number if bananas).

(1) (4)

(2) (5)

(3) (6)

12) Enter the names and numbers of any useful trees or plants in the plot

13) Was any crop sown more than once (give details) _____

14) If a mixture, give the sequence in which each crop was sown and the interval between sowings.

(1) _____ (interval)

(2) _____ (interval)

(3) _____ (interval)

15) How many times was the plot weeded (a) Hand only _____)
(b) Jembe (shallow weeding) _____) Number
(c) Jembe (deep weeding) _____)

16) How many times was the plot sprayed _____ What was the Spray _____

17) Was the plot mulched _____ Give details _____

18) How many weeks did harvesting last (if harvested separately give separate times (1) _____ wks (2) _____ wks (3) _____ wks.

19) Give details of fertilizer or manure applied including quantity _____

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