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CHAYANOV'S MODEL OF PEASANT HOUSEHOLD  
RESOURCE ALLOCATION AND ITS RELEVANCE  
TO MBERE DIVISION, EASTERN KENYA

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CHAYANOV'S MODEL OF PEASANT HOUSEHOLD RESOURCE ALLOCATION  
AND ITS RELEVANCE TO MBERE DIVISION, EASTERN KENYA<sup>1</sup>

"One of the commonest and most unfortunate difficulties in understanding the peasant farm is our characteristic statistical method of perceiving and thinking about it. Concepts of 1.78 horses compared with 8.34 persons of both sexes, 26.15 percent without horses, a decline in the average number of livestock held (in terms of large ones), depending on a rise in the percentage of literacy - these are the images and conceptions in which Russian economists are accustomed to think about the subject of our inquiry. Nevertheless, we can surely suppose that to think in this way about the peasant farm production machine is the same as to describe the structure of a modern steam engine as consisting of 39 percent Fe, 31 percent Cu, 16 percent H<sub>2</sub>O and 14 percent various organic substances."<sup>2</sup>

In this paper we consider whether we can identify the key variables governing household resource allocation in Mberere Division, Eastern Kenya. Our starting point will be Chayanov's theory of peasant household resource allocation. Following a brief description of Mberere, we shall first outline the main features of this theory and then consider to what extent the same theory can explain the economic behaviour of Mberere households.

Mberere is one of six divisions in Kenya which in 1969 was drawn into Kenya's newly introduced Special Rural Development Programme. The purpose of the programme was to select six ecologically and economically diverse rural divisions and to deploy within them exceptional amounts of capital and skilled manpower with a view to identifying development strategies which, if successful, might then be replicated in other similar areas of Kenya. Mberere was selected to represent the semi-arid farming systems of eastern and south-western Kenya.

The Kenya Government wishes to generate growth in output and income in Mberere as in all regions of the Kenyan economy. There are two ways in which it may do this: (i) investment by the public sector in the provision of economic infrastructure and social services (i.e. chiefly development of roads, expansion of formal education and of health care and pursuit of agricultural research geared to the needs of the area) and (ii) direct encouragement of productive activity in the private sector chiefly through the provision of technical knowledge supplemented by credit and subsidies. Direct public sector participation in productive activity is ruled out on politico-economic grounds; the state in Kenya usually only participates

1. I am grateful to Michael Lipton for his comments on an earlier draft of this paper. Responsibility for it as it now stands is, however, entirely mine.

2. A.V. Chayanov, "Peasant Farm Organization" in Thorner, Kerblay and Smith, eds., A.V. Chayanov: The Theory of Peasant Economy, American Economic Association, Irwin, 1966, p. 118.

directly in production in high growth sectors and then normally by taking up a 51 percent shareholding.

Mbere currently holds no high growth prospects. The people of the area derive approximately 47 percent of their income from crop production and another 17 percent from livestock products. It is a poor area where the rains may be expected to fail to achieve a critical minimum of 300 mm approximately one season in two, known ground water supplies are poor, soils are medium to poor, the topography in much of the area does not permit agricultural mechanisation even should it be thought economically desirable, and predators in the form of wild animals and birds pose a constant threat to planted seed and maturing crops. Because, in the past, agricultural research in Kenya focussed on the needs of the high-potential areas and not on medium-potential areas such as Mbere, there is still a chronic dearth of knowledge of appropriate income-raising recommendations to make to farmers in the area. In response to these unattractive farming conditions, it is hardly surprising to find a high rate of labour out-migration, especially by adult males. At the time of the 1969 census, the adult male-female ratio for Mbere S.R.D.P. area was 1:1.27 (in other words there were 27 per cent more adult females in the area than adult males). The actual population in 1969 was 64,500 which over a land area of 1,630 sq. km. gives a mean density of 40 persons/k<sup>2</sup>.

Given the lack of job opportunities in the towns, it is national policy in Kenya to reduce the rate of rural-urban migration, but only if a reliable and reasonably profitable labour use pattern adapted to conditions prevailing in medium-potential areas such as Mbere can be developed will the rate of out-migration from these areas decline. The urgency of achieving such an improvement is rendered greater by the fact that parts of Western and Central Mbere, and presumably other medium potential areas also, are now becoming areas of in-migration for investors from high potential areas around Mount Kenya who find that land is not available for purchase in sufficient quantity or at an acceptable price in their own areas. As, due to further population increase, more people looking for land are forced into areas such as Mbere these areas could be required to absorb a population increase above the national average.

The 1969 population figures suggest that 4,200 males must be attracted back to Mbere before the present population can be regarded as being in balance. It would be a smaller but still difficult task simply to try to prevent a rise in the absolute number of outward migrants.

It is only possible to speak of a traditional cropping pattern in Mbere if traditional is interpreted loosely. Mbere is far from constituting a stagnant agricultural backwater. The last decade has seen considerable agricultural experimentation on individual farms and in preceding decades there had already been important changes such as the introduction of cotton and tobacco to the division, and the earlier introduction of maize. By the later 1960s and early 1970s the farming pattern of the conservative or traditional farmer in Mbere was a risk-averting system of mixed cropping aimed at achieving as nearly as possible in the face of a hostile climate self-sufficiency in subsistence crops. The main food crops are maize, bulrush millet, sorghum, beans, cowpeas and green grams. Maize decreases in importance and green grams increase as one moves from west to east in the division.<sup>3</sup> Pigeon peas are commonly interplanted with other crops, and bananas and sugar-cane are grown along stream-beds. (Additional planting of bananas in deep holes away from stream beds developed in the later 1960s and is now encouraged by the extension service.) Crops are grown in a wide range of combinations; maize is often interplanted with either a pulse (beans, cowpeas or grams) or another grain (usually bulrush millet) as well as with pigeon peas. On most farms, land is cultivated entirely by hand using hoes and digging sticks (worn down panga blades attached to wooden handles). Off-farm work provides approximately 40 per cent of total household incomes.<sup>4</sup>

Chayanov, working with a mass of survey data collected from peasant farms in late 19th Century and early 20th Century Russia, developed an economic model of the peasant family farm which has yet to be rivalled for its comprehensiveness. His work was published in Russia chiefly in the 1920s.

In its entirety Chayanov's model was intended to explain two phenomena: the distribution of income between peasant households and the pattern of resource allocation by individual peasant households. Here we are concerned with Chayanov's attempt to explain household resources allocation. Chayanov set out to do this by identifying the various determinants of resource allocation on individual peasant farms and the inter-relationship of these determinants. Interest in the model revived in western academic circles in the 1960s (Thorner, Kerblay and Smith, 1965, and Kerblay in Shanin (ed.), 1971).

3. The East being hotter and drier than the west.

4. Off-farm work includes work for pay on others' farms. Of this, however, only a very small proportion is carried out in Mbere, most of such income being earned from short-term migration to the farms of upper Embu, on the well-watered slopes of Mount Kenya.

Interest centred on the potential usefulness of the model in present-day developing countries. Neo-Marxist critics were quick to point out that the model was not acceptable because it failed to take account of (i) the full extent of the external relationship of the peasant with the capitalist economic system and (ii) the full extent of the constraints upon access to land which affect large numbers of peasant farmers. As a consequence of (i) Chayanov neglected the influence of the outside world in generating economic differentiation amongst the peasantry and related phenomena of marginalisation, unemployment and proletarianisation of the peasantry.

Chayanov noted the fact that his model would require modification in a context where there were limitations on access to land observing that in such cases "the relationship between land and family is regulated by a change in the amount of labour hired or hired out" (Chayanov in Thorner, Kerblay and Smith, 1965, p. 112). He also noted, as indicated below, various aspects of the relationship of peasant producers with the capitalist system, but it is nonetheless true that he tended to play these phenomena down in focussing his attention on the pure family farm, employing no wage labour.

It should be noted, however, that this weakness in the model does not invalidate Chayanov's analysis of the determinants of resource allocation on individual peasant farms. This analysis itself is of considerable potential importance to the administrators of agricultural development programs in peasant economies, for it is only on the basis of a full understanding of determinants of peasant resource allocation that effective innovations can successfully be introduced in peasant economies. It is upon this aspect of Chayanov's model that we focus in the following discussion.

Chayanov emphasised that peasant household income is derived from both farm and non-farm sources. However he developed his model primarily in terms of farm resource allocation.

His starting premise was that peasant economic life is usually based upon a non-wage family economic unit: "most peasant farms in Russia, China, India, and in most non-European and even many European states are unacquainted with the categories of wage labour and wages."<sup>5</sup>

It followed that whereas the key to understanding economic life in capitalist society was to grasp the basis for calculating economic profitability the same profit motive and profitability calculation could not be adopted and applied by a non-wage family economic unit. In capitalist society an enterprise is considered profitable if its gross income  $G_1$  after deductuion

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5. A.V. Chayanov, "On the Theory of Non-Capitalist Systems" in Thorner, Kerblay and Smith, op. cit. p. 1.

of the circulating capital advanced (i.e., the annual material expenditure ME, and the wage cost W) makes a sum, S, which is at least as large as the whole of the (constant and circulating) capital, C, at interest, a, calculated according to the rate currently prevailing.

$$\text{i.e.} \quad G1 - (ME + W) \geq \frac{C \cdot a}{100} \quad (6)$$

Peasant households use family labour and not wage labour. Because labour is not paid a fixed wage, Chayanov argued that its value cannot be determined, and because the cost of labour cannot be determined the profits generated by different enterprises cannot be measured. For these reasons the key to understanding peasant economic behaviour must be sought elsewhere, peasant household economic behaviour Chayanov identified the composition of. In seeking an alternative explanation of the farm family as the crucial characteristic of the peasant farm, governing both its objectives and its productive capacity. Thus he stated:

"Whichever factor determining peasant farm organization we were to consider dominant, however much significance we were to attach to the influence of the market, amount of land for use or availability of means of production and natural fertility, we ought to acknowledge that work hands are the technically organizing element of any production process. And since, on the family farm which has no recourse to hired labor, the labor force pool, its composition and degree of labor activity are entirely determined by family composition and size, we must accept family make-up as one of the chief factors in peasant farm organization."<sup>7</sup>

Chayanov saw the family cycle as a key determinant of the objectives, productive capacity and economic performance of the household. The peasant household has a life cycle in the course of which the ratio of producers to dependents in the household changes. For Chayanov the cycle starts when a young man and his wife establish their first independent household. The second stage is characterised by an upward trend in the number of dependants which the household must support as children are born to the family. The third phase witnesses a growth in the number of producers and a decline in number of dependants as the children move into early adulthood. The fourth stage witnesses a decline in the number of producers as the children marry and leave home to establish their own households. Finally the parents themselves begin to lose their productive capacity. At this stage they may either continue to operate an independent household or may become increasingly dependant members of the household of one of their children.

6. Chayanov, *ibid.*, p. 3.

7. Chayanov, "Peasant Farm Organization", in Thorner et al., *op. cit.*, p. 53.

Chayanov argued that the absolute number of household members (consumers and dependants), their age and sex and the traditional standard of living of the community in which they live are the dominant determinants of the minimum total output that a household must produce. Secondly, he claimed that the ratio of producers to dependants is an important determinant of the minimum amount of labour time that must be expended by each of the producers in order to produce the socially acceptable minimum output for the household as a whole. This necessary minimum amount of labour is, however, also effected by other variables including the agricultural potential of a given the relative prices of outputs, inputs and consumer goods, and the stock of capital equipment owned by the household. As well as these variables the absolute number of producers in the household is also important for "this gives the chance of applying the principles of complex cooperation in work and thus, increases the power of each."<sup>8</sup>

Chayanov claimed that the minimum acceptable return to labour in peasant households varies between households. This conclusion follows directly from his analysis of the influence of household composition upon the total labour input (drudgery) tolerated by each productive member of the household. If we consider two households which are endowed with equal amounts of land and capital, one having a producer dependant ratio of 2:1 and the other of 2:4, we may expect to find lower total labour inputs per worker and hence a higher marginal return per hour worked for the first household than the second. Implicit in this argument is the normal assumption of diminishing marginal returns to labour, all other factors being held constant.

"Each new ruble of the growing family labor product can be regarded from two angles: first, from its significance for consumption, for the satiation of family needs, second, from the point of view of the drudgery that earned it. It is obvious that with the increase in produce obtained by hard work the subjective valuation of each newly gained ruble's significance for consumption decreases; but the drudgery of working for it, which will demand an ever greater amount of self-exploitation, will increase. As long as the equilibrium is not reached between the two elements being evaluated (i.e., the drudgery of the work is subjectively estimated as lower

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8. Ibid., p. 60. Chayanov continues: "Thus, every family, depending on its age, is in its different phases of development a completely distinct labour machine as regards labor force, intensity of demand, consumer-worker ratio, and the possibility of applying the principles of complex cooperation."



than the significance of the needs for whose satisfaction the labour is endured), the family, working without paid labour, has every cause to continue its economic activity. As soon as this equilibrium point is reached, however, continuing to work becomes pointless, as any further labour expenditure becomes harder for the peasant or artisan to endure than is foregoing its economic effects."<sup>9</sup>

Chayanov stated that

"If in the farm's estimation the basic equilibrium has not yet been reached, then unsatisfied demands are still quite sharp, and <sup>the</sup> family running the farm is under a very strong pressure to expand its work and to seek outlets for its labor while accepting a low level of payment. 'Due to necessity', the peasant initiates what are, at first sight the most disadvantageous undertakings.

"Conversely, if the basic equilibrium is completely met in the farm's estimation, only very high labor payment will stimulate the peasant to new work. Thus, the marginal (lowest of those allowed) payment of labour unit depends on the farm's general equilibrium and cannot be objectively determined a priori from outside ....

".... let us introduce an example to make things clear. Let us suppose that a desyatina of oats gives, excluding seed, a harvest of 60 puds; the price of oats is 1 ruble a pud, the gross income is 60 rubles, outlays on materials for the crop 20 rubles; the number of working days necessary is 25, wages are 1 ruble. Then the elements of the calculation will be:

For a Capitalist Farm

Gross income	60 x 1 ruble = 60 rubles
Expenditure:	
Outlays on materials	20
Wages	25
Net income	15

For a Family Farm

Gross income	60 x 1 ruble = 60 rubles
Expenditure:	
Outlays on materials	20
Obtained for labor payment	40 rubles
Payment per working day $x = \frac{40}{25} = 1.60$	rubles

9. Chayanov, "On the Theory of Non-Capitalist Economic Systems" in Thorner, et. al., op. cit., p. 6.

"For the capitalist farm, the crop is evidently advantageous; for the peasant farm, it is advantageous if the consumer budget may not be met by other uses of labor that give a payment for the working day higher than 1.60 rubles.

"Let us now suppose that the price of oats fell to 60 kopeks a pud.

For a Capitalist Farm

Gross income	60 x 0.6 ruble =	36 rubles
Expenditure:		
Outlays on materials		20
Wages		25
		<hr/>
Loss		9 rubles

For a Family Farm

Gross income	60 x 0.60	= 36 rubles
Expenditure:		
Outlays on materials		<u>20</u>
Obtained for labor payment		16
Payment per working day		0.64 rubles

"As is seen from the table, the capitalist farm would have a net loss of 9 rubles a desyatina, and the cultivation of oats would become absolutely disadvantageous to it. For the peasant farm, however, labor payment would fall to 64 kopeks, and this figure would be completely acceptable if the basic economic equilibrium could not be met by directing its labor to occupations that gave a higher payment.<sup>10</sup>

While this return might be acceptable for one peasant household, for another it might not be.

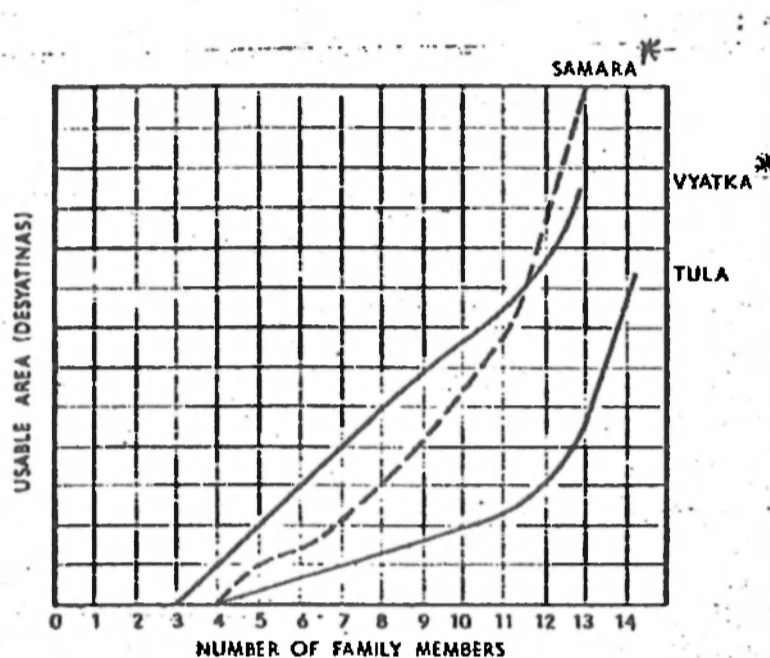
Chayanov anticipated that in a given production environment with a given soil, climate and market conditions, et cetera, income per capita would tend to be higher the higher the producer:consumer ratio of the household. In a family with a low producer:consumer ratio the work-force would be compelled to work harder and longer hours in order to achieve the desired minimum output per capita. Thus the lower the producer:consumer ratio the less the likelihood that the minimum output per capita could be exceeded due to the increasing marginal disutility of labour. Furthermore the higher the household's income per capita, the higher would be the household's propensity to save and to accumulate productive capital, which in turn would raise the output per workhour.

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10. Chayanov, op. cit., pp. 87 and 88.

DIAGRAM 1

Farm area related to family size: Russian peasant farms



\* Chayanov estimated the following equations to fit these curves:-

$$\text{Samara: } y = 0.36x^2 = 0.52x - 2.6$$

$$\text{Vyatka: } y = 4.38x = 10.5$$

Source: Chayanov, "Peasant Farm Organization", in Thorner et al., op. cit., pp. 61 and 63.

In order to test empirically the validity of his thesis Chayanov relied most heavily on the use of total cultivated area per household as an index of total family economic activity. He argued that the relationship between family development and farm size would vary between different areas, depending on variations in the form of general economic life, but that it would tend to be constant within a given area. For three areas Chayanov presented the results reproduced in Diagram 1. While this diagram tells us nothing about the determinants of output per capita it does present empirical data from Russian rural communities which demonstrates the positive relationship that one might reasonably predict between the peasant farm and family size in all areas where there is sufficient land available and where, if there is private ownership of land, there is a sufficiently flexible market in it to permit such size adjustments.

Chayanov continues, however,

"We ought to stress that at any particular moment the family is not the sole determinant of the size of a particular farm and determines its size only in a general way. The comparatively high correlation coefficients (0.4 to 0.65) established between these figures are, nevertheless, far from 1.00. This alone indicates the existence of parallel factors which in turn exert pressure on the figure being studied.

"In studying the road along which the peasant farm develops, we ought to notice that to convert the number of family working hands into farm size and income we must additionally determine: to what extent these hands may be utilized; what part of potential working time is actually expended; what is the intensity of their labor or its degree of self-exploitation; what are the available technical means of production with which labor enters the production process; how high, in the final result will be the productivity of this labor, depending on natural conditions and the market situation."<sup>11</sup>

With regard to the total labour energy expended Chayanov found that

"peasants spend a comparatively small proportion of their labor-- in all, only 25-40 per cent - on agriculture in the areas we have studied. Even if we add to this all work in crafts and trades, we still have to recognize that peasant labor is far from fully used and gives a use rate not exceeding 50 per cent."<sup>12</sup>

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11. Chayanov, "Peasant Farm Organization", op. cit. p. 69.

12. Chayanov derived these figures by relating hours worked to hours spent awake!

"The main reason for this undoubtedly lies in the particular features of labor organization in agriculture. In contrast to the processing industry, in which labor processes are not connected with any time of the day or year, a great part of the agricultural process is exclusively seasonal in nature, and some demands particularly favourable weather conditions which are not always present ....

"We must add that in different farm periods there are sharp changes not only in the number of working days but also in the intensity of each day's work."<sup>13</sup>

Since the stock of capital per worker was also seen as an important determinant of total output per worker, Chayanov was concerned to explain the forces determining capital accumulation on peasant farms. He observed that on peasant farms gross income must be divided between meeting (i) consumption needs, (ii) capital renewal (including both working capital and maintenance and occasional renewal of fixed capital), and (iii) capital augmentation.

In Novgorod guberniya Chayanov observed that as its well-being grew the peasant farm increased its capital intensity more and more until it reached a level of about 80 rubles economic expenditure per consumer. After this, the advances for capital formation increased no further, but fluctuated about this sum. (See Diagram 2). Chayanov states:

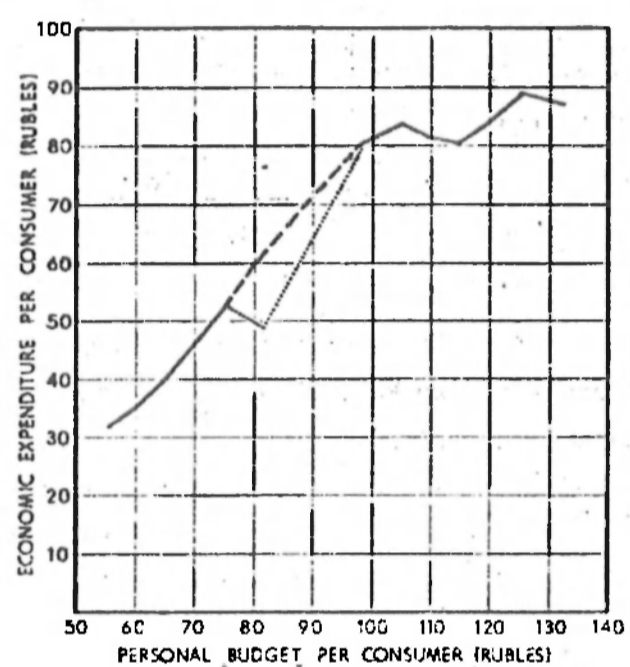
"This observation has recently been made by other economists as well as by us; it permits us to suppose that in peasant farm organization there exists a certain limit to national equipping of the work force with means of production. Any increase in capital available to the worker up to this limit obviously helps to raise labor productivity. At this limit, the maximum is reached and the available capital enables the work force to develop its full production potential. No further increase in the farm's capital intensity (unless accompanied by a change in technique, of course) can increase labor productivity and alter the basic equilibrium of on-farm factors ....

"We see that at a low level of personal budget the process of capital formation, or even only of capital renewal, cannot take place to any considerable extent. So far are elementary needs from being satisfied that there can be no thought of limiting

DIAGRAM

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ECONOMIC EXPENDITURE PER CONSUMER  
AND PERSONAL BUDGET NOVGOROD GUBERNIYA



Source: Chayanov, op. cit. p. 201

consumption and devoting any considerable amount to capital formation. Only gradually, as labor productivity increases and the personal budget can be expended to meet chief family needs one after another, is the head of the farm able to direct an ever-increasing part of income to capital renewal and formation. In other words, we can say that on the family farm advances to renew and to form capital carried out from the same budget are linked to the process of satisfying personal demands, and in every case their amount depends on the degree to which these demands are satisfied.<sup>14</sup>

Thus capital accumulation on the peasant farm may be contrasted with the same process in a capitalist undertaking. In the capitalist case "We see that the capital advanced is invested in elements of production (land, equipment, labor and so on); when these have gone through the production cycle they are sold for money and give gross income. From gross income, first, the advanced capital is renewed; then, all that remains is the undertaking's net profit. The profit is the farm's target ..."<sup>15</sup>

Chayanov observed diminishing returns to both land and capital, other factors being held constant.

As stated earlier, Chayanov observed that the peasant household usually engages in crafts and trades as well as farming. He found that in different areas the average amount of time devoted to farming and to these other activities varied, and argued that these variations were a function of variations in the relative return to labour in farming and off-farm income earning activities in different areas. Table 1 illustrates this variation in time allocation with data from three guberniyas.

Chayanov did not believe that the family farm sector should be viewed as a totally self-contained unit, completely separate from other sectors of the national economy. Rather, he held that

"Great family farm sectors of the national economy, in general always passive, are drawn into the capitalist system of the economy and subordinated to the organizing centers of capitalism. They themselves then begin to influence these centers with the peculiar features of their economic behaviour..."<sup>16</sup>

14. Chayanov, op. cit., pp. 201 and 202.

15. Chayanov, op. cit. p. 197.

16. Chayanov, op. cit. p. 225.

Table 1

	Agri- culture	Crafts & Trades	Total Prod- uctive Labor	House Work	Unused Time	Festi- vals	Total
	%	%	%	%	%	%	%
Vologda Uezd, Vologda Guberniya	24.7	18.1	42.8	4.4	33.0	19.8	100.0
Volokolamsk Uezd Moscow Guberniya	28.6	8.2	36.8		43.2	20.0	100.0
Starobel'sk Uezd, Khar'kov Guberniya	23.6	4.4	28.0	3.0	42.0	27.0	100.0

Source: Chayanov, op. cit., p. 74.

Chayanov's model is significant not only for the light which it throws upon the determination of resource allocation and household incomes in a peasant economy, but for the predictions which the model makes regarding the peasant household's response to changes in the value of exogenously determined variables which influence the household's resource allocation decisions. These variables include the prices of outputs and inputs, the quality of agricultural land and population density.

We will illustrate this using Chayanov's own example with respect to the rent of agricultural land. Chayanov argued that the peasant household's response to changes in the variables just mentioned is ultimately manifested in changes in the values of the only four general economic realities in the peasant farm system. These are (i) the farm's gross income, (ii) sums spent from it on capital renewal, (iii) the family personal budget, and (iv) savings not invested in the farmer's own farm.

Chayanov maintained that it is impossible to impute rent to peasant farm land since there is no wage category objectively given. Secondly, where peasants hire land both the determinants of the price which they are prepared to pay and the level of the price paid differ from those on capitalist farms. He continued:

"To construct a theory of economic rent elements on the labor farm, it seems to us necessary to trace the effect on it to the usual rent-forming factors that create and quantitatively determine the differential rent of capitalist agriculture. It is clear that for the peasant farm both better quality of fields and more favourable situation of the farm as regards the market leads either to a fall in material expenditure and labor effort to obtain the same gross income, or to a rise in this income given the same expenditure and labor effort.



"In both cases, this will mean for the labor farm an increased payment per labor unit in more favourable conditions as regards economic rent. It will lead to establishing a new equilibrium between drudgery of labor and demand satisfaction.<sup>17</sup>

The consequences of a shift to better quality land are an increase in the peasant household's consumption level, a lowering of labour intensity and an increase in the farm's power to form capital.

Chayanov concluded:

"It is clear that the peasant labor farm will consider worthwhile the rent paid for any plot of land that enables it to achieve its internal balance at a more favourable point of equilibrium between drudgery of labor and demand satisfaction than it would have without it. To do this, it is necessary that other than the deduction for rent the labor used on the rented land should receive from income a payment higher than the marginal payment obtainable if the equilibrium of on-farm factors were established without the rent payment ....

"In accordance with this, in areas where there is a vast amount of land, where net labor payment on peasant farms is no lower than wages, and where farms operate at optimal intensity, the peasant farm will, if it has to pay rent, pay no more than capitalist farms, and more probably will take land only at lower amounts.<sup>18</sup> In over populated areas, however, in order to establish its internal equilibrium the peasant farm is obliged to force up intensification far above the optimum.

Where payment per labor unit in the peasant farm's usual sectors is lower than the capitalist farm's wages, the peasant farm will consider it worthwhile to pay a much higher rent than the capitalist rent. This will leave it a labor payment below farm wages. Nevertheless, given a severe pressure on the land, these 'hunger rents' .... can improve the peasant farm's internal equilibrium point ....

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17. Chayanov, op. cit. p. 230

18. It has been suggested that this statement cannot hold in conditions of a competitive land market. One possible explanation is that Chayanov meant that peasants would probably only be willing to take up additional land at a lower price, since, assuming capitalists and peasants farm land of the same quality, in a competitive market only one price could prevail. A more probable explanation derives from the fact that peasants and capitalist farmers operated very different sized holdings, and in such circumstances peasants may be interested in leasing in from capitalist farmers for varying periods pockets of land which the latter do not wish to use.

"This brings us to a paradoxical conclusion: in overpopulated areas, the poorest peasant families will pay the highest prices for land and in rent.<sup>19</sup>

The consequences for the peasant household of a change in land rent are analogous to those that derive from changes in other exogenous variables such as the quality of farm machines, the prices of inputs and outputs and the price of capital.

One other apparent paradox in the behaviour of peasant economic systems should also be mentioned. In Chayanov's words:

"We may theoretically assert that peasant family division of labor between earnings from agriculture and from crafts and trades is achieved by a comparison of the market situation in these two branches of the national economy. And since the relationship between these two market situations is inconstant, the relationship between labor expenditure on crafts and trades and on agriculture also inconstant. In years of an unfavourable agricultural market situation - for example, given a harvest failure - the impossibility of attaining the economic equilibrium with the help of general agricultural occupations obliges the peasants to cast onto the labor market a huge quantity of peasant working hands who look for a livelihood from crafts and trades. As a result, we have the situation - normal for Russia, but paradoxical from a Western viewpoint - in which periods of high grain prices are, at the same time, periods of low wages.<sup>20</sup>

Let us now turn to consider whether the Chayanov model is applicable in the Mbere context. Since the model starts from the assumption of a non-wage economic unit, the first question that we must ask is whether such units are a dominant feature of the Mbere economy. To this the answer lies in the affirmative. Only a very small minority of Mbere households employ farm labour on a permanent basis. The great majority employ either no labour at all or a little casual labour at peak seasons, this latter constituting a very small proportion of the total labour input. Of fifty-two households taken into a twelve month case-study in 1972/3 five employed permanent labour; three young girls as maids, two young boys as herdsboys and one adult farm-hand; and a

19. Chayanov, op. cit., pp. 234 and 235.

20. Chayanov, op. cit. p. 109.

random sample survey of 205 households throughout the division revealed that five per cent of all households employed permanent labour.

Chayanov concluded that for non-wage economic units there could be no objective measurement-of-labour costs and hence no measurement of profits. Our next question must therefore be: do these conclusions also hold in Mbere? It may seem strange to ask this question at all, since if certain conclusions follow from a given premise in one context, they might also be expected to do so in any other context in which the conditions of the first premise are met. However, it is logically possible that the same conclusions might not hold in Mbere. This would be the case if it were possible in Mbere to measure objectively the marginal returns to labour in the range of different uses in which it is normally employed in this area and if it were found both that the mean return in different uses was constant and that the variation about the mean was low. Such conditions would differ markedly from those observed by Chayanov, for it was the variation in the observed marginal return to on-farm labour between households that impressed him and which is, of course, an essential feature of his model.

In Mbere we observed two phenomena. Firstly, there also is a very wide variation in returns to labour. These are illustrated in Table 2. Secondly, there appears in Mbere to be a notable tendency for the average return to labour in different activities such as crop production, livestock production and part-time off-farm income-earning activities to tend towards shs.-/40 per hour, which is itself equal to the normal rate of pay of casual farm labour in the area and in neighbouring Upper Embu.<sup>21</sup> since the data on which this statement is based derive from a small number of case-study households, we cannot claim that this impression is definitely correct. Assuming, however, that it is correct does this finding mean that in Mbere we must modify Chayanov's conclusion concerning the impossibility of measuring profit on predominantly non-wage economic units? The answer is no: Chayanov's conclusion stands. Even if the mean is constant the conclusion stands due to the very high observed variations about the mean. For these variations signify that the objective returns to labour vary widely between households. Hence the use of a single figure to value all labour costs would mean that we would find all households with returns to labour below the mean operating at loss, which once again generates the apparently nonsensical result that many households remain in business year after year when they are apparently earning a negative profit.

It was precisely this wide variation in the returns to labour in peasant communities which led Chayanov to develop his theory of peasant

21. Whither many Mbere migrate temporarily in search of farm-work following a crop-failure in their own area.

Table 2

A Returns/Hour to Labour Used in Crop Production<sup>(1)</sup>

<u>Farm No.</u>	<u>1st (Short Rains) Season</u>	<u>Both Seasons Taken Together</u>
1	-/50	-/44
2	-/52	-/47
3	-/89	-/82
4	-/36	-/29
5	-/57	-/57
(6	-/32	-/29
(6	-/66 (adult labour only)	
7	-/43	-/37
8	-/32	-/30
9	-/24	-/22
11	-/24	
	<u>-/44</u>	<u>-/40</u>
20	1/07	-/77
17	-/54	-/42
19	-/52	-/41
22	-/85	-/67
21	-/94	-/76
23	-/55	-/42 (?)
	<u>-/75</u>	<u>-/52</u>
28	-/35	-/25
29	-/53	-/39
30	-/20/	-/12
31	-/40	-/27
32	-/24	-/19
(33	-/31	-/13
(33	-/42 (adult labour only)	
34	-/20	-/14
	<u>-/32</u>	<u>-/21</u>

(1) Figures are given for all households taken into the case-study for which on the basis of twelve months' daily records of labour use plus comprehensive crop yield estimates complete estimates of returns to labour are available.

B Returns Hour to Livestock Production

Farm No.	Herd Size	Herd Size	Adult Labour	Child Labour	Total Value of Production		Return per Hour	
	(Oct 1972) Cattle	(Oct 1972) Sheep & Goats	Hours Over 12 Months	Hours Over 12 months F=Family H=Hired	Prior to Deduction to Labour Costs	Net of Hired Labour	Adult Labour Only	Total Labour
2	1	9	106	3155(F)	443/=	443/=	4/18	-/14
3	0	13	569	1184(F)	332/=	332/=	-/58	-/19
6	11	5	140	2900(H)	580/=	388/=	2/77	-/20
7	0	12	155	623	223/=	223/=	1/44	-/29
14	0	1	208	0	100/=	100/=	-/48	-/48
16	0	4	73	276(F)	250/=	250/=	3/42	-/72
20	0	4	463	281(F)	118/=	118/=	-/25	-/16
9	8	3	572	0	420/=	420/=	-/73	-/73
28*	0	8	1061	0	1752/=	1752/=	1/62	1/62
29*	0	11	1158	1447(F)	1400/=	1400/=	1/21	-/54
30	10	19	3101	0	592/=	592/=	-/20	-/20
Mean							1/54	-/46

\*Received dowry during year

C Returns Hour to Off-farm Income-earning Activities Engaged in by Mbere Adults Without Full-time Off-farm Employment

Activity		Return/hour*
Livestock trading	men only	0 up to 1/=
Maintaining beehives	" "	0 up to 2/=
Making and selling charcoal	" "	-/31 - -/80
		Mean = -/55
Cutting and selling sisal	" "	-/71
Working in quarry		-/75
House-building		-/80
Working sugar cane press at a bar		-/95
Working on SRDP water trench		1/-
Tailoring	men and women	1/20
Farm Labouring in Upper Embu or Mbere	" "	-/40
Making and selling beer	" "	-/46
Crop trading	women only	0 up to 1/-

<u>Activity</u>		<u>Return/Hour</u>	
Selling mandasi and gruel	Woman only	-/26	-/76
Collecting and selling firewood	" "	-/25	
Collecting and selling thatching grass	" "	-/21	
Making and selling sisal strings			/18

\*Where one figure only is given this represents an average for all observations.

economy with its emphasis upon the importance of family size and the producer: consumer ratio as determinants of variations in returns to labour within a given area.

As pointed out earlier, Chayanov held that variations in family size were closely associated with variations in sown area on the family farm, and that variations in the producer:consumer ratio of different households were closely associated with variations in hours worked per producer. We have therefore three dependant variables (size of cultivated area, hours worked per producer and per capita income) all of which Chayanov claimed are influenced by the demographic make-up of the family (in terms of family size and the producer:dependant ratio). Let us now turn to consider whether in Mberere also family size and the producer:dependant ratio are closely associated with these dependant variables.

Table 3 and Diagram 3 relate family size (in standardised consumption units) to cultivated area for 38 case-study households. They reveal a marked tendency for both variables to increase in size together. A rank correlation test confirmed the strong positive association between the two, being significant at the 0.01 (1 per cent) level.

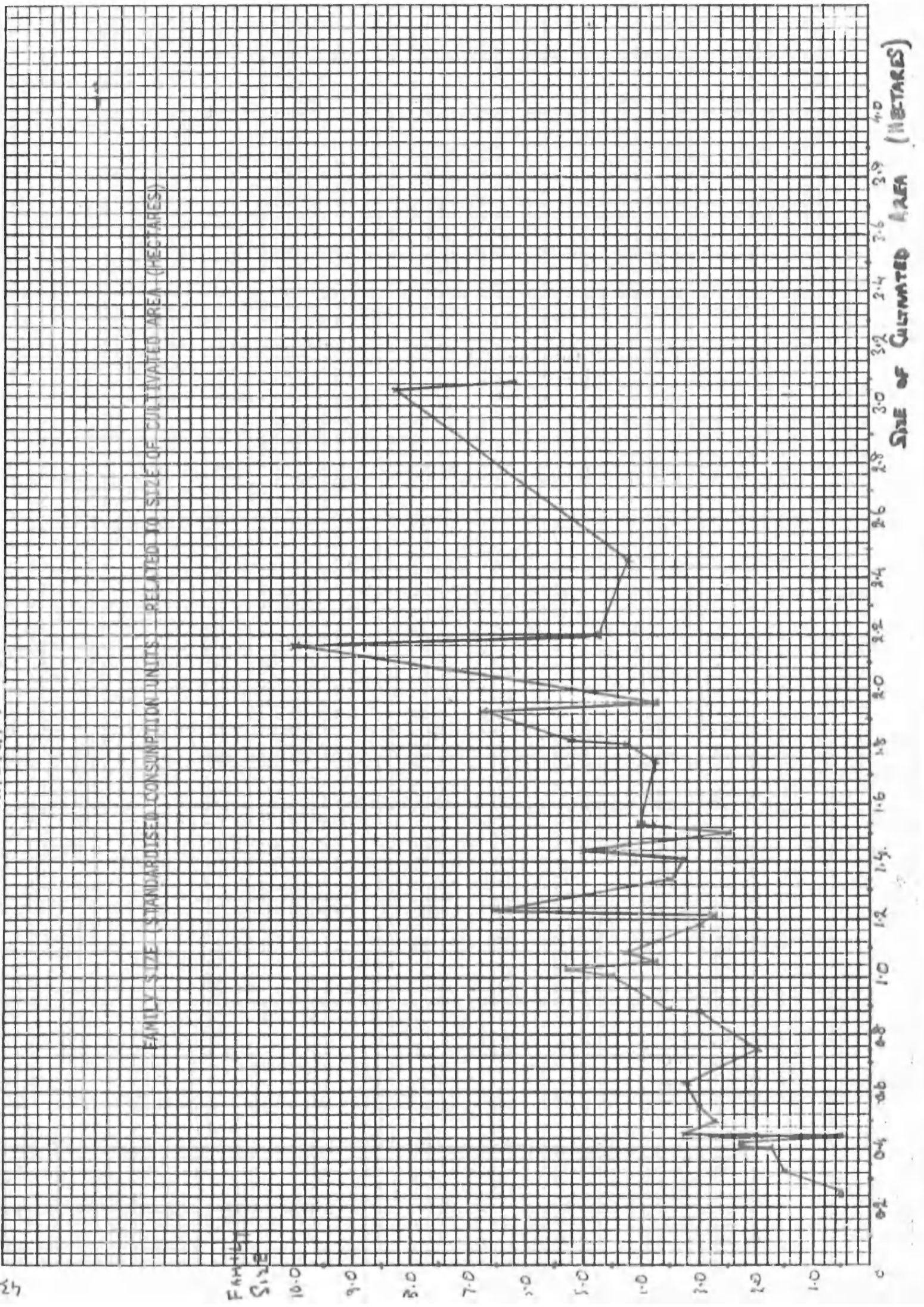
Table 3

Size of Cultivated Area related to Family Size \*  
38 Case-Study Households

Family Size (Standardized Consumption Units)	Cultivated Area (Square metres) 1 hectare = 10,000 sq. m.	Family size (Standardized Consumption Units)	Cultivated Area (Square metres)
0.50	2431.5	4.25	10989.2
0.50	2477.3	3.00	11799.0
1.50	3237.3	2.75	12153.0
1.75	4042.7	6.50	12336.0
2.25	4152.7	3.50	13422.0
2.25	4270.5	3.25	14160.0
0.50	367.5	5.00	14476.3
2.50	4600.0	4.25	14649.0
1.75	4607.8	2.50	15000.0
3.25	4622.8	4.00	15362.0
2.75	5120.0	3.75	17500.0
3.00	5412.7	4.25	18108.0
1.75	6259.0	5.25	18255.0
3.00	7510.0	6.75	19399.7
3.50	8823.0	4.00	19610.0
3.50	8854.0	10.00	21640.7
4.50	10147.0	4.75	22041.0
5.25	10318.5	4.25	24659.0
3.75	10608.0	8.25	30633.2
		6.25	30872.0

\* Family members aged 12-59 are counted as one consumption unit each. Family members aged 3-11 and 60 and over counted as a half each, and family members aged less than 3 are counted as a quarter each. The family does not include permanent employees. It includes all adults resident at home, whether or not they work on the farm, but excludes those who live and work elsewhere.

INDONESIA



SIZE OF CULTIVATED AREA (HECTARES)



Table 4 presents data relating hours worked per adult per annum to the household produce:consumer ratio. In this case Chayanov hypothesised an inverse correlation between the two variables. The case-study data also support this hypothesis. For the 29 households for whom the data were available the rank correlation coefficient is again significant at the 0.01 level.

It is when we turn to examine the relationship between the producer: consumer (P:C) ratio and per capita income that we find the Chayanov model ceases to hold in the Mbere context. For the 23 Mbere households for whom comprehensive income estimates were made there is no correlation at all between the P:C ratio and per capita income (see Table 5). The main explanation for this lies in a phenomenon which Chayanov did not consider: the variation in the formal educational attainment of the household heads. This phenomenon was obviously of little importance in determining income distribution amongst peasant households in pre-revolution Russia. In Kenya, however, ever since the early decades of this century experience of formal education has been generally the sine qua non for access to better paying jobs. Since Independence in 1963 there has been a massive expansion of the educational sector, of which one of the most notable features has been the expansion of primary education in rural areas.

IN the final column of Table 5 we have listed the educational attainment of the heads of the 23 households whose per capita incomes are listed in the table. Although one or two households go against the trend (particularly household number 6, which has a high per capita income although the household head has had no formal education) even this small group of households reveals a marked contrast between the mean income of those households where the head has received some formal education (Shs 604/=) and those where the head had received no education (Shs 398/=).

Data obtained from the random sample survey confirm this distinction. Multiple regression analysis revealed that education alone explains 19 per cent of the variation in wealth between households in Mbere.

Chayanov also claimed that for a given area and a given producer: consumer ratio households with a relatively large number of productive members would achieve a relatively high value of output per productive member due to exploitation of economies of scale in allocating labour time. This hypothesis cannot be reliably tested against the case-study

data since the total number of households for which comprehensive income data is available is too small for it to be possible to meaningful subdivide them into groups with different P:C ratios. However, given the importance which we have already found attaches to formal education in the determination of differences in per capita income, we would be unlikely to find that the number of producers exerts a very noticeable influence upon per capita output for households with a given P:C ratio.

The limited data that was obtained from the case-study households which is relevant to the testing of this hypothesis is listed in Table 6. From the table we can see that there is certainly no market trend apparent of the kind Chayanov refers to. The ten households where the head had received no education neither consistently confirm nor refute the hypothesis - clearly a much larger sample is needed in order to reach a clear conclusion. For there is one reason for supposing that there is some scope for obtaining economies of scale in labour use. This lies in the nature of the task which we have classified as housework. For most of these, such as fetching water and firewood, the amount of time required for their completion may increase as household size increases, but at a slower rate than the rate of increase of household size. Thus it is certainly possible that where both the P:C ratio and education are held constant there might be some increase in output per producer (or in leisure time per producer) as the number of productive members of the household increases. Compared with the potential influence of education on per capita income, however, we may expect the potential impact of economies of scale in labour use to be small, for there appears to be relatively little scope for the exploitation of economies of scale in what we have classified as actual productive activities in Mbere (which exclude housework). Thus the impact of such economies of scale on total output or leisure time must derive predominantly from the impact of labour "released" from housework.

Chayanov held that in a peasant household production takes place not up to the point where the objectively measurable marginal cost equals marginal revenue but to the point where the marginal utility of output equals the marginal disutility of work. This statement cannot be submitted to any sort of objective test. All that we can say is that in Mbere it appears to describe accurately the basis upon which labour is allocated to farming and to casual off-farm income earning activities (i.e. those off-farm income earning activities that are not undertaken on a regular basis working more or less fixed hours.) For the small minority with regular

Farm No.	Producer:Consumer Ratio*	Ranking for Producer: Consumer Ratio	Hours Worked Per Resident Adult	Ranking for Hours Worked
1	1:1	21	1783	11
2	0.51:1	2	1432	19
3	0.77:1	13	2018	7
4	0.47:1	1	1867	9
5	0.67:1	10	2260	3
6	0.57:1	4	2593	2
7	0.62:1	7	2202	6
8	0.77:1	14	2211	5
9	1:1	21	2598	1
14	0.88:1	15	1853	10
15	1:1	23	1583	15
16	0.57:1	5	1553	16
18	1.14:1	27	1318	24
19	1:1	24	812	29
20	0.69:1	11	1873	8
21	0.74:1	12	1362	22
22	0.89:1	16	1473	18
28	0.95:1	20	1689	12
29	0.61:1	6	1585	14
30	0.91:1	18	2248	4
31	1.14:1	28	956	27
32	1.14:1	29	1246	25
34	1:1	25	1426	20
35	1:1	26	884	28
36	0.92:1	19	1368	21
37	0.63:1	8	1513	17
38	0.51:1	3	1663	13
39	0.64:1	9	1361	23
40	0.89:1	17	1119	26

\* including absent household head

Table 5

Producer:Consumer Ratio and Per Capita Income for 23 Case-Study Households

1	2	3	4	5	6	7	8
Farm Number	Total Income (Shs)	No. of Consumer Equivalent	Income per Consumer Equivalent	Rank	P:C (incl. absent males)	P:C Rank	Educ. of Household Head
1	1262.0	4.0	315.5	5	1	17	P1-4
2	1351.0	4.25	317.9	6	0.51	3	0
3	2488.0	3.25	765.5	19	0.77	12	P1-4
4	531.0	3	177.0	1	0.47	2	0
5	5463.0	6.25	874.1	20	0.67	8	P5-end
6	3473.0	3.5	992.3	22	0.57	4	0
7	1405	3.25	432.3	13	0.62	6	0
8	864	3.5	246.9	2	0.77	13	0
9	679	1.5	435.0	14	1.0	18	0
12	1730	5.25	330.0	7	0.46	1	0
14	2250	2.5	900.0	21	0.88	14	P1-4
16	2200	3.5	639.0	17	0.57	5	P1-4
17	2070	2.75	752.7	18	0.73	10	S3-4
18	2104	3.5	601.1	16	1.14	20	P1-4
19	900	3.0	300.0	4	1	19	0
20	1204	3.5	344.0	8	0.69	9	P1-4
21	1155	3.25	355.4	9	0.74	11	0
22	846	2.25	376.0	10	0.89	15	0
28	1955	4.75	411.6	11	0.95	16	P1-4
29		4.5					
30	1427	3.0	479.0	15	1.23	23	P1-4
31	522	1.75	298.3	3	1.14	21	P5-end
32	736	1.75	420.6	12	1.14	22	P5-end + mechanics training
39	4500	4.25	1058.8	23	0.64	7	S3-4

Note 1: Persons aged 12-59 equal 1 consumer equivalent each; those aged 60+ and children aged 3-11 equal one half consumer equivalent each; babies equal one quarter.

Note 2: In column 8 the educational attainment of the household head is listed by specified ranges of years of schooling and not by the exact number of years of school received.

off-farm work who are earning regular pay Chayanov's statement presumably often does not hold. For an important cost of possessing a regular job is the loss of the worker's freedom to determine the number of hours he or she works each day. Evidence to support our presumption that Chayanov's statement is correct with regard to the first group of income-earning activities mentioned lies in the fact that households do indeed accept varying marginal returns to work. We may suggest that the readiness of some households to accept relatively low returns derives partly from such factors as (a) ignorance of potential returns that might be obtained and (b) the psychic satisfaction that may derive from the visits and commendation of the extension service and of the "important visitors" that they may sometimes bring with them, as well as from such important factors as the variation in produce:dependant ratios, in the absolute number of producers per household, and in the stock of farm capital. But acceptance of the influence of all these variables in determining per capita output in no way alters the fundamental fact that some people work much longer hours than others even when the objectively valued marginal return to their labour is notably low. This can only be explained in terms of variations in the subjective valuation of the utility of output and the disutility of labour.

As stated earlier, Chayanov also observed that on peasant farms gross income must be divided between meeting (i) consumption needs, (ii) capital renewal and (iii) capital augmentation. He claimed that as its well-being grows the peasant farm increases its capital intensity up to a certain equilibrium level beyond which point he implies that the marginal cost of further capital accumulation would exceed the marginal return.

We have some data obtained from the case-study households which enables us to consider whether Chayanov's observation holds also in Mbere. Certainly one would expect the allocation of resources to capital renewal and accumulate to increase as gross income per capita rises. In Table 7 we examine this hypothesis. Columns 2 and 6 in this table list the total cash outlays on farming by 23 case-study households during 1972-73. Columns 2 - 4 refer to working capital and columns 5 and 6 refer to fixed capital. The rank correlation coefficient for total capital outlays and total capita income is significant at the 0.05 level. Thus, although some households are ranked very differently in columns 8 and 10 (especially farms numbers 2, 3, 12 and 17) the data do reveal a general tendency for those with the highest total per capita income to spend most on farm working capital and capital accumulation.

Table 6

Output per Producer Related to the Number of  
Producers in Each Household

Farm No.	P:C Ratio	Rank	Total Income (Shs)	No. of Producers	Rank	Value of Output per Producer	Rank
1	1	17	1262-00	4	21	315.5	1
2*	0.51	3	1351-00	2.16	13	628.4	12
3	0.77	12	2488-00	2.5	17	995.2	17
4*	0.47	2	531-00	1.41	3	379.3	3
5	0.67	8	5463-00	4.2	22	1300.7	21
6*	0.57	4	3473-00	2.0	7	1736.5	22
7*	0.62	6	1405-00	2.0	8	702.5	14
8*	0.77	13	864-00	2.4	15	360.0	2
9*	1.0	18	679-00	1.5	5	452.7	
12*	0.46	1	1730-00	3.8	20	455.36	8
14	0.88	14	2250-00	2.2	14	1022.7	18
16	0.57	5	2200-00	2.0	9	1100.0	20
17	0.73	10	2070-00	2.0	10	1035.0	19
18	1.14	20	2104-00	3.0	19	701.3	13
19*	1	19	900-00	2.0	11	450.0	6
20	0.69	9	1204-00	1.4	4	860.0	16
21*	0.74	11	1155-00	2.4	16	481.3	9
22*	0.89	15	846-00	2.0	12	423.0	4
28	0.95	16	1955-00	4.5	23	434.4	5
30	1.23	23	1437-00	2.65	18	542.3	11
31	1.14	21	522-00	1.00	1	522.0	10
32	1.14	22	736-00	1.00	2	736.0	15
39	0.64	7	4500-00	1.70	6	2647.1	23

\* Household head has received no formal education

The seasonality of allocation of labour to farming and the seasonal variations in intensity of farm-work both of which were observed by Chayanov in Russia were observed to exist in Mbere as they did on peasant farms in Russia, and as they have been observed to do in many farm systems throughout the world.

From the case-study records (See Tables 8 and 9) we have summarised the allocation of labour time to the two main crop mixtures (i.e. those having maize or millet as the dominant grain) over one complete good rainfall season. The conflated results do not give very specific calendar dates for the various activities performed. This is because, due to the uncertainty in the timing of the onset of the rains and variability in resource constraints between households, the optimal planting date, which determines the optimal timing of the performance of subsequent activities, varies between households. Broadly speaking, however, the pattern of labour inputs into crop production in a good short rains season may be represented as in Diagram 3.

In Russia Chayanov also noted that the division of labour between on-farm and off-farm income earning activities was determined by the relative return to the obtained in each. The same also appears to apply to Mbere. J.N., when asked why he neglected his cotton in order to give time to charcoal production replied that he earned a better income from the latter (which was indeed true) and those who can get regular paid employment prefer this to farming. It was noted that whenever men do have full-time off-farm work they expect their wives to continue to work the land. This makes sound economic sense since housework is not a full-time activity. What is perhaps more remarkable is the amount of capital that some of these men are prepared to sink into crop-production out of their savings from off-farm work. (Farm number 39 is a case in point.). The returns to these investments in additional working capital are often low or negative due to the failure of the rains. The readiness of such people to make these investments can only be explained in terms of a desire to pioneer farm innovation in Mbere despite the high risk attached to doing so. Although crop production potential is poor in Mbere, crop production has become over the past century an important component of the Mbere way of life.

Table 8: Mean Time-Flow of Labour Inputs into Production of Millet Mixtures, Short Rains 1972/73.

Study Site	Land	Crop	Clean- ing	Date	Plant- ing	Date	Weed- ing	Date	Scar- ing	Date	Harvest- ing	Date	Thresh- ing	Date
	1 Hectare	Millet Mixture												
Ishiana			220		94		414		433		137		125	
Kamugu			167		99		625		631		252		157	
Kiritiri			93		75		288		355		169		111	
Overall Average			160	July- Sept.	89	2nd half Sept. & all Oct.	442	1st weeding Nov. & 2nd weed- ing Dec.	473	2nd half Sept. & all Oct. & Dec.-Feb.	186	2nd half Jan. & 1st half Feb.	131	Feb.- March

\* Does not include transporting crop to homestead or to market.



Table 9: Mean Time-Flow of Labour Inputs into Production of Maize Mixtures: Short Rains 1972/73.\*

Study	Land	Crop	Clear- ing	Date	Plant- ing	Date	Weed- ing	Date	Scar- ing	Date	Harvest- ing	Date	Thresh- ing	Date
	1 Hectare Maize Mixture													
Ishiarara			193		85		275		385		127		70	
Kamugu			154		64		724		345		148		64	
Kiritiri			77		66		339		60		142		62	
										2nd half Sept. & all Oct. & Dec.- Feb.				
Overall Average			141	July- Sept.	72	2nd half Sept. & all Oct.	446	1st weed- ing Nov.; 2nd weed- ing Dec.	263		139	1st half Feb. & 2nd half March	65	when needed

\* Does not include transporting crop to homestead or to market.

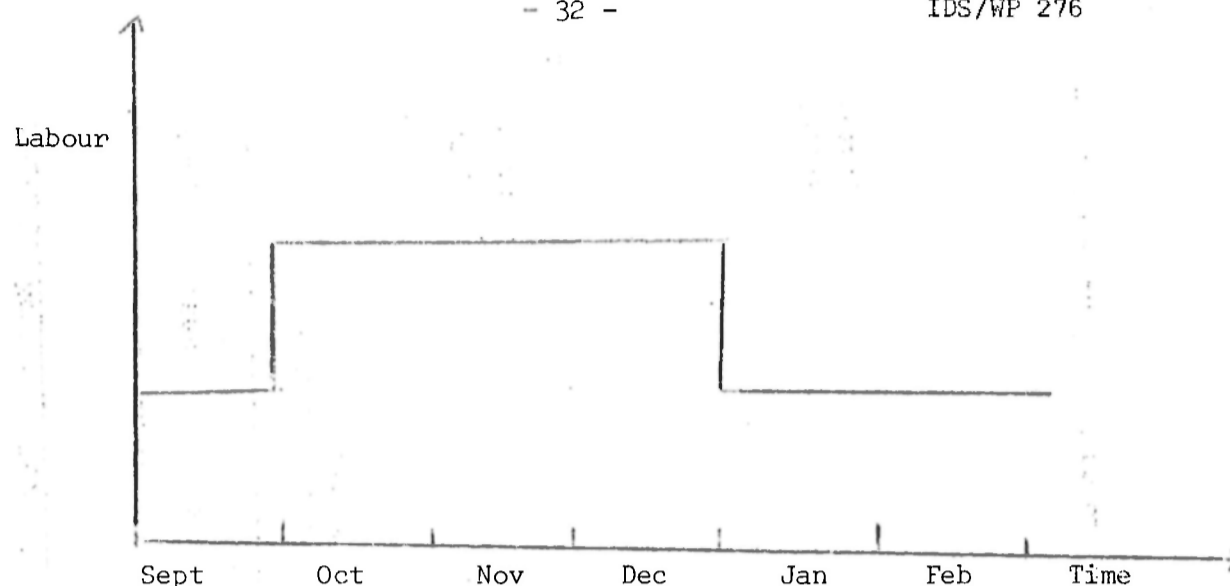


Diagram 3.

In Mbere some of the better paying casual off-farm jobs exploited by farm households are not available on a regular basis. For example, work on the construction of the Special Rural Development Program pipeline was available for a limited number of months; work cutting sisal for the Meka sisal factory is available only when sisal prices are high enough to make it attractive for the sisal factory to operate; and work quarrying stones or digging sand from a stream bed is only available when the contract wants the work done. Consequently the relative profitability of farming compared with the available off-farm work will vary over time for a given household depending upon what off-farm work is available.

Chayanov also observed that in Russia a series of exogenously determined variables influence output per capita, and the same also applies in Mbere. These variables include population density, the natural quality of the land, climate, proximity to markets and the prices of inputs and outputs. However, Mbere population density tends to be greatest where water availability is most favourable to farming, so that there is no significant difference in the average total wealth of households in the more and less well-watered areas.

Also as in Russia we might expect the family farm in Mbere necessarily to enter into economic relationships with the broader capitalistic economic network which governs economic life in the modern sector of the Kenyan economy. We cannot illustrate this for Mbere as we did for Chayanov's own model with the example of the impact of changes in the rent of agricultural land on household resource allocation because during

Cash Outlays on Farm Production October 1972-September 1973 (Shillings)

1	2	3	4	5	6	7	8	9	10
Farm No.	Seed	Labour Hire for crop Production	Livestock Maintenance (incl. herds-boy)	Livestock Acquisition	Other	Total Outlay	Rank	Total Income Per capita	Rank
1	5-75	0	0	0	0	5-57	8	315.50	5
2	4-45	0	4.00	140-00	0	148-45	20	317.90	6
3	2-00	0	0	0	0	2-00	3	765.50	19
4	5-50	0	0	0	0	5-50	7	177.00	1
5	26-00	40-00	0	0	0	66-00	17	874.10	20
6	5-75	129-00	192-00	0	0	326-75	21	992.30	22
7	4-00	0	0	0	0	4-00	5	432.30	13
8	0-95	0	0	0	0	0-95	2	246.90	2
9	2-00	0	0	0	0	2-00	4	453.00	14
10	18-25	38-00	0	300-00	0	356-25	22	330.00	7
14	36-00	0	0	80-00	0	116-00	18	900.00	21
16	30-00	96-00	0	0	0	126-00	19	629.00	17
17	4-00	0	0	0	0	4-00	6	752.70	18
18	28-50	0	0	0	0	28-50	13	601.10	16
19	10-50	0	0	0	0	10-50	11	300.00	14
20	16-80	14-00	0	0	0	32-80	15	340.00	8
21	28-50	0	0	0	0	28-50	14	355.50	9
28	10-30	0	0	0	0	10-30	10	376.00	10
28	17-50	6	0	0	0	23-50	12	411.60	11
30	12-00	7-00	9-00	0	50-00	78-00	17	479.00	15
31	6	0	0	0	0	0	1	298.30	3
32	1-00	8-00	0	0	0	9-00	19	426.60	12
39	30-00	1130-00*	0	0	0	1160-00	23	1058.80	23

\* Some of this labour was used for the construction of fixed capital

1972-73 most land in Mbere had not been adjudicated and there was neither widespread ownership of freehold title (ultimate disposal of most land still being controlled by the clan elders) nor a developed market for agricultural land. Also, there was minimal use of purchased agricultural inputs except amongst a small minority of relatively wealthy farmers, and most farmers produced their output primarily for home consumption, selling only the surplus produced in good seasons.

It is in the market for food-crops and the sale of agricultural labour time to the more prosperous farms in Upper Embu that we might expect to observe the distinctive relationships of a non-wage family economy with the impersonal market system. We do indeed observe that farm households in Mbere tend to sell their surplus output in precisely those periods of plenty when prices are low. But we must acknowledge that this phenomenon can also be observed in other more advanced farm systems in Europe and U.S.A., and is not in fact peculiar to peasant farm systems.

With respect to the price of peasant labour, Chayanov observed in Russia that in years of an unfavourable agricultural market situation - for example, given a harvest failure - the impossibility of attaining economic equilibrium with the help of general agricultural occupations obliges peasants to cast onto the labour market a huge quantity of peasant working hands. Consequently periods of high grain prices are, at the same time, periods of low wages.

It is remarkable that this phenomenon of a wage fall does not apparently occur in the Mbere economy. The reasons for this appear to be firstly that the Mbere, even in a dry season when they migrate to Upper Embu in relatively large numbers to look for work, do not constitute a sufficiently large proportion of the farm work-force in surrounding areas to exert a marked influence on agricultural wages, and secondly that whenever there is a tendency for money wages to fall, the Mbere request payment in kind, usually in the form of specified quantities of maize.

That we do not observe the same range of distinctive relationships between the farm family economy of Mbere and the capitalist market system as Chayanov observed among peasant communities in Russia derives from the fact that for most Mbere households the Mbere economy is as yet less fully integrated with a broader market economy than was the case in Russia.

We are now in a position to recapitulate. There follows in Table 8 a summary of the key features of Chayanov's model together with an indication of whether each feature is applicable in the Mbere context.

Thus we may conclude that in most respects Chayanov's model of the determinants of peasant farm resource allocation also explains household resource allocation in Mbere. The most important modification that we need to make in Mbere is that the dominant determinants of variations in per capita income in Mbere are experience of formal education and access to full-time off-farm work which are in fact closely related. Also, two phenomena which appeared to Chayanov to be of importance in Russia are as yet of less significance in Mbere, in one case because the Mbere farm economy is technologically less advanced than the peasant farm systems observed by Chayanov (feature no. 6) and in the other because it is less fully integrated into a wider capitalistic market economy than were the communities studied by Chayanov (feature no. 12).

For purposes of planning the promotion of farm development in areas of relatively traditional family farming such as Mbere an understanding of the determinants of household resource allocation is of considerable importance. This is chiefly because it must be appreciated by planners and extension staff that households must be expected to respond differently and not uniformly to a given economic opportunity depending upon their subjective evaluation of the utility to be derived from it and the disutility of allocating resources to it. The smaller the potential increase in income (objectively measured) to be derived from a particular recommendation the more varied the response of different households to it is likely to be.

Chayanov himself was not so concerned to explain innovation on peasant farms as the use of working capital and accumulation of fixed capital where both represented the use of already tried techniques. In Mbere and other such areas it is important also to explain readiness to innovate. In concluding this paper, therefore, we note that as with the use of capital, so we may also expect the allocation of all resources - land and labour as well as capital - for innovatory purposes to rise as household capita income rises. The data to support this additional feature of

the model are presented elsewhere<sup>1</sup> Whereas in the case of capital, as per capita income rises a larger surplus becomes available for "ploughing back", in the case of land and labour, as per capita income rises a larger surplus becomes available to protect households against the risk and uncertainty which for individual households are inevitably associated with shifting these resources from their more traditional uses.

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<sup>1</sup> See Diana Hunt, Farm Innovation in Mbere, I.D.S. Working Paper No. 166, 1974.

Table 8

<u>Feature</u>	<u>Relevance in Mbere</u>
1. Dominance of the non-wage family economic unit	
2. Due to (1) impossible to calculate profit according to capitalist formula.	
3. For each household family size influences the size of the cultivated area.	
4. For each household the producer:consumer ratio influences the hours worked per adult.	
5. For each household the producer:consumer ratio determines the value of total output per capita	In Mbere experience of formal education and access to full-time off-farm work are the chief determinants of variations in per capita income.
6. In a given area the number of producers in a household influences the level of output per producer.	Possible as a result of economic of scale in housework.
7. For each household production takes place up to the point where the marginal utility of output is equal to the marginal disutility of work.	
8. For each household as the value of output per capita rises the allocation of resources to the acquisition of farmworking and overhead capital tends to increase.	
9. There is a seasonal variation in the application of labour to farming and in the intensity of farm work.	
10. The farm family also allocates labour to off-farm work. The extent to which it does so is influenced by the relative return to labour in different uses.	
11. Other exogenous variables such as climate, the quality of soil, population density also influence the value of total farm output.	
12. The peasant farm economy may be expected to respond to changes in the values of exogenously determined variables such as the price of farm outputs and inputs and the price of agricultural land in a different manner from that in which the capitalist farm responds.	Potentially true but of little relevance as yet in Mbere.

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