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FARM MANAGEMENT UNDER THE IMPACT OF URBANISATION AND
INDUSTRIALISATION IN THE JINJA AREA. HYPOTHESIS, FIELD
WORK, SOME IMPRESSIONS AND NOTES.

Now as the field work is almost finished I would like to present a draft of the study. I will give a somewhat generalized hypothesis, a short summary of the work done, a discussion of the methods applied, finally some preliminary impressions and some notes concerning the problems in later planning.

At the present stage a thorough discussion of research methods applied in the field should be of most practical value.

As you can see from the title I refer only to the Jinja area. I am well aware of the fact that research in other regions may have its own problems as to methods applied.

This paper is not an original one in the sense that I have invented any of the described methods of field work. They were known long before. But its use may be that I have tested them in the field and that I can speak with the "experience" of one year's intensive field work.

A Hypothesis.

Farm-management as an activity could be defined as a current allocation of a farm's resources to technically practicable agricultural production activities and the change of the capacities of these resources in the course of time with the aim to maximise the subjective welfare of the farm family.

For the so called developed countries the theory of the farm firm assumes that the only or main immediate aim of the farm family is maximisation of returns to capital, land and family labour. Therefore the theory of the location of agricultural production assumes that the town as the centre of demand for food stuff, raw materials, work and of the supply of means of production c.p. only influences farm management via varying factor- and product-prices which are a function of distance. In fact there this theory conforms sufficiently to the reality, although one must admit that allocation of resources varies considerably around the?

Does now, in the beginning of industrialization, agricultural production react so efficiently that the food supply to the town at optimal prices is guaranteed?

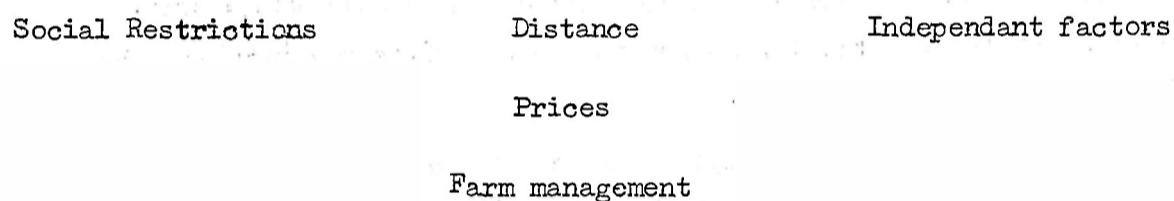
If not, which factors cause the frictions?

I introduced my hypothesis as a question which in its essence it must always remain.

I would like to divide the innumerable factors influencing farm management provisionally into the following main groups:

<u>Factors depending on the town</u>	<u>Social, educational and macro-economical restrictions</u>	<u>General independent factors</u>
Product prices Factor prices	Cash-Crop Prices (The rest will be defined by E. Gerken ¹ .)	Soil and climate Tribe Land Tenure Ratio $\frac{\text{cultivable area}}{\text{family labour}}$ Education Availability of credit Extension service

As a graph:



How far social restrictions are a function of distance must be found out by Gerken. This whole scheme is of course very rough and a first attempt to bring things into an order. It can on the other hand only be valid in the short run. The kriteria of farm management, that is under these conditions mainly the allocation of land and labour, are the target variables of this system.

-Here I must admit to be a bit perturbed at being involved also with a sociologist's problems:-

B. Extent. location and method of field work

I. Extent and location

The field work consists of following parts:

1. The mapping of farms
2. General questionnaire in two parts
3. Plotquestionnaire
4. Book-keeping

Parts 1 - 3 of the field work have been done in 200 farms. Daily book-keeping has been done over 6 and 7 months respectively in twice 20 farms out of the predominant size group (2-8 acres). It will be continued in the 28 most informative farms by the Faculty of Agriculture at Makerere University College under the supervision of Mr. M. Hall², for another 6 - 7 months. The data will be exchanged between us. In detail parts 1 - 4 have been done in the following villages:

- a. Buwenda-Mutala in Busoga, on the old Kamuli-Road,
3-5 miles from Jinja centre
52 farms
- b. Kibibi-Mutala in Busoga, between old Kamuli-Road the Nile,
12-14 miles from Jinja centre
70 farms
- c. Bugolo-Muluka 3-5 miles from Jinja across the Nile in the
south-eastern part of Buganda
53 farms
- d. Mpogo-Muluka 9-11 miles from Jinja in the same part of
Buganda near the Lake shore
23 farms

Book-keeping has been done on 20 farms each in Buwenda and Kibibi.

II. Method of field work

1. General Questionnaire

First Part

- a. Family structure
- b. Labour capacity of family
- c. Hired labour
- d. Time of settlement
- e. Fluctuation of landownership
- f. Land prices
- g. Education of owner
- h. Professional experiences of owner
- i. Development of farm organization
- j. Rotation**
- k. Yields of coffee and bananas
- l. Marketing frequencies and channels

Second Part

- a. Future plans of the farmers
- b. Attitude towards savings
- c. Attitude towards credit
- d. Private and farm capital
- e. Yearly expense of family
- f. Land tenure
- g. Sales of last week
- h. Influence of extension service

2. The mapping of farms

Maps of all 200 farms have been drawn to scale. This part of the study has been done very carefully, as on the one hand crop acreage is the only criterion of farm management that can be quantified without the farm's possibly inaccurate information and on the other hand as divisor has decisive influence on the accuracy of Input-Output data.

3. Plotquestionnaire

In this part of the study the age of perennial crops, the mixture of Crops interplanted, indications of rotation and labour intensity have been investigated.

4. Daily book-keeping

This has been done to get the labour capacities of the family members, Input - Output data as the other indicator of farm management as well as planning material, sales and purchases.

C. Some experiences and discussion of methods applied

I. Approach of the village

After having received clearance and having explained the study in the Saza - and Gombolola - Head Quarters, it is best to contact the Mutala-chief and Kisoko-chiefs directly without any further introduction from above. A village meeting should if possible be avoided. The opposition within the village must be overcome by "salami - tactics". If the farmers have the opportunity to formulate their suspicions and opposite points of view in public they stick to them and the progress of the field work is considerably delayed. As the field work proceeds it is necessary on the one hand to keep a good contact with the farmers, on the other hand one must be careful not to become too involved in the problems of the village. One of the main difficulties in this kind of research which has to continue over a longer period, lies in the complete lack of any concrete rewards for the farmer for the inconvenience the research is bound to cause him.

II. Enumerator - Problem

It is advisable to select the main enumerators very carefully. The most important quality beside intelligence and reliability is a good hand with people. A main enumerator should for the whole duration of the research stay in the same village or close in the neighbourhood of it. A change of enumerators inevitably brings a set back.

The recruiting of less qualified enumerators will be discussed later.

III. Problems of a random sample

Before setting up a sample frame one must start field work beginning with the chiefs. - After that they can hardly remain or develop as centres of opposition. - It is best to start with farm mapping which admittedly rises the fiercest opposition from the farmers. But once accepted it guarantees a relatively undisturbed progress. As soon as 10 or 15 farmers have received a copy of their farm maps, the suspicion is decreasing and by and by more farmers come to ask how big their farms might be. - Their interest in this question is a good bait. -

Then it is time to set up a sample frame together with the Kisoko or Bitongole-chiefs. - The Taxpayers' List is useless for quite a number of

reasons. - I find it impossible to start with a random sample straight away. If you do, you will at the least get a too high percentage of false information. In the extreme case the whole research could be ruined. This whole warming-up period lasts at least 3 months. If you have not got the time, the only remaining possibility is to draw a random sample from a volunteers' list. Whether this method causes a serious bias, I can not tell. I think it worthwhile to discuss what is preferable:

- a. to draw an exact random sample and run the risk of a high quota of false information
- b. or to cope with a possible bias and get a lower quota of false information

The outcome will of course depend very much on the aim of the study and the area you are working in.

IV. Farm mapping

A farm may be defined as that piece of land in one village, which in accordance with local land tenure is disposable to a family in the closer sense or that part of a family which forms a working as well as a consumption unit. Actually it occurs fairly often that a farmer has another block of land in another village which is farmed by one of his wives. It is however difficult to handle these two pieces as one unit.

In the Lake shore area of Uganda, without a doubt the best method of measuring is the triangulation method with a measuring wheel, if the study is dealing with a large number of farms.

A well-trained enumerator together with a "wheel-man" can measure and draw to scale a 5 acre farm within 3 hours of pure working time, in one day approximately 1.5 farms of average size (4 - 6 acres). The error in this type of measuring should prove to be well under $\frac{1}{2}\%$ on farms under 10 acres, if an accurate cross-check for instance by an airphotograph could be made. On larger farms the error tends to be greater, as it becomes more difficult to run diagonals over a longer stretch of bush, coffee or bananas accurately. A substitution of the wheel by a chain certainly diminishes the error but much more time and manpower is needed. - These maps are then copied onto thin standardized cardboard, the acreage is calculated by weighing the cut out plots on a fine balance (mg. -scale) and multiplying the weight with a transversion factor. Error in cutting and paper stays within $\frac{1}{2}\%$. Especially as a high proportion of the plots has a totally irregular shape, much time is saved hereby. ^x

A plot is defined by:

- Crops grown
- Age of perennials
- Date of planting of annuals

^xThis method was suggested to me by Dr. G. Lorenzl

Percentage of components interplanted
Quality of cultivation
Place within the "rotation"
Position on the hill-profile

-There is an almost linear relation between plot number and total acreage of the farm up to approximately 8 acres' farm size. There are on an average 3 plots per acre. On larger farms the function tends to be asymptotic. -

It is best to build up a farm map plot by plot. There by one plot serves as a cross-check of the other. At the end some checks across the whole farm must be run. The other way, getting the circumference of the farm first and then filling in the plots brings especially on larger farms more inaccurate results.

It happens often that the farmer conceals a second or third block in the same village during the first measurement. In most cases this can be found out by a comparison of crop-acreage and family size or just by listening around, 12 - 15% of the farms in the Jinja area have more than one block in the same village.

V. General Questionnaire

The general questionnaire should be short and clearly classified. As we are mainly interested in quantitative data, I think that the sociologist's approach with a psychologically frictionless sequence of questions is not of very great importance. After ten interviews the whole village anyway knows what you are after. The most important thing in this part of the work is the personality of the enumerator and his ability to handle the farmers.

VI. Plotquestionnaire.

This is the most tedious and monotonous part of the work. After only a short period the enumerator will try to cheat you. Strict cross-checks are necessary. I have come to the system of paying the plot-enumerator during the current research 3/5 of his salary and keep back 2/5 as an insurance until the work in the village is finished.

VII. Book-keeping.

This is apart from the measurement the core of every farm management research and therefore it may justify a longer discussion. As I have done this part of the research only in Busoga it may be that many methodological observations are only valid for this area. - As the methods of field work must necessarily vary with the area under research. -

Book-keeping in a random sample is not feasible. Farmers and enumerators must be selected very carefully, so that a continuous flow of information as close to the truth as possible is guaranteed for a long period. This is only possible in a well-planned and supervised case-study.

Thereby must be observed:

1. The book-keeping farms must not be isolated in the village
It is necessary to concentrate them.
2. As enumerators only boys of the same village or even the same part of the village should be selected. After a proper training a P8 boy can do the work satisfactorily.
3. If possible the boys should work on the farms of the fathers, friends and relatives. Firstly this guarantees the farmer discretion, secondly the people are interested in helping the boy keep his job.

The Book-keeping asks for:

- a. Daylight activities and labour-inputs by working persons and plots.
- b. Output by plots
- c. A rough disposal of produce
- d. Expenditure

Every farmer and enumerator gets a copy of the farm map. Every enumerator is equipped with a spring balance. The daily interview takes approximately 1/2 hour per farm. The data of the previous day are asked for. One enumerator should deal with not more than three to four farms, so that the danger of cheating is diminished. It is necessary to measure the farm 3 to 4 times a year, as there is no strict rotation and therefore the plot boundaries vary considerably within one year.

A strict control on farm-level is very difficult, as frequently shown suspicions will spoil the co-operation. The only feasible and most effective way of controlling is without doubt the running summation of incoming data. If then mistakes are pointed out to the farmer and the enumerator, the incoming data will easily be improved. Naturally most lies occur in the data concerning the sales. Who is after all willing to reveal his cash income? Expenditure exceeds admitted sales by approximately 20 - 30%.

-For this reason, in the general questionnaire only the expense as a measure of market integration has been asked. - Labour-inputs are fairly accurate, but outputs are difficult to get with sufficient accuracy as the products often come from the field into the pot in small portions at different stages of growth.

Without doubt the lack of accurate out-put-data will be the bottleneck of later farm planning as they firstly are very difficult to obtain, secondly time series over several seasons are necessary to cope with the variations resulting from climatological conditions.

VIII. Optimal approach.

If the research is conducted with the aim of obtaining planning data for a defined area, the research should be split up into three parts. In an extensive survey, if possible based on a random sample, an inventory of capacities should be made. Within this random sample an accurate case study of typical farms should be done to get a key for the labour-capacities of the different sexes and age-groups over the year and also to get a first impression of input-output data. The third part should be the collection of input-output data on plot level over several seasons, also if possible based on a random sample. The single-plot-approach should have the advantage that the farmer will give accurate information because he needs not fear that his total income will be revealed by the yields of one or two plots. A harvesting sample would give the most accurate yield-data possible except with Bananas, Sweet-Potatoes and Coffee. The third part of the survey could be combined with or substituted by the following method:

The labour requirements for the single operation of each farm activity by seasons could be found out by a relatively small series of accurate observations.² These observations based on a random sample would provide a key for the following investigations of input-output data. Later in combination with a broader harvest sample only the number of specific operations need be asked. By applying this method one would not need to measure the plot and the farmer would only have to be bothered 2 to 4 times a year. I am convinced that the last method properly organized and worked out should prove to be the most accurate, the least expensive and the quickest one. Furthermore it would be easy to repeat it in an established random sample.

D. Some first impressions - the banana problem.

B. Schubert³ found strong indications of a price-inelastic supply of bananas in the Jinja area. This was accepted with great reservations in the last term's seminar, as it does not fit into the theory of the highly elastic supply of peasant farming. In the Jinja area, as everywhere in the world, the natural conditions of production have the decisive influence on farm-management.

Mr. Schubert pointed out three main areas of banana supply:

- a. The extreme south-eastern part of Buganda in the triangle between the Nile and Lake Victoria.
- b. The area of Buganda between the Nile, Bugerere Road, Kampala Road and Mabira Forest.
- c. Budondo-Gombolola in Busoga.

In Budondo-Gombolola the Nakabango-Catena⁴ occurs, one of Uganda's most fertile soils. Here coffee blocks a large part of the acreage and of the family labour, especially in the main group of farms (2 - 6 acres).

^xThis method was first applied in american industrial production.

At the moment I can not give a proper reference.

On **this** soil coffee can grow well for a lifetime, banana yields however go down very quickly after 5 - 6 years. This means that bananas must be put into a rotation. If they are grown for a longer period, the average annual yield, the main criterion of profitability, will sink far below the optimum. As the families usually grow some minor crops for home consumption, there remains very little "long-time-fallow" after which to establish a new Lusuku. On the other hand the equilibrium between normal coffee and normal Matoke in terms of land is at the present Matoke price approximately given at a coffee price of 50 cents per pound of Kiboke. Even if the coffee price goes down the farmer will of course not run the risk of up-rooting his coffee. And a reallocation of labour will only be effective in combination with a good production technic (mulching) which is widely unknown or impossible because of the lack of mulching material. Similar conditions may prevail on the better Buganda-soils.

Area a. lies on a relatively poor soil, Kabira-Catena.⁵ Nevertheless it is the main area of Matoke supply for Jinja.

This soil is apparently marginal for coffee production. As a consequence there is not much coffee on the farms, and a lot of coffee-plots have been abandoned or some even uprooted. On the other hand there is a lot of fallow land on the farms, after which bananas can grow surprisingly well for 3 or 4 years in the sandy loams on medium and lower slopes. In this area therefore bananas obtain the place of coffee as the most profitable cash crop. As this area already seems to produce bananas to the limit of the restrictions, the elasticity of supply should also here be relatively low.

In the other parts of Busoga finally, the poorer sandy loams occur on which banana yields go down very quickly already after 2 years. Here a good crop of groundnuts followed by good cotton may bring more returns to land as well as to labour than a Lusuku, especially if there is not enough good fallow left on the small farms. Accordingly Mr. Schubert found only a minimal banana supply coming from greater Busoga to Jinja. There also some other reasons may be valid. Greater Busoga is isolated from Jinja by Budondo - Gombolola and Kakira - Sugar. Estate, which also is a big centre of demand. Further it could be that the traditional mindedness of the typical Busoga is an impediment of further market-production, which I doubt.

In this context another problem which already clearly can be seen in the Kampala-area should also be pointed out. On the one hand the rural population tends to migrate into urbanization areas to get a job in the town on the other hand the employees try to get a shamba near the town in order to reduce their cost of living - food and housing -. Thereby the farm sizes are cut down very quickly. The land tends to become overcropped which primarily results in a decrease in the Matoke supply, as Matoke must be planted after well rested land to give an economic yield.

Consequently the areas of Matoke supply are removed further and further away from the town. On poorer soils than those which occur in Buganda this phenomenon must have a disastrous effect on the agriculture. - In Jinja this problem will without any doubt rise in the future. Already now, 3 miles north of Jinja the average farm size is only 3 - 4 acres, whereas 10 miles further north, on the same soil, it is approximately 8 acres. In this context I do not intend to enter into a discussion on macro-economic advantages or disadvantages.

To formulate farm plans including integration of a productive fallow should later on be of some use for the Jinja area.

E. Some notes on farm planning.

If an agriculture is fully commercialized and prices are stable over a long time, farm planning is not of much importance, as in a lifetime or more of experience farmers have arrived at the optimum plan by a continuous process of trial and error. The farm systems tend to be stable and fairly uniform in different ecological areas. But when a period of quick price fluctuation and technical change comes it is necessary to abbreviate this trial and error process. In developing countries there arises the difficulty - which also exists to a lesser degree in the so called developed countries - of there being a number of social and educational restrictions which strongly tend to make a normative farm plan impracticable. Concretely a farm plan tends not only to reallocate resources according to changed prices, enterprises and production techniques to economic restrictions, but at the same time to seriously violate social and educational restrictions. If there was a stable price system in a developing country, the farming system without doubt would be at an optimum as to social and economical restrictions. Each proposed change towards mere profit maximisation must necessarily violate the social restrictions more or less. Even under the condition of varying prices these social restrictions tend to be violated as will be shown. To decide, how far they can practicably be violated in the single steps of development, is a clear task for the sociologist. In the course of application of linear programming and related methods of planning to local conditions among others the following difficulties and inconsistencies will arise:

The labour capacities of the family members could prove to be price elastic in the short run. It could be that for instance rising coffee prices result in an increment of family labour. But the programme must necessarily work with fixed labour-capacities and the total labour-input of the farm must be regulated by labour-purchasing activities as long as this question is not solved. It will be difficult to assess the capital capacities in a farm-development-plan and to solve problems according to reality. It is unrealistic to assume that a farmer will stick to a budget. The marginal rate of consumption tends to be highly elastic. The main danger of being normative however will lie on the capital side, as under present price conditions a farm development plan will lead to a highly labour intensive system wherein labour is purchased.

This hired labour must be paid regularly and this requires that the farmer will keep to a budget. Beside this type of social problems there arises a good number of technical problems.

It is from a point of data-collecting extremely difficult to verify curvi-linear input-output functions, which split up into a bundle of activities could be fit into a programme. This question is especially important as to the perennials, bananas and coffee, as they are the activities with the highest net price. It is important to know whether it pays to turn labour from coffee into bananas - on the same or a larger scale - and vice versa. With annuals I think it is more or less a question of all or nothing up to a modicum level of labour input at the present yields and prices. Once a minimum number of weeding have been done the marginal returns to additional labour-inputs must be low. - This whole problem seldom occurs in developed countries as labour-inputs tend to be fixed by mechanical production technics. -

Further it is very difficult to quantify the accumulative or decreasing effect of interplanting in a field study. Here lies a clear and urgent task for the agronomists. At present I think we can neglect it if only annuals are involved, except for instance the cotton-beans-or G.nuts-Sweet Potatoes mixture. With perennials it seems to be of great importance, especially the interplanting of an outrunning Lusuku or a Lusuku in the first year. Should one respect the time used for processing crops in formulating input-output-data? With the bulk of farms (2 - 6 acres) this would often be a serious mistake, as in practice this work is mostly done in connection with other extensive daylight activities such as for instance cooking or conversing. Drying coffee for instance is not even mentioned in the labour records. It may be necessary to diversify here, for instance one should neglect coffee drying but take partly into account cotton sorting. On the other hand this latter approach would be a serious mistake where larger farms or farms with a low labour/land ratio are concerned.

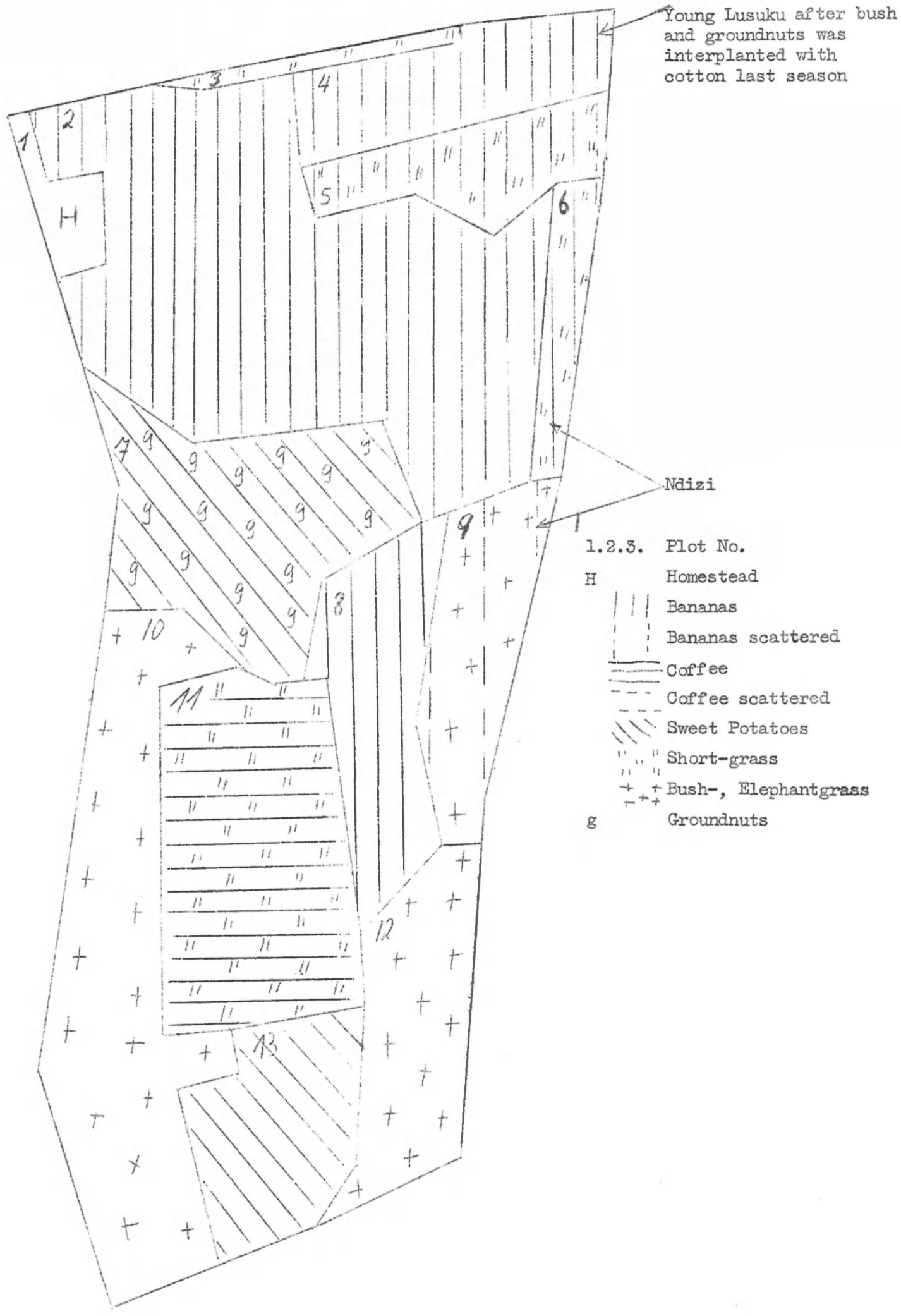
For the reasons given it seems inevitable to simplify the model in the beginning. Here the advantages of linear programming comes into bearing. By parametric programming one can in the face of uncertain input-output-data test the stability of a plan, which of course must be interpreted by a sound knowledge of respective local conditions. Also the marginal values of some capacities would allow for interesting normative conclusions as regards the co-operation with the sociologist.

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District: East Mengo
 Mutala: Bukubizi
 Date 2.3.'68
 Size: 4.82 Acres

Miluka: Bugolo
 Scale 1 yd= 1mm
 Enumerator Paul Bakunda



Young Lusuku after bush and groundnuts was interplanted with cotton last season

Ndizi

- 1.2.3. Plot No.
- H Homestead
- Bananas
- Bananas scattered
- Coffee
- Coffee scattered
- Sweet Potatoes
- Short-grass
- Bush-, Elephantgrass
- g Groundnuts

District: East Mengo

Miluka: Bugolo

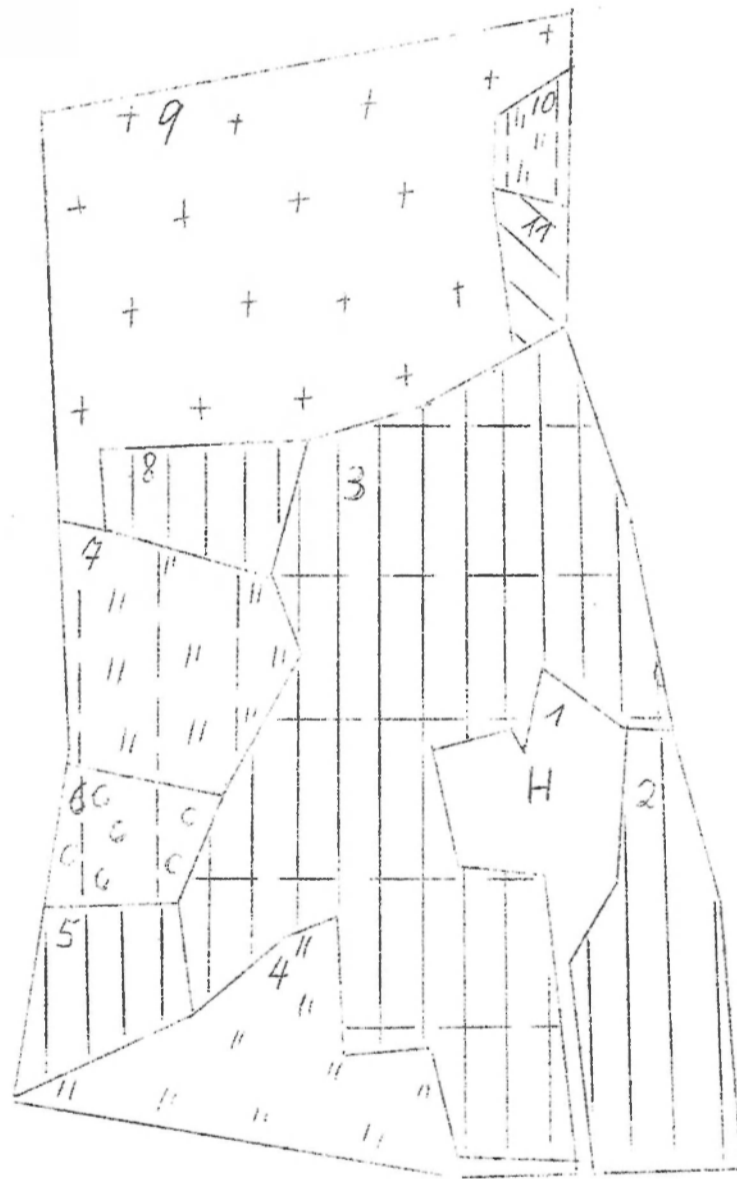
Mutala: Kikwanya

Scale: 1 yd = 1mm

Date: 14.2. '68

Enumerator: Paul Bakunda

Size: 2.20 Acres



1.2.3. Plot No.

H Homestead

|||| Bananas

- - - Bananas scattered

==== Coffee

- - - Coffee scattered

\\ \\ Sweet Potatoes

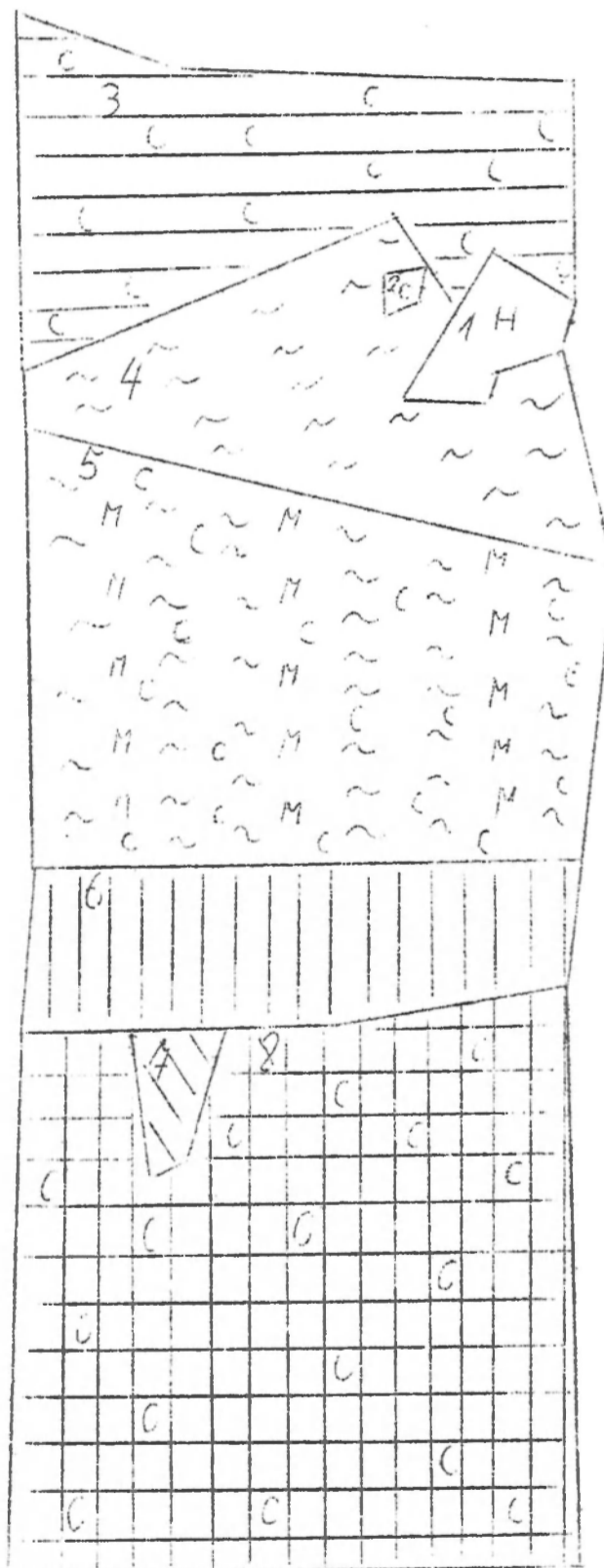
" " Short-grass

+ + Bush-, Elephantgrass

c Cassava

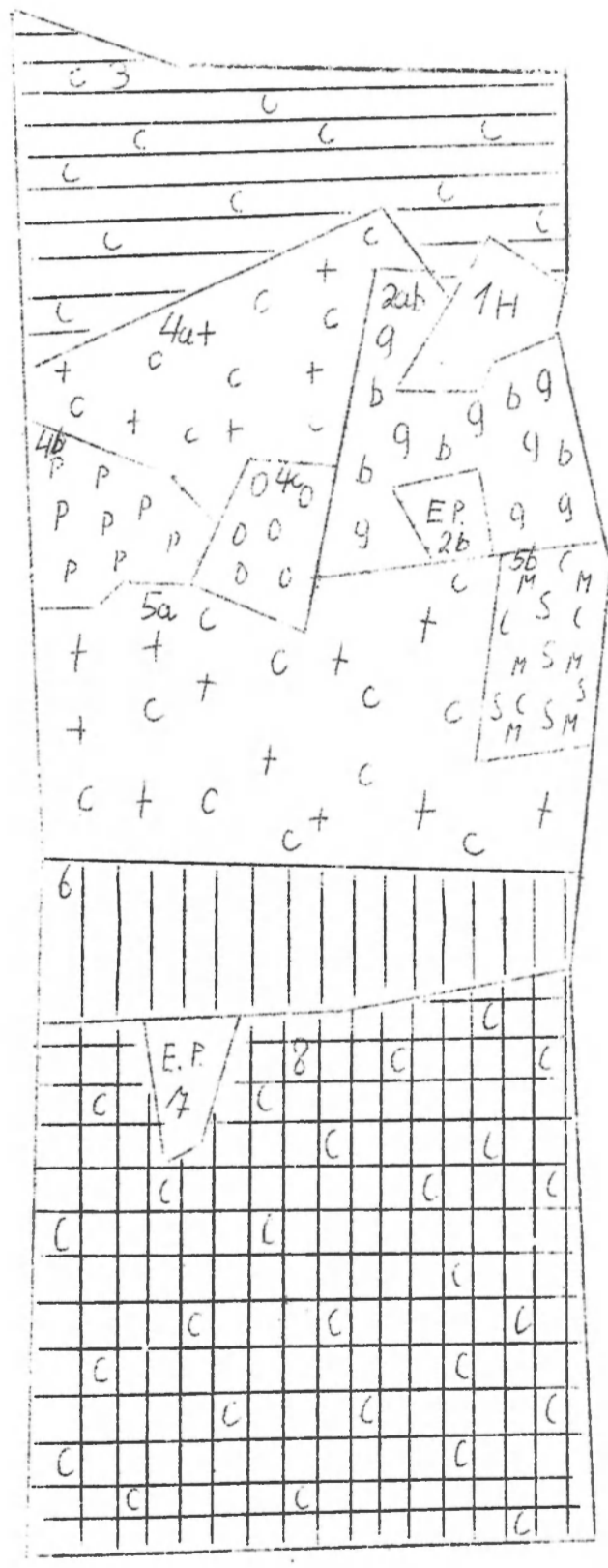
District Busoga
Mutala Kibibi
Date October '67
Size 3.27 acres

Gombolola Budondo
Scale 1yd= 1mm
Enumerator Stephene Basoga



District Busoga
 Mutala Kibibi
 Date June '68
 Size 3.27 acres

Gombolola Budondo
 Scale 1yd = 1mm
 Enumerator Stephene Basoga



- 1.2.3 Plot No.
- H Homestead
 - ||| Bananas
 - - - Bananas scattered
 - ==== Coffee
 - - - Coffee scattered
 - /// Sweet Potatoes
 - ||| Short-grass
 - +++ Bush-, Elephant grass
 - G Groundnuts
 - C Cassava
 - O onions
 - ~ ~ Cotton
 - B Beans
 - P Peas
 - E.p. English potatoes
 - S Simsim
 - M Maize

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