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PEASANT FARMING AND THE THEORY OF THE FIRM.

NOTE : **Rural Development Research Papers are written as a basis for discussion in the Makerere Economic Research Seminar. There are not publications and are subject to revision.**

INTRODUCTION:

The paper begins by looking at the decisions that face the farm firm, and at the early development of the theory of the firm. Objections by anthropologists to the use of this theory in primitive societies are considered and the economists methodology for dealing with these objections discussed. Further objections to the standard assumptions of the theory are enumerated, and suggestions made for a variety of constraints that could be built into standard farm management models.

The author wishes to thank Mrs. B. Brock and Mr. M. Hall who kindly spared time to read the draft of the paper.

Boulding (1955) defines a firm as an institution which buys things, transforms them in some way, and then sells them with the purpose of making a profit. Immediately certain problems arise when the firm under discussion is a peasant farm. It buys very little in order to transform it, in terms of goods; and the services of labour are usually 'unpaid'. The validity of the profit motive in peasant farming depends on the definition of profit.

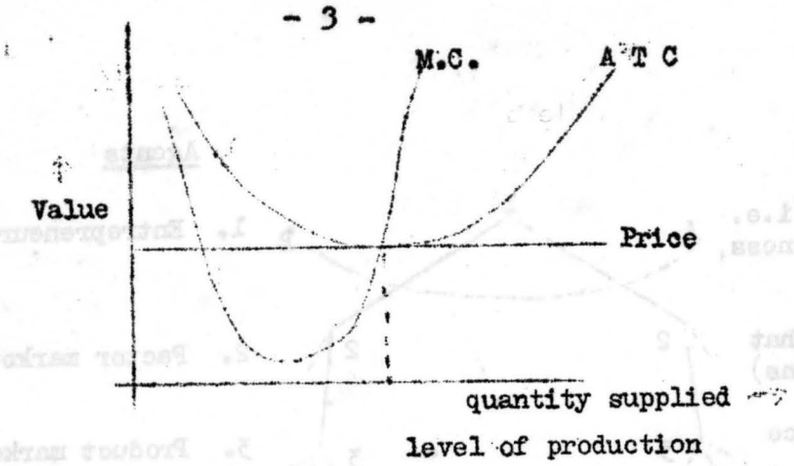
Among other characteristics generally ascribed to a firm are that it is a decision making unit (a managerial unit of production) and an individual economic unit.[1] Both these characteristics are only relevant in part to peasant farming systems. However it is also necessary to modify them before they can apply to modern business corporations. Economic theory and analysis need to be adapted to the type of economy under study.

Decisions facing the farmer in both peasant and more commercialised forms of agriculture or industry are in essence the same. These are the problems of the product mix - what to produce, and how much of each; the factor proportions - how to produce, when and by what methods ? ; and the distribution of the product - for whom to produce and where to dispose of production ? Formal economic theory can suggest ways in which these decisions are taken. Ways in which they may be taken more efficiently arise from the theory. It is a matter of some controversy as to whether formal theory has any relevance in societies outside those in which it developed.

Early Development of the Theory

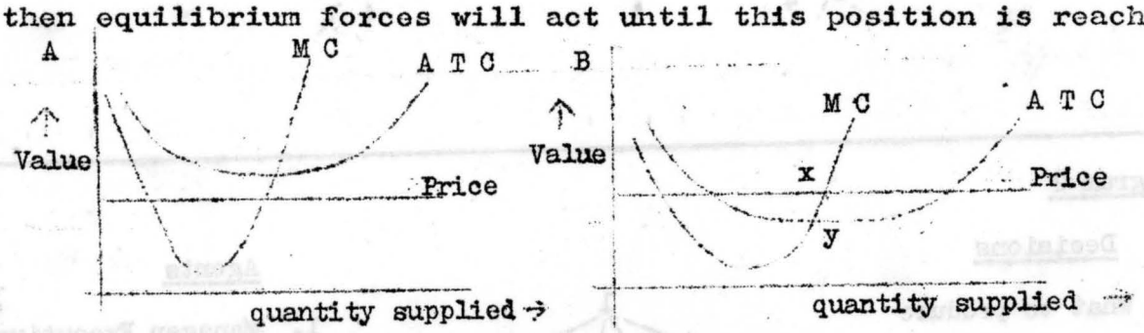
In classical economic theory the "firm" hardly exists at all. It is an aggregation of capital and labour rather than an organisation. Cournot (1838) was the first to develop the theory, but his work did not enter the main stream of economic thought until a generation later. Jevons (1870).Before this the firm was thought a of as a passive reactor to market events. The only decision made by the firm was "what to produce",. It was assumed that conditions of perfect competition[2] operated and using the concept of the margin all the other decisions were determined by the market . Diagram I. In other words the firm was forced to produce at a certain level, by a certain set of methods, and sell at a price unaffected by that firm, if it was to keep in business at all. Under perfect competition the price is constant to the individual producer whatever quantity he supplies. If he wishes to maximise profit in the short run, he is forced to produce where Marginal cost is equal to Marginal return and this will also equal average price.

I



If the position where MC = MR occurs where MC does not equal AC then equilibrium forces will act until this position is reached.

II



In case A since the average total cost is always higher than the price, people would be forced out of business, until the reduced supply brought an increase in price and position (I) was reached again. In case B the price received would be higher than the average total cost and abnormal profit XY would be made, encouraging people to enter the business until position (I) was again reached. Thus profits were forced toward the level of normal profit (that just sufficient to keep the firm in business) and the only avenue of escape was by innovation.

Under this simplified idea of forces acting on the firm it was relatively easy to decide where the optimum level of production came, i.e., the position out of the set of all possible positions for which the net revenue is maximum. However in agricultural production this position could be less easily defined, as the production function for any particular season cannot be forseen. The assumption of perfect knowledge is untrue, as is the assumption at least in part that there are an infinite number of buyers and sellers, so that no individual can affect the market. It is more true for the small agricultural firm or peasant farm than for industry, but even in farming it is usually only the buyer of inputs or the seller (i.e. the farmer) who exists in large numbers.[3]

However, as has been suggested previously; the individual producer may be able to affect the market by innovation thus gaining for himself a temporary monopoly advantage. In reality this situation exists the entire time, each new innovation giving its earliest adopters a monopoly advantage, while the later adopters gain no such advantage. Thus market limitations remain important but are not controlling. Diagram 2. This situation exists far more strongly in big

Diagram 1

Decisions	Agents
1. What to produce (i.e. what line of business to entre).	1. Entrepreneur
2. How to produce (what factor combinations)	2. Factor market forces.
3. How much to produce	3. Product market forces.
4. What price	

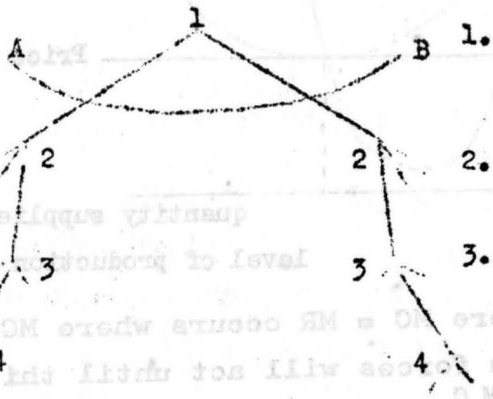
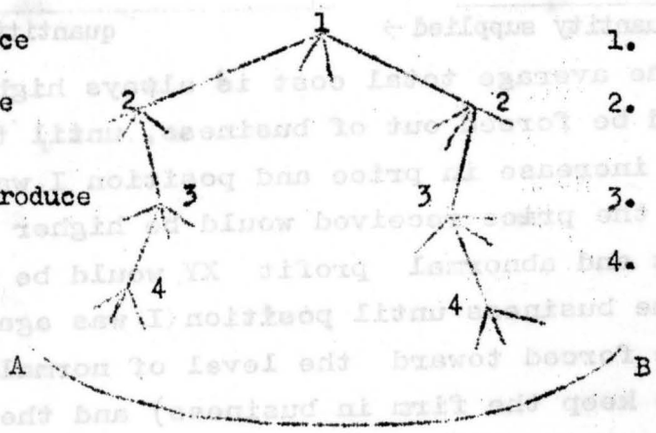


Diagram 2

Decisions	Agents
1. What to produce	1. Manager Executive
2. How to produce	2. Production management group
3. How much to produce	3. Sales management group
4. What price	4. General management group.



Source: Sherrill Cleland: "A Short Essay on a Managerial Theory of the Firm". In Boulding & Spivey 1960.

business enterprises than in small peasant farm firms, but the assumption of perfect competition is unrealistic in both.

Economic theory was thus developed to incorporate systems where imperfect competition was the rule. Under conditions other than those of perfect competition, however it is impossible for a producer to know either the price level or the production function, and thus although it would still be best for him to produce at an output where MC = MR, he cannot decide where that level of production lies. His own level of production and that of his competitors will affect the price and possibly the other costs involved. Thus as a theory which was developed to represent actual behaviour the maximisation theory suffers from the serious defect of failing to consider the information available to the decision maker. A theory which assumes knowledge of what cannot be known is clearly defective as a guide to actual behaviour. If a firm cannot know what is its marginal costs and marginal revenues are it is useless to advise it to act so as to bring them into equality. Under imperfect markets we are not only uncertain as to the future, but we are uncertain even as to the present parameters of the market functions. Linear Programming game theory, and organizational theory are theoretical developments which attempt to solve these problems of decison-making under conditions of imperfect knowledge. The first of these will be discussed later.

Objections of Anthropologists.

Apart from these objections to marginalism, there has been much criticism of the concept from some anthropologists. They have objected both to the assumption that all behaviour connected with the peasant farm firm was motivated by a wish to maximise profit, and also to the assumption that a value could be attached to goods and services not normally valued in non-monetary societies.

There is a large volume of literature by both anthropologists and economists dealing with the applicability of formal economic theory to primitive economies.[4] This includes some discussion on the theory of the firm and its relevance to peasant farms.[4] Peasant farms are usually considered to have entered the money economy at least to some extent and therefore do not fall into the area of fiercest battle. However, if economic theory is to be applied usefully to even this form of economy, a broader view of important variables and resources must be taken.

The writings of Polanyi(1947, 1959) and Dalton (1961) express their view that economic theory is not applicable to primitive society. Much of what they say is sound, but the latest developments in economic theory, to some extent invalidate their basic

objections. Dalton tends not to consider contribution to the economic literature subsequent to those of the founders of Neo-classical theory; several supporters of the universal applicability of basic economic theory. (Burling1962, Scott Cook 1966)

Scott Cook (1966) feels that some anthropologists are unable to see the applicability of economics because they wish to idealize the primitive. For instance Polanyi (1947) describes a (Utopian) model of primitive society which minimizes the role of conflict, coupled with a model of man which emphasizes innate altruistic co-operative propensities while playing down self-interest, aggressiveness and competitiveness. He feels that modern trends should be reversed so that man can "recover the elasticity, the imaginative wealth and power of his savage endowment". Herskovits(1952) however, gave support to the view that it is lack of knowledge about the latest developments in economic theory which prevents some anthropologists from acknowledging the applicability of the theory to primitive societies. He originally supported Polanyi and Dalton, but changed his attitude because of :

1) new ethnographic data about the economies of non-literate, non-industrial, non-pecuniary societies which convinced him of the univesality of the concepts and principles of economic theory.
2) increased knowledge on his part of the scope and methods of economic theory and of economists' views about economic anthropology.

In fact there are many developments in economic analysis which could be adapted and used with profit in studying the economies of peasant societies.

It is worth expanding a little on the arguments against the universality of economic theory. Dalton (1961) defines two different meanings of economic - the substantive sense and the sense of economizing. This is really a difference between regarding economics as dealing with a certain type of behaviour or regarding it as dealing with an aspect of all behaviour. The substantive sense referes to the provision of material goods which satisfy biological and social wants. This definition of Dalton does not accord with Robbins'(1932) statement that "economists regularly deal with many non-material aspects of life", and Burling's(1962) statement that the"real point is we must repeatedly economize between material and non-material aspects". "Economizing" is defined as obtaining maximum achievement using minimum expenditure. Dalton suggests that economics in the sense of the first definition is useful in the study of primitive economies but not the second.

Some anthropologists appeared to believe that economic theory could only be applied to those goods and services which had a monetary value in the western economy. If only such goods and services were studied in a primitive society then anthropologists would be fully justified in regarding economic analysis as unapplicable to these less developed societies, and in regarding only the descriptive side of the subject as having any value. Economic theory developed in a society where money was used in the vast majority of exchanges. Hence activities which are not easily valued in monetary terms tended to be ignored in economic analysis. (Examples are the services of a housewife, hospitality, care of children by parents) Valid results and arguments can be formed from such analysis without allowing for these as the majority of goods and services are easily quantifiable. In fact the strength of economic theory lies in its reliance upon simple assumptions and the method of successive approximations, so that the results of analysis are widely applicable. If however all but the easily quantified goods and services and exchanges are ignored in the analysis of a primitive economy or if only the same things are studied, which are studied in western economies. The results are useless, as the analysis is dealing only with only a small part of the economy which has little relevance to the whole. It is necessary, therefore, in the analysis of this type of society to put values on good and services not usually valued in any comparable way, so that a large enough part of the economy is being studied for the analysis to be of use.[5] Quantification of such values is the real problem when applying economic analysis to primitive society and not the relevance of the theory itself.

Dalton also contends that to apply economic analysis, certain assumptions have to be made, whereas the substantive approach of describing the economic system of a community requires no prior assumptions about "necessary techniques, motivations or specific types of economic organisation". This contention is true, but economic theory can be usefully applied if the economist has knowledge of the different motivations and values prevalent in the society in question so that he can incorporate these values into his analysis. The real problem is that anthropologists often fail to provide the sort of information that economists need, and in a form that economists can readily use.

There are several examples of descriptions of primitive societies written in economic terms. LeClair (1962) gives three examples of how anthropological descriptions of non-pecuniary

societies can be re-cast in economic terms. First he summarizes the structure of the society and then what he calls"process and the systematic outcome". In primitive society, production and consumption units are nearly synonomous but it still possible to divide them and point out any differences there may be in the groups. Transfer between the groups is of minimal importance but may in some cases have bearing on the economic structure. Le Clair next outlines the actual production process showing what variables influence the product mix. Then he notes the importance of the various factors in the production process and finally the system of distribution of the product. This type of description begins to pinpoint areas where a standard farm management model might fall, although it answers only a few of the questions the economists would need to ask for economic analysis.

Barth (1967) an anthropologist,has done some interesting work in this field. He represents his results in the form of a flow diagram (Diagram 4). However, he is an exception, and few anthropologists collect data so useful to economists. Joy (1967) shows that even Barth has not recorded all the information an economist would need, but Barth's work has exciting possibilities.

Turning to East Africa, a paper by an anthropologists, Van Velsen (1958), on the, Kuman Family is also relevant to descriptive economics. He shows the economic units operative within the family and his description is based on the idea of each unit being engaged on an economic enterprise with certain factors of production within their control, and a certain pattern of distribution obligations. On marriage, husband and wife form a joint enterprise in in agricultural production. The husband is a member of as many production units as he has wives. The produce from each wife's garden is nominally hers, although she cannot refuse her husband money for purposes which he considers are for their mutual benefit, (such as a permanent house). The wife is expected to provide all that is needed for her own economic unit, (herself, her children and obligations to her husband.), from her own garden, and this extends even to bride wealth for her sons. There seems to be little interchange between these related units, and each wife unit would have to be considered as a separate firm, although the husband would belong to each firm.

This type of descriptive study allows the economist to expand or alter some of his basic assumptions in order to adapt his analysis to the society he is studying. This brings us back to Dalton's (1961) second definition of economics - economizing, which is the basis of all economic analysis. It is this assumption

that people wish to maximise income [6] (this is incorrect if the most modern economic theory is cited) which underlines the major objections to the application of economic theory to primitive society. Burling (1962) feels that "it is possible to look upon a society as a collection of choice-making individuals, whose every action involves conscious or unconscious selections among alternative means to alternative ends. The ends are the goals of the individual coloured by the values of his society towards which he tries to make his way". Goals in a primitive society can be more food, more wives, more prestige or a combination of several of these. This concepts of maximisation is not absent in other branches of the social sciences. Burling points out that the Freudian conception of personality includes the idea that deeply imbedded in our make up we have the principle of maximisation of pleasure and minimisation of pain, and that we will give up momentary pleasure for an assured pleasure later. Even Dalton suggests in later writings that is should be established by empirical investigation whether members of a certain community do in fact go through an "economizing" calculation.

It should be clearly recognised that maximization is not necessarily in terms of monetary profit. Often people are dex described as maximizing utility, but in practice it is impossible to value such an aim and thus profit is usually maximised instead. New theories can allow for multiple goals, but only one of these goals can be maximised at any one time. Others have to be set at some predecided level and treated as constraints, and this is often refered to as minimaximizing, in other words maximizing some goal after some minimum standards have been met. The major concern of any firm if is first of all to survive, but different managers will allow a different magnitude of safety. Thus some households will produce or aim to produce enough food for any season however bad, while others will produce food at a level which will be adequate in all but exceptionally bad seasons. Maximization can refer to long term or short term profits, but in practise with peasant farm firms it is nearly always the short term production which is being maximised.

Preliminary analysis of recent field work in Embu and Buganda shows that very little attention is paid to the food value of crops produced. Specific crops do not appear to be planted in order to maximize calorific value, but this aspect is still being investigated. The main aim does in fact appear to be maximization of cash income once all other subsistance and social constraints are met. Desire for cash is related to the very strong desire for education. Very few families have adequate money to educate their children to the standard they desire. Maximization or at least minimaximization does appear to be an important factor in the peasant farm

firm.

Often the economist is not so concerned with whether people economise intelligently, but by what means they could do it more efficiently. It hardly matters to him how the members of any particular society make their choices - if they are inefficient so much the worse for those people. Economists themselves are divided in the manners in which they interpret the roles of "rationality" "economizing" and "maximisation" postulates in model building, Scott Cook (1966). However, using the values and motivations of the particular society in building models may help to indicate to the members of the society possible steps in the direction of the 'best' alternative, and also the cost of these social constraints. Thus whether people are in fact maximising or not and whatever they are maximising, economic analysis can be usefully applied in that society.

Later Developments in the Theory of the Firm.

Later developments in the theory of the firm go beyond the idea of maximising behaviour but retain two basic concepts.

i) A limited field of choice of possible position.

ii) Selecting the "best" position among those possible. Linear programming involves considering different constraints and finding the best solution within the allowable bounds of those constraints. In graphical form this can be shown by the area in which production is possible and then if the "best" is net revenue, the iso-netrevenue curve depicts the "best" level of production. (Diagram 3).

opp. cost concept

This type of analysis has several obvious advantages over marginal analysis,. Firstly, it is possible to come to a solution. Certain assumptions still have to be made regarding the production function, but this can be valued at different levels - say different intensities of cropping. The production function is thus assumed to be a series of straight lines. Also, when isomers are used to maximise the level of production, it is possible to maximise in respect of other goals than profit. Secondly within the form of the matrix, goods and services can be valued in terms of opportunity cost, and there is no necessity to put a monetary value on them. The last two advantages are of great importance when linear programming is being applied to peasant societies.

Linear programming can also allow for many requirements of peasant economics. For instance it may be, that subsistance food requirements must be met or that minimum famine crop acreage be grown to meet emergencies, or that maximum leisure should be

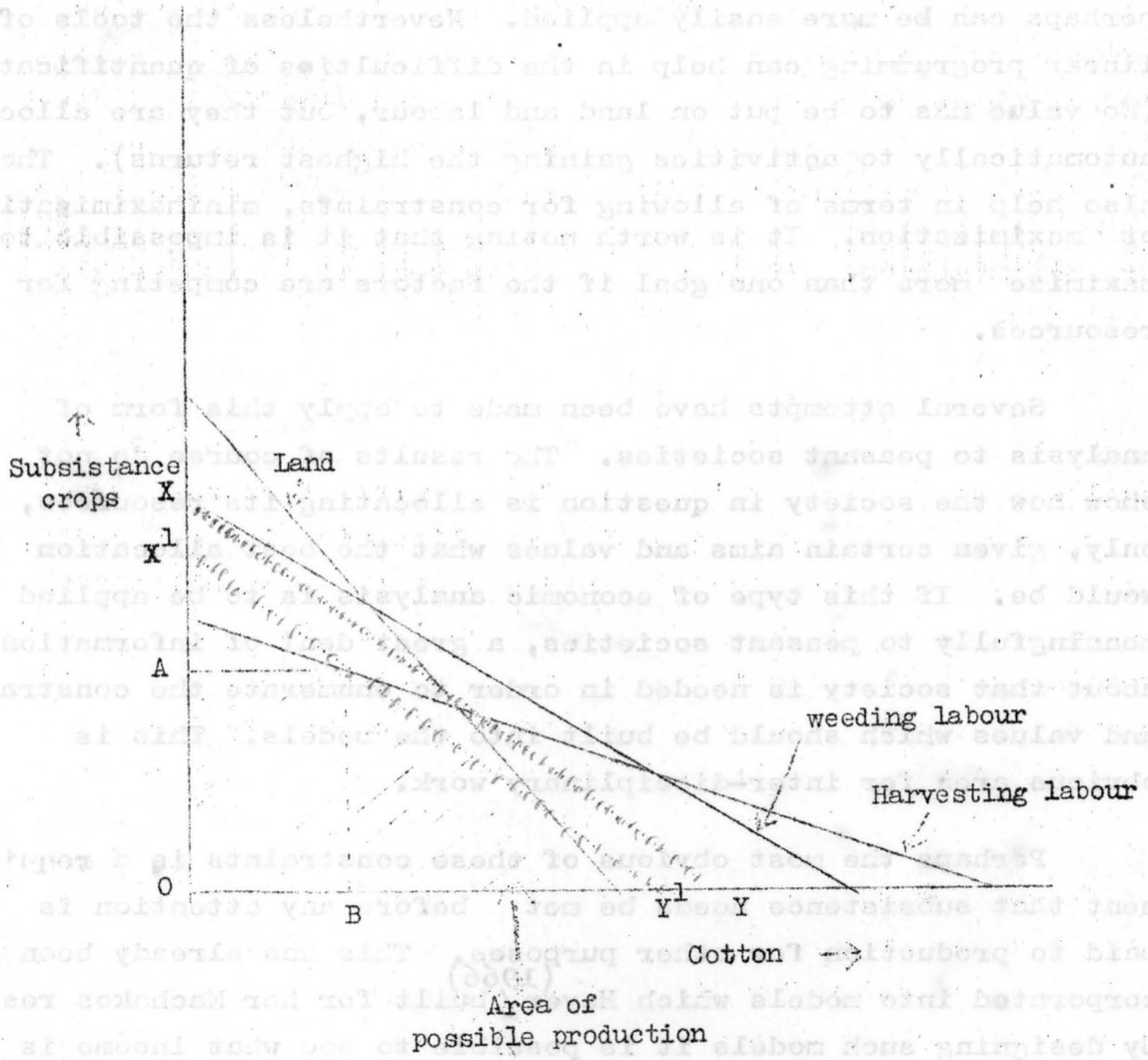
taken once a certain minimum level of income has been reached. Thus linear programming can be of great assistance in the study of peasant farms. In some senses the situation of peasant farm adhers more closely to the definition of perfect competition, than a more advanced form of industry, and marginal analysis perhaps can be more easily applied. Nevertheless the tools of linear programming can help in the difficulties of quantification (No value has to be put on land and labour, but they are allocated automatically to activities gaining the highest returns). They also help in terms of allowing for constraints, minimaximization or maximization. It is worth noting that it is impossible to maximize more than one goal if the factors are competing for resources.

Several attempts have been made to apply this form of analysis to peasant societies. The results of course do not show how the society in question is allocating its resources, but only, given certain aims and values what the best allocation would be. If this type of economic analysis is to be applied meaningfully to peasant societies, a great deal of information about that society is needed in order to enumerate the constraints and values which should be built into the models. This is obvious area for inter-disciplinary work.

Perhaps the most obvious of these constraints is a requirement that subsistence needs be met before any attention is paid to production for other purposes. This has already been incorporated into models which Heyer (1966) built for her Machakos research. By designing such models it is possible to see what income is foregone in meeting the requirement of subsistance food production. However within different societies there are other factors which have to be allowed for, if the final analysis is to have any relevance in practice. These values and social constraints are likely to change rapidly as development proceeds, but linear programming models can be used to show the level of likely resistance to each change, i.e. innovations which provide the biggest return in terms of cash profits (if that is the important goal) are likely to be more easily adopted than those which provide a smaller cash return.

Clayton (1961) also used linear programming on his Nyeri sample, before the applicability of linear programming was widely accepted. He took the standard Agricultural Department plan aims and constraints, and worked out the levels of income and labour requirements generated by these. He then went on to show a larger income could be obtained by lifting some of the restrictions, and that in the optimum plan without these constraints it was labour that become the limiting resource. Using this

Diagram 3



Of OA amount of subsistance crops are needed, then only amount OB of cotton can be produced. The iso revenue curves (XY & X^1Y^1) might indicate that a lower level of subsistance production would increase total income.

type of analysis Clayton was able to show theoretically, in terms of reduction of cash income, the cost of the restrictions imposed by government and by the need for subsistence to be obtained from the farm.

More recently Joy (1967) has shown how matrix analysis can be applied in a peasant economy.[7] He demonstrates that the flow diagram . (Diagram 4) used by the anthropologist, Barth (1967) can be expressed just as easily in terms of a matrix, and that from the interdependencies expressed in the matrix values can be assigned to different goods and services in terms of other goods and services. For this example (Diagram 5) Joy uses data collected by Barth for another purpose, and thus there are many gaps in his matrix. He shows, however, that by asking the right questions these gaps could be filled, and the complete matrix built even for the peasant society.

Further objections to the relevance of the theory of the firm to peasant farms

Having looked at the anthropologists main objections to the theory of the firm as applied to peasant economies and the economists new tools for dealing with them, it remains to see what other objections there are to applying the theory, and if these can be dealt with using similar tools. Assumptions made in the traditional theory of the firm are modified to some extent by more recent ideas. The main assumptions can be summarized as :-

1) The motivational assumption - that satisfaction will be maximized. This point has already been dealt with above, and suggests that all resources will be allocated in such a way as to give maximum satisfaction.

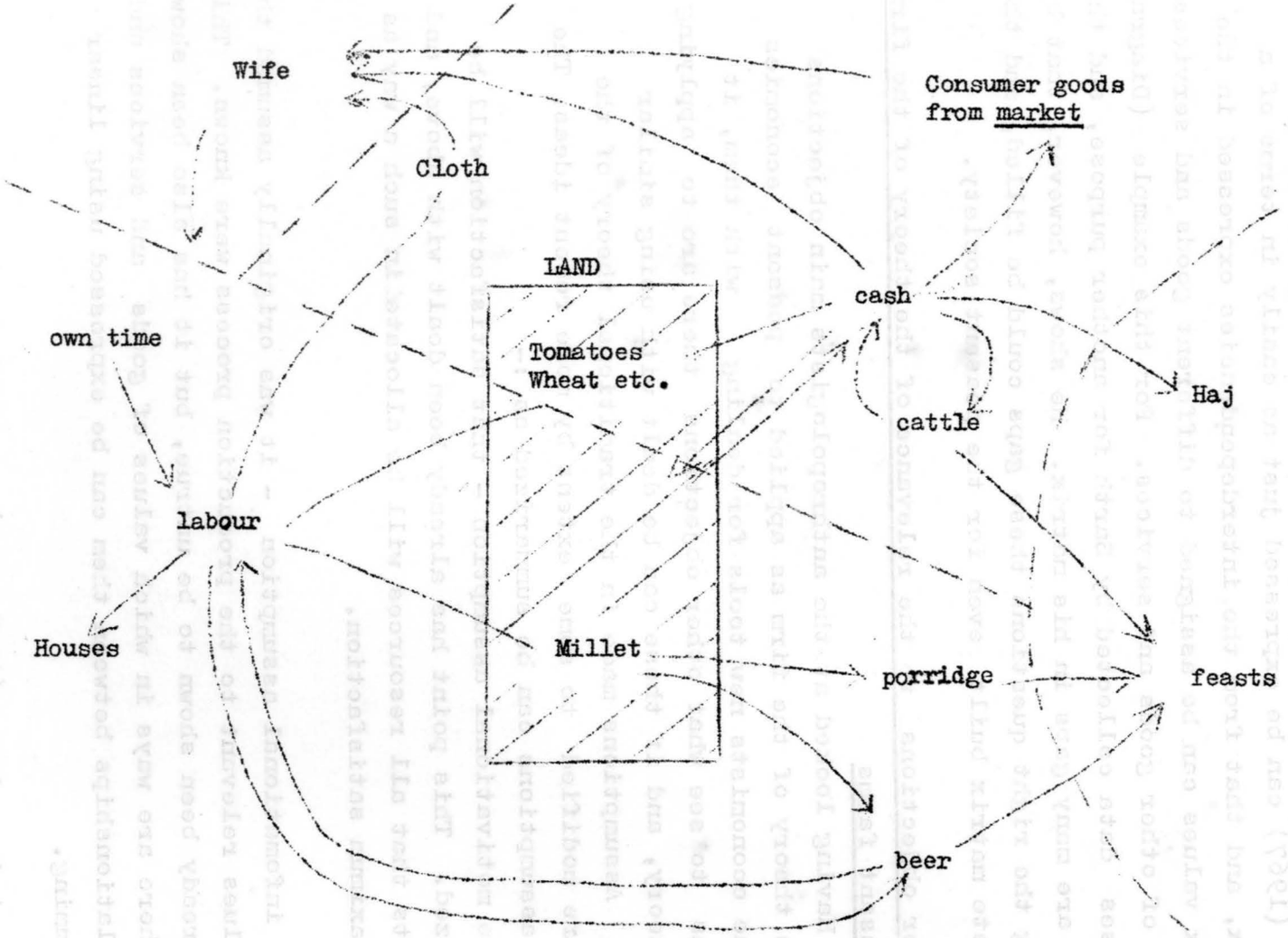
2) The infomational assumption - it was originally assumed that all values relevant to the production process were known. This has already been shown to be untrue, but it has also been shown that there are ways in which values of goods and services and the relationships between them can be expressed using linear programming.

3. The independence (influence) assumption - at one time it was assumed that all wants and resources were independent of one another. This assumption is no longer held and competing resources are very important in the peasant farm firm.

4. The stationary (growth) assumption - things were assumed to be unchanging developments in theory are just beginning to deal with the dynamic situation of real life in peasant farms the developmental cycle of the family is very important and

Diagram 4

THE PATTERN OF STANDARD ALTERNATIVE CHOICES FOR A FUR MANAGEMENT UNIT



Source Barth In "Themes in Economic Anthropology" Banton (ed.)

5) The organisational assumption, the actions of the firm had a co-ordinated aim, namely that of maximization. This last assumption is not true of the peasant farm firm, and this point will be considered first as it is the most obvious deviation from the standard theory.

Three types of decision to be made by the firm are the product - mix, factor proportions, and distribution of product, as has been described earlier in the paper. However cross cutting these categories there are three other levels of decision making long-term decisions, decisions taken each season and day to day decisions. It is assumed in the theory of the firm that all these types of decisions are taken by the same person with the same a end in view. Frequently within the peasant farm firm, however, these decisions are the responsibility of several different people, and in many cases it is difficult to define exactly where responsibilities do lie.

The most likely members if the family to hold any responsibility in the management process are the husband and or the wife. However in societies where sons remain subordinate to their fathers until his death they too may take some part in decision-making within the household.[8] The control patterns are constantly changing as the family matures, and the stages of each family in the developmental cycle will determine to what extent control of the land and farming practise is split between different members of the family. The extent to which labour imigration has taken place will also affect these control patterns. Where the husband is away for long periods, the wife is free to make most of the decisions, and the traditional pattern is modified. Yeld (1966) states that is the case with the Kiga, but where husband and wife move to a settlement area, they tend to co-operate closely in decision-making and work.

Since one of the problems in either formulating or applying a farm plan to an individual farm is first to decide what constitutes a meaningful economic unit, the division of control and decision-making among different members of the family makes this difficult. The unit may be bigger or smaller than first appearances would imply. For instance it may be smaller because the farm is virtually split into two - the commercial farm with the manager aiming at maximizing his profits, and the household firm with the manager aiming at if not maximizing food supply at least providing an amount of food in excess of household needs. There is likely to be very definite interconnections between these two firms in terms of resources and allocation of output and it is difficult to decide how far it is sensible to treat them separately. The above example is just one way in which the farm might be divided, and is rather simplified.

Diagram 5

Column Vectors (Activities)

Summary Raingrown Crops

P_1 Bulrush millet
P_2 Tomatoes
P_3 Wheat

Irrigated - Winter

P_4 Wheat
P_5 Onion
P_6 Garlic

Irrigated - Summer

P_7 Chillies
P_8 Herbs
P_9 Potatoes

Irrigated Orchard

P_{10} Orchard - bearing
P_{11} Orchard - establishment

Livestock

P_{12} Cattle
P_{13} Goats
P_{14} Collecting and gathering
P_{15} Hut-building

Labour and Marketing

P_{16} Series Reciprocal labour given (by periods)
P_{17} Series Reciprocal labour received (by periods)
P_{18} Brew beer (by periods)
P_{19} Sell labour (by periods)
P_{20} Cloth-making
P_{21} Buy cattle
P_{22} Buy goats
P_{23} Buy wives
P_{24} Buy tools
P_{25} Buy millet
P_{26} Sell millet
P_{27} Sell tomatoes
P_{28} Sell wheat
P_{29} Sell onions
P_{30} Sell garlic
P_{31} Sell chillies
P_{32} Sell herbs
P_{33} Sell potatoes
P_{34} Sell fruit
P_{35} Sell cattle
P_{36} Sell goats

Row Vectors (Constraints)

P_{101} Land - unirrigated
P_{102} Land - irrigated - summer
- irrigated - winter
P_{103} Manure
P_{104} Series labour by periods - non brewing
P_{105} Series Beer (at different times)
P_{106} Millet
P_{107} Series Brewing labour
P_{108} Series Reciprocal labour commitments
P_{109} Series Livestock feed
P_{110} Series Subsistence and feast requirements, millet for porridge, and own beer (n.b. possibly in storage form)
P_{111} Cash requirement - tools consumer goods, etc.
P_{112} Cattle requirements, feasts, dowry, status, etc.
P_{113} Tomatoes.
P_{114} Wheat
P_{115} Onions
P_{116} Garlic
P_{117} Chillies
P_{118} Herbs
P_{119} Potatoes
P_{120} Fruit
P_{121} Cattle
P_{122} Goats

$P_{1 - 10}$ shows the range of possible cultivating activities with the direct input requirements for these activities - land, labour and manure ($P_{101 - 104}$) Labour resources are shown to be augmentable by (P_{105} series). Beer in its turn requires millet (P_{106}) and brewing services (P_{107} series) Millet can be obtained by growing it (P_1) or by purchase (P_{25}). Thus the matrix formulation can express the interdependence between activities and between alternative resource allocations. Source: Joy, Barth's Presentation of Economics spheres in Darfur.

It assumes a monogamous marriage, and a certain stage in the developmental cycle. The addition of more wives, dependant mothers or other kinsmen would multiply the variations possible in the division of the original unit.

The assumption in the theory that there is little influence from surrounding firms is thus very unrealistic. Strong connections exist between the production and consumption units as well as between different production units and different consumption units. These connections are ramified further when the strong obligations of mutual aid and assistance between a household and kin living elsewhere are considered. Application of the theory of the firm to such situations involves not only considerations of what might be termed external links in organisation, but also internal links. The later vary from household to household, and there is no standard form even within a single community. In general, it may be fair to say, however, that the more long term the decision the more likely it is to fall within the area of responsibility of the head of the family unit.

The only really long term decision which has to be taken is the allocation of rights to use land to different members of the family. This allocation may be permanent or revocable at anyt time customs differ greatly even within East Africa. Here I am not talking about allocating land outside the immediate household only within it. At marriage the husband will usually give the wife a garden in which to grow food for the family. This happens in both societies in which I worked, although the pattern is less well defined in Buganda. In Embu, however, these rights once given to the wife remains hers, and she may even continue to cultivate the garden after the marriage has broken up. She is free to allocate part of this garden to her daughters who may continue to cultivate even after marriage if their new homes are not too distant. In Buganda it appeared that all rights in land would be restored to the husband should a divorce take place.[9] There are many other examples in the anthropological literature of allocation of land to wives, but it is seldom recorded how permanent the allocation in fact is. Another difficulty is that the allocation pattern is not static as re-allocation takes place throughout the developmental cycle. The permanency of allocation is important in terms of farm planning, as where the farm permanently divided or is being constantly re-allocated it would be more difficult to put into operation a plan for the whole farm.

From my own field work it seems that the division of the farm into these two or sometimes more sections depends not on family food requirements, nor monetary income desired, but purely on how much land the wife is able to cultivate for her food crop garden. The amount of land she manages to plant up during the planting season, until weeding produces a labour shortage determines this area. The first weeding often begins before she has finished planting all she might and, this usually curtails her using further land. If she has time to spare in the planting season, she will endeavour to borrow land from anyone who is not making full use of his land, and thus the majority of women seek to maximise their output of food crops in this way. Few of the wives visited had either enough time or a small enough family to be sure of adequate food in really bad years, and thus the desire to maximise originated from survival motives. None of the women felt sure that the monetary income from the farm would be used to meet family needs, as this income was not hers to control, but more than that she would feel she had failed in her role as a wife and home maker if she was forced to ask her husband to buy food which she would ordinarily have produced on the farm. In addition, in years when shortages were acute food was only available for purchase at very high prices. Most farms grew a small patch of cassava as a famine crop, and most of them diversified in their food cropping patterns, both for variety and also as insurance against particular crop failures. Thus again the difficulties of formulating farm plans becomes apparent. If the plan should suggest lower food crop acreage than the woman feels necessary, she is probably still free to borrow more land, and labour which would appear available in the plan would be used to work these gardens.

As has been mentioned previously, on a shorter term basis the rights of use of land are nearly always divided between members of the household, even in a society where the household head has great authority such as the Arusha each wife has her "own field and her own cattle", and the land is further divided as each son marries. Gulliver (1955) does not state the extent of the wife's control over her own field . In the short term decisions, (what I previously called seasonal decisions) it is possible that it is still the husband's responsibility to decide on the product mix . In the two societies that I studied, this was generally untrue in practice of the Embu and even in Buganda it seemed that in many cases the woman was able to decide for herself what to plant. An extreme example of female control of farming is the Jie (Gulliver, 1954). The woman decides "how much land she is to cultivate in any year, and where and what she grows is entirely her own decision." The Kuman woman (Van Welsen, 1958) is a full partner with her husband in the economic unit, but she makes her own decisions at the product-mix stage[10], as does the woman in Kigezi (Yeld, 1966). In the latter case, it is caused partly through the absence of the husband, and as this is becoming increasingly common, examples of situations of a high level of wifely control should increase in frequency. Of course, at this level (seasonal) of

decision making it is still possible for an absentee farmer to be un control. Most of what I have said refers to the food garden, which was allocated to the wife by the husband. She usually has little say in what he does in his own garden, where he has one.

The patterns of control in day to day decisions are shown in Diagram 6. However there are very few societies of which I know, where most of these dicisions were not taken by the wife at least for her own garden. In the Embu sample one exception was found in the household of the most progressive farmer, but his wife did not have a garden of her own at the homestead. She did manage, completely on her own, another farm, which was being reserved for the eldest son. She was also required to help her husband, working under his direction on the home farm. However, even in this case he seldom told her how to do a job only what to do. Thus the decisions concerning factor combination are often made by the wife, but perhaps modern trends show that this may alter.

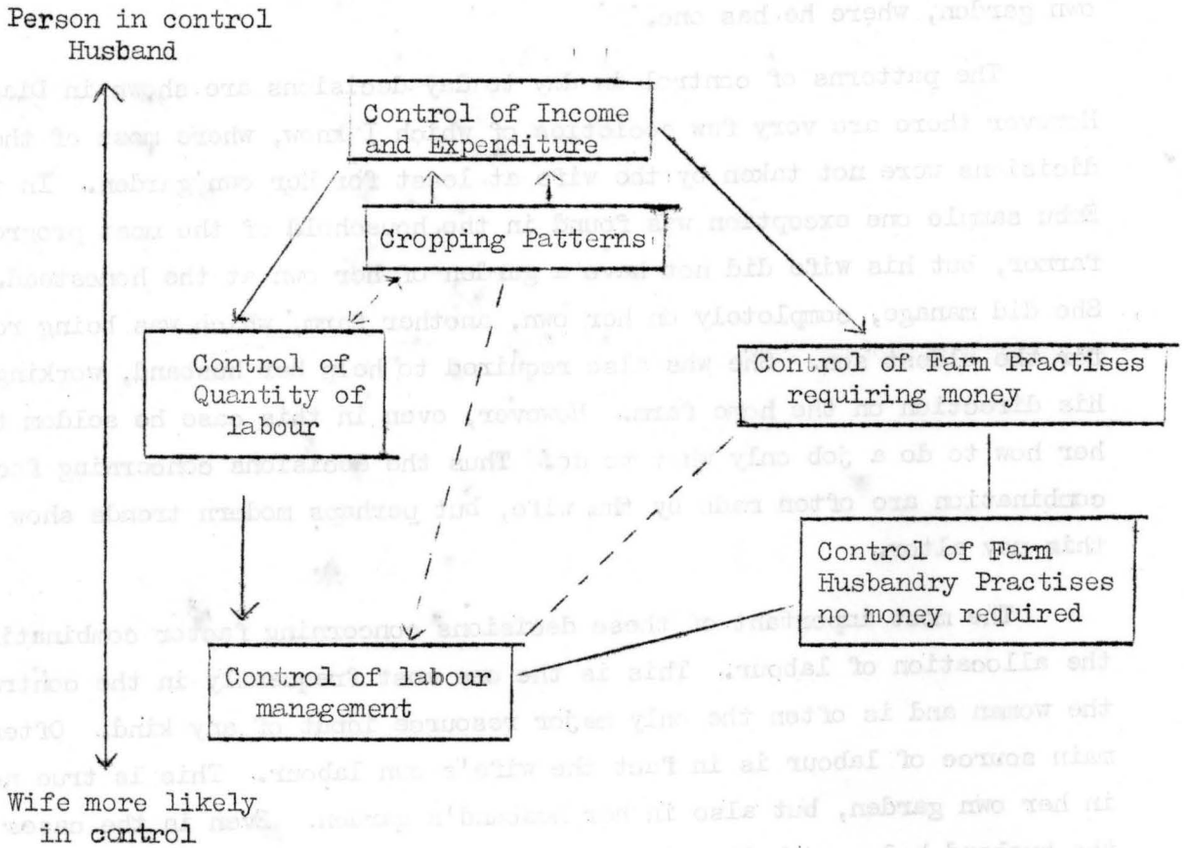
The most important of these decisions concerning factor combination is the allocation of labour. This is the one most frequently in the contral of the woman and is often the only major resource input of any kind. Often the main source of labour is in fact the wife's own labour. This is true not only in her own garden, but also in her husband's garden. Even in the cases where the husband had no job it was uncommon to find him working in the garden for as long as the women. This was partly due to the peak labour penod being that of weeding, which is not usually defined as a man's job. In Buganda it was more common to find the husband working on the farm although again the hours worked tended to be shorter, but he appeared to organise the work on the farm in a greater number of cases than in Embu.

Two others sources of labour on the farm are employed labour and children. The employed labour was nearly always paid by the husband from money obtained in the sale of his crops, and except where he was permanently away from home, he controlled its allocation, usually on his own crops. In Embu the wife sometimes directed the labour, and in Buganda this was nearly always the case . Since children mostly seemed to help in the house, it was usually up to the mother to allocate tasks to them. The wife had to allocate her own time between household tasks, her own farm tasks and meeting those the husband required her to do in his gardens. Allocation of labour in the peasant farm firm is not governed by a single set of objectives.

One of the biggest problems in dealing with the labour resource in farm plans is its evaluation. Male and female labour are not the same resource, and care should be taken before they are treated as such. From my own observations it seems that a woman can do most of the male tasks (because husbands are often absent), but this does not apply in the other direction. The household responsibilities of the wife fluctuate slightly with the season - cleaning taking more time in the wet season, but water carrying less, etc.,

Diagram 6

CONTROL PATTERNS ON THE FARM



but they also alter as the family grows up, and thus the stage of each family in the developmental cycle will alter the amount of time each woman must spend on household tasks. It is also worth observing that all hours in the day are not equally valued, the midday hours in Buganda being regarded as useless for farm activities and the early morning hours being the most valuable in both cases. In Embu some women, under heavy pressure of work, were forced to use even the midday hours for farm work. Labour requirements may not necessarily be measured in terms of hours, but in terms of energy. Thus ten minutes fetching water up a steep hill may be worse than several hours of weeding or the like. Another difficulty is the value in terms of productivity of male, female, hired and children's labour, and of course, the practice of communal labour groups makes evaluation of labour available even more of a problem. It is usually assumed that labour given equals labour received under reciprocal arrangement, but, in practice, this is by no means always even approximately true. Since studies indicate that labour is a vital constrait (Heyer, 1966) these problems concerning the measurement of the labour resource could have a big influence on the optimum plan of a farm.

The control over proportions of other factors in the production process depends to some extent on what rights each individual has over distribution. Although the wife may have complete control over the distribution of produce from her own garden (Jie, Kiembu) she is unlikely to have much surplus after she has fulfilled her obligations of feeding her family. Thus although she may sell a small amount of food crops in a good year, she usually lacks capital to invest in improving her production process. Any spare cash she does obtain will most likely be spent on family requirements. This means that the production process in the wife's garden is often carried on at a very inefficient level, while her husbands fields produce at a much higher level. In many cases where this is true the surplus income from the husbands gardens are not available to the rest of the farm. Income is used to pay school fees, tax, clothes and so on, and possibly a certain amount spent on fertilizer for the cash crop, but it is only the most progressive farmer who ploughs back any significant amount of capital to the farm. In my work, it is difficult to trace where this capital in fact goes but it seems it is more often spent on the husband's pleasure than on investment in other business enterprises.

The rights over distribution have bearing on the original premise of maximization. If there are certain definate obligations on the part of the family in the form of gift and ceremonial exchange then these can be built into the matrix. However, if these obligations are less definite, solution becomes more complecated, and relative profitability of different crops may alter. For instance if the wife is obliged to give away food in excess of her own immediate needs, she would probably be better in economic terms to produce crops other than food. The social obligations, however, may be greater than the cash profit motive. Crops from which profit accrues to the husband and only partly to the family are also less profitable to the wife, and as in the

case of the Bwamba (Winter, 1956) she may be unwilling to work on the cash crops for this very reason. It is worth considering the rights of distribution, as the farm firm may benefit from a shift of resource allocation to activities where profit returns to the farm and to the household. In cases where the long-term profits return eventually to the household, then the problem is entirely different.

The observing economist can also err in valuing profit by failing to take into account the factor of timing. Crops are planted at a sub-optimum time, so that food will be available in a difficult season, or they are harvested early to supply a food necessity. It might be possible to show that crops which can be easily stored, are produced at a higher level of efficiency than those which cannot be stored. Crops are also often sold when prices are low, because cash is urgently needed, which is really only an expensive way of gaining credit. This is also the case when a small expenditure on seed or fertilizer and more particularly insecticide for storage would yield a large return in a short time, but cash is unavailable at the right time. The pattern of income distribution throughout the year is very important to the peasant farm firm.

Other objections to the application of the theory of the firm to peasant farms have been mentioned above. The difficulties of data collection in order to formulate realistic plans will remain for sometime. Nothing much has been said about this, but it has been assumed that data collected refers to what actually happens (given other difficulties already discussed) whereas data actually collected may reflect what people think ought to happen or what people think does happen. Perfect knowledge is unobtainable by anybody, but often the woman knows even less about production possibilities than her spouse, and when thinking about information it is worth remembering that information itself is costly to obtain and these costs may be higher than the returns gained from the new knowledge.

It should be obvious that the simple theory of the firm does not correspond to the situation on peasant farms, as closely as it does to a small farm enterprise say in U.K. However, it remains to see how far the theory can be applied even within the complex pattern of organization on the peasant farm. Linear programming is a toll, which is very useful in dealing with such a situation. It can be used to show the alternative of action and the consequences of these different forms of action in terms of what is foregone in each case.

CONCLUSION

During the discussion of the assumptions of the theory of the firm, certain ideas for adapting models have been suggested. Many of these suggestions have been biased toward the main aspects of my own study, namely the place of women in the peasant farm firm. It should also be pointed out that within each society there are farms at different stages of economic development, and in the future, the adaptions suggested here will probably become irrelevant. However at present it is hoped that consideration of sociological and other constraints will speed the development process.

In summarising the type of models which might be built, firstly it should be realised that the value of most of these models is to show what profits are lost while sociological constraints are still operative. The first model which must be built in any case is the standard maximum plan for that ecological zone and land-labour ratio. Individual farmers have little advantage one over another, thus this standard model is widely applicable. The model for the divided - two manager farm firm is difficult to build so that it is generally applicable, but it is possible to build models allowing for subsistance requirements to be met from the farm. It is also possible to show how, by increasing productivity of food crops, acreage required for subsistance could be reduced to a minimum, and what extra profits could be earned by so doing. Reductions in food crop acreage often lead to the production of less palatible food, and also to a reduction in the seasonal availability of food. Thus many plans for reducing food crop acreage are untenable in practice.

The model would have to be adapted to family size and also to the stage of the family in the developmental cycle. Polygamous households would add further problems in formulating the model, and if marital stability was low, then risk elements involved in a wife devoting labour to her husband's garden would be high. (Winter, 1956) The stage of the family in the developmental cycle affects the labour available to the firm, in terms of both wife's input (a young family requires more of her time than a grown up one, and in the later stages of pregnancy she cannot do as much) and in terms of help which the children can give, it might be useful to make the developmental cycle an important variable in the standard models. Where a certain amount of cash is available to the farm enterprise and extra labour is available, this could be incorporated in the plans allowing for a reduction in productivity of that labour and sometimes the extra food committments it entails, as for example in Embu. The amount of land in the plan might be expanded in areas where land can be borrowed, or rented, but no permanent crops can be grown on such land, which would have to be allowed for. In certain cases reduced profit levels for crops where profits are not accruing to the family firm in either the short or long-term might be worked out. Where money is limiting progress on the development of the farm, it might be possible to work out plans where a farm

could restrict consumption for a year or so in order to save for future consumption. This could be done perhaps by changing the diet. Often it is possible to produce more calories per acre from less favoured crops (Appendix I) However, if the restricting resource is labour then it is calories per man how which is important. Care would have to be taken in such a plan that young children received adequate nutrition. It has also been noted earlier that often income is not available at the right time. Sometimes lack of cash is due to an inability to save but it may be due to extreme poverty. The advantages of saving in order to have cash available at the right time could be demonstrated, and also the cost of ordering production to give a desired income profite throughout the year. These are then just a few ideas of different constraints which might be usefully built into farm management models for East Africa.

The incorporation of other variables into farm management models would greatly assist the extension service. It would enable the advice given to the farmer to take account of some of the constraints operating on that farm, and it would also provide the extension worker with some definite arguments as to the benefits of the optimum plan. He would be able to show the farmer the cost of operating within those constraints. At a higher level it would be possible to see what innovations might be the easiest to introduce; as the ones effecting the greatest increase in income might be the most readily adopted. Thus adapted, models could be useful in several ways.

Finally, the theory of the firm is applicable to peasant farms, providing it is the underlying principles rather than specific adaptions to a market economy which are used. Further modifications to the theory will probably take it in a direction opposite to that needed for analysis of peasant farms, as the new theories will need to be applicable to big organizations However, the concepts and the tools of the economists will still be unversally applicable, but in some societies, will require additional information provided by sociologists and anthropologists. The economist will still be able to suggest the type of questions that should be asked if the analysis is to be useful and relevant to the problems of economic development.

FOOTNOTES

1. Resources available for use in production are the same for all the activities of the firm.

2. Perfect Competition. assumptions:

   (a) Very many, buyers and sellers.
   (b) Perfect knowledge
   (c) Complete interchangability of the product
   (d) Ease of entry and exit into the productive activity.

3. This is sometimes called atomistic competition.

4. A primitive economy is one which is non-pecunary. There are no examples of such an economy in East Africa today. A peasant economy is one which has become market and money orientated at least to some extent.

5. Herskovits 1952 expands the topics included in economic analysis to include goods and services not priced in Western economies, but he does not include everything e.g. care of children by their mother.

6. In other words, people wish that:

   (a) Any material end shall be fulfilled with no more than a minimum resources necessary for its fulfillment.

   (b) No means shall be provided for lesser ends before provision for greater ends is made (Robbins 1932).

7. See page 7

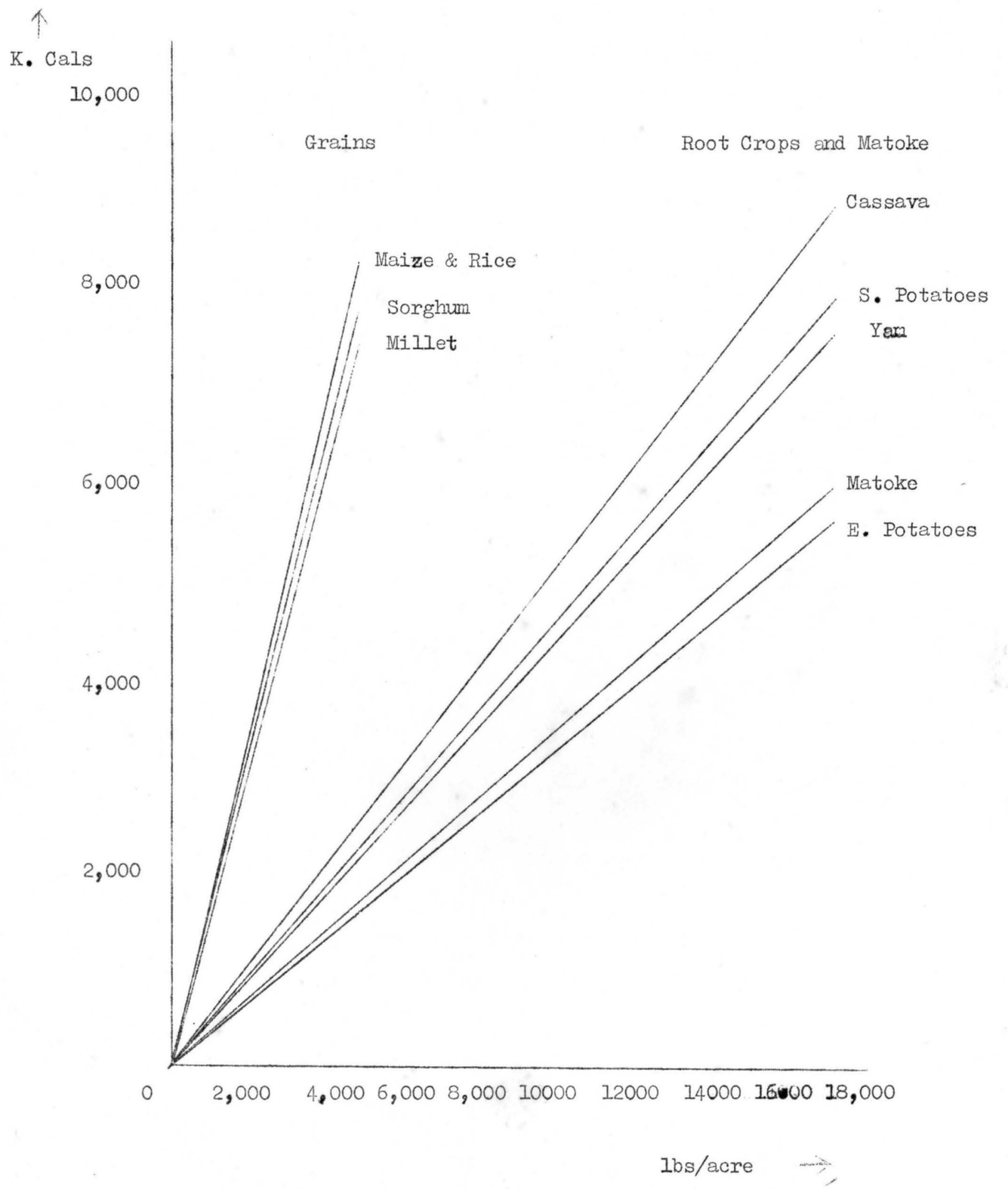
8. Household signifies a co-residence grouping. This may exclude some members of even the (nuclear) family and it made also include people living at the farm, who are not members of the family.

9. There was one instance in Buganda of a woman owning land under Mailo tenure, which had not been given her by her husband, and she would continue to cultivate this land even after a divorce, should that occur.

10. These are decisions about what and how much of each to produce.

Appemdix 1

K. Cals per Acre of Starchy Food at Different yield Level



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