The Chayanov Concept of a Peasant Farm Economy

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The *Chayanov* Concept of a Peasant Farm Economy

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SUMMARY

This paper concentrates on "**The Theory of Peasant Economy**" introduced by the Russian economist A.V. Chayanov. The peasant farm theory assumes that no labor market exists, hence farm household entirely reliant on family labor. Lack of labor market causes households to make two subjective decisions:(1) **work on farm,** (2) **work-avoidance on farm.** These two decisions conflict each other: work on farm is an income objective in order to satisfy consumption needs; work avoidance involves households to do separate activities than farm work which is against with income generation. The main factor influencing such household decisions is the **demographic structure** of the households. This factor is summarized in the theory by the **ratio of consumers to workers** in the family, called the **c/w ratio.** Using the family size and structure of the peasant house holds,the theory explains the **demographic cycle.**

INTRODUCTION

The Sri Lankan economy, in the past has been concentrating on strategies for rural development through agricultural development. It was generally thought that such efforts would lead to economic growth and prosperity. This was based on the belief that the potential for growth lies in the development of the rural productive forces which include the technology of production, and the skills and productivity of labor. Seventy-four percent of the total population of Sri Lanka is classified as rural, most of whom are engaged in small-farm subsistence agriculture (traditional sector)[a] or plantation agriculture (modernsector)[b]. Sri Lankan agriculture is a labor-oriented industry solely dependent on the rural labor force[1]. Rural labor force represents the family labor in households and hired labor in rural labor market. The most common features of the Sri Lankan rural labor market are a fluctuation in the demand and supply of labor due to the seasonal nature of agriculture, a low absorption capacity of labor due to the lack of a diversified rural economy, and the absence of non-farm opportunities. All these facts lead to disguised unemployment, and finally to open unemployment in the rural sector. Unless a vigorous solution to this unemployment problem in rural sector, can be found the country's expected development cannot be achieved, because rural development is a prime part of Sri Lankan economic development. The Chayanov theory of peasant economy is based on the rural family labor and their inheritance problems and some solutions. The aim of this study is to investigate to what extent the Chayanov model can be applied to the Sri Lankan-type duel characteristic economy.

The peasant household economy occupies the margins of the capitalistic economy. The main characteristic of the peasant household is that it has one foot in the market and the other in a subsistence mode, neither of which is fully integrated into that economy nor wholly insulated from its pressures. The economic study of farm families in the world has undergone formidable increases in its scope and complexity in recent decades[2]. Many theories now exist to analyze peasant household behavior, e.g., the working of rural factor markets, the paths of technical change, the internal relations of farm households, and the prospects for peasants in a capitalist world economy. Among these approaches, the household decision making pattern constitutes **the theory of peasant economy,** which still makes valuable contributions as an analytical tool of a microeconomy. The theory of peasant economy (put forward by the Russian economist A.V. Chayanov) emphasizes the influence of family size and the structure of the household economic behavior, via the subjective evaluation of labor within the household. In his theory Chayanov describes the peasant household decision making procedure through the labor availability of the family using both production and

consumption functions, therefore this model is known as the theory of household utility maximization[3]. Since the theory assumes the farm household is entirely reliant on family labor, the lack of a labor market causes time not working on the farm to enter the utility function as a goal separate from income. Hence households are involved in two opposing objectives: work objectives and work-avoidance objective, therefore this theory is also known as "the drudgery-averse"[c] of the rural peasant households. Further the theory explains the "demographic cycle"[d] through family size and household structure[4] .

(a) Labor intensive agriculture sector operating with small holdings.

(b) Capital intensive agriculture sector operating with large scale holdings.

(c) Drudgery averse choice between income and leisure.

(d) Demographic cycle family flow from one generation to another.

RESULTS

1) Definition of peasant households

Defining peasant households is not an easy task, because peasant life is based on social characteristics which differ from other social groups mainly with the field of social anthropology. *Chayanov* defined a family farm as "**a farm normally run by a family without hired outside wage labor, sometimes in part engaging in non -agricultural crafts and trades.**" Since Chayanov s definition is very narrow and describes only labor and agricultural activity, we have to consider a broader definition. In recent decades the most acceptable definition is that introduced by *Frank Ellis*, i.e., "**peasants are farm households, with access to their means of livelihood in land, utilizing mainly family labor in farm production, always located in a large economic system, but fundamentally characterized by partial engagement in markets which tend to function with a high degree of imperfection.**"

2) Assumptions of the Chayanov theory

For the purpose of model building, the Chayanov theory makes the following four main assumptions.

(a) There is no market for labor, i.e., no hiring in or hiring out of labor by the household (absence of a labor market).

(b) Farm output may be retained for home consumption or sold in the market, and is valued at the market price.

(c) All peasant households have flexible access to land for cultivation.

(d) Each peasant community has a social norm for the minimum acceptable per person, which implies that the household as a unit has a minimum acceptable consumption level.

3) Validity of the key assumption in the Chayanov theory

3.1) There is no market for labor, i.e., no hiring in or out of labor by the household (absence of a labor market).

This is the key assumption of the Chayanov peasant economic theory, which implies that family farms depend solely on the work of their own family members without resort to outside wage labor. But this assumption does not exclude resort to outside labor on an ad-hoc basis in the peak harvesting period. However, this practice is negligible in the rural labor market. Chayanov stressed this assumption cannot be worked-out in capitalistic economy, because if absence of one factor in the factor market capitalistic economies market structure would not survive. In the rural labor market, the demand and supply of labor depend not on market forces but on the availability of family labor in the household[5]. Therefore peasant family farms ordinarily have no hired labor and they pay no wages which are not relevant to family activities among rural peasants. Chayanov took the entire family household as the single economic unit among peasants. Based on this, he introduced the labor/consumer balance between the satisfaction of family needs and the drudgery of labor, which means that, since there is no labor market, they work for the family s prime

goals and spend the rest of the time in leisure (there being no demand for labor). In further developing his concept of the labor /consumer balance, he explained how to calculate the return to peasants. He began with the peasant family household s gross annual product minus expenses like seed, fodder, repairs, and the replacement of expired livestock and worn out equipment. After deducting household expenses he arrived at their net income, including the return for their labor during that agriculture year. The net income was to provide the family budget for consumption and for capital formation to raise the farm's potential level of production[6]. Chayanov insisted that there is no valid way of estimating the monetary value of their work because all they can see before them is the net product of that work. The nature of Chayanov s theory defines their return as something unique and indivisible.

3.2) Farm output may be retained for home consumption or sold in the market, and is valued at the market price.

As Chayanov assumed that total family production is retained for their consumption, any surplus is sold in the prevailing market and valued at the market price. This assumption depends heavily on the main assumption that 'there is no market for labor'. Non-existence of the labor market means that peasant households have a choice in consumption needs for survival purposes (work for consumption) and spending the rest of the time work-avoidance (spending time leisure or other activities). Therefore, the utility function includes the alternatives of income earning and leisure. Income here implies the output retained for home consumption and the monetary value of surpluses in the market. Goods retained for consumption and surplus sold in the market depend on family size and composition. If the family is large, consumption need are correspondingly great, and vice versa. Chayanov strongly assumed that output should be sold at the market price ; otherwise the net profit of the peasants might be miscalculated.

3.3) All peasant households have flexible access to land for cultivation.

Peasant farms that have a considerable amount of land are therefore able to utilize the family's whole labor force at an optimum degree of cultivation rather than to lease or buy land. This assumption was based on the socialist system prevailing at that time in Russia. The impact of flexible access to land is to defer one set of diminishing returns as labor use increases, since extra labor is combined with additional rather than fixed land. In other words, production function may have a constant marginal return before diminishing marginal returns.

3.4) Each peasant community has a social norm for the minimum acceptable income per person, implying that the household as a unit has a minimum acceptable consumption level.

Farm households must meet a minimum acceptable standard of living according to their family structure. If that level is reduced, they cannot survive. This minimum level according to Chayanov depends solely on size of the family.

4) The Labor - Consumer Balance

Chayanov's central concept for analyzing family economics was the labor/consumer balance between the satisfaction of family needs and the drudgery of labor. In developing this concept, he stressed that peasant households have experience in agriculture over many generations. Therefore, peasant families are in a position either to work more hours or to work more intensively, and sometimes even both. The capacity for work of peasant families in such a situation he called the degree of the self-exploitation of family labor. The peasant would put greater effort into increasing output if it could be devoted to greater family consumption or to enhancing the investment in the family, or to both. The mechanism Chayanov used to explain how peasant families achieved their labor/consumer balance is that each family would work to adequately meet their basic needs; anything more than that involves drudgery. Peasant families do not work beyond the point

where the possible increase in output is outweighed by the irksomeness of the extra work involved[7]. Each family strikes a rough balance between the degree of satisfaction of family needs and the level of drudgery required. Chayanov showed that the balance between consumer satisfaction and the degree of the drudgery is affected by the size of the family and the ratio of working members to non-working members. In his analysis, Chayanov examined the effects on the labor/consumer balance of a wide range of factors such as size of holdings, qualities of soil, crops grown, livestock, manure, location, market prices, land prices, interest rates on capital loans, feasibility of particular crafts and trades, availability of alternative work, the relative density of population, etc. In weighing the influence of these several elements on the delicate balance between family needs and the drudgery of labor, he employed the technique of a marginal utility analysis through the demand satisfaction and marginal expenditure of the work force.

5) Consumers to workers ratio

As mentioned above, households made a subjective decision as to the drudgery of the farm work to meet consumption needs. The most influential factor in these decisions is the demographic structure of the household; in other words, composition of the household influence the above two conflicting decisions. In every peasant household, the family composition includes both working and nonworking members. Taking the demographic structure into account, Chayanov introduced the ratio of consumers to workers in the household, known as the c/w ratio. For example, if a household consists of just two adults and children, its c/w ratio (consumers 2, workers 2) $2/2 = 1$; but for an adult with elderly parents and two children (each contributing half of an adult's work contribution) the c/w ratio is (consumers 5, workers 2) $5/2 = 2.5$. The c/w ratio gives some predictive advantage. If the number of dependents rises, the c/w ratio would rise, meaning that the work days of the working people in the family have to increase to achieve their consumption needs. If the number of the family working members increases, the c/w ratio would fall.

Table 1 . Family member's ages in different years

Years of Family Exis-tence	Husband	Wife	Age of children									Number of Persons
			1st	2nd	3rd	4th	5th	6th	7th	8th	9th	
1	25	20	-	-	-	-	-	-	-	-		2
2	26	21	1	-	-	-	-	-	-	-		3
3	27	22	2	-	-	-	-	-	-	-		3
4	28	23	3	-	-	-	-	-	-	-		3
5	29	24	4	1	-	-	-	-	-	-		4
6	30	25	5	2	-	-	-	-	-	-		4
7	31	26	6	3	-	-	-	-	-	-		4
8	32	27	7	4	1	-	-	-	-	-		5
9	33	28	8	5	2	-	-	-	-	-		5
10	34	29	9	6	3	-	-	-	-	-		5
11	35	30	10	7	4	1	-	-	-	-		6
12	36	31	11	8	5	2	-	-	-	-		6
13	37	32	12	9	6	3	-	-	-	-		6
14	38	33	13	10	7	4	1	-	-	-		7
15	39	34	14	11	8	5	2	-	-	-		7
16	40	35	15	12	9	6	3	-	-	-		7
17	41	36	16	13	10	7	4	1	-	-		8
18	42	37	17	14	11	8	5	2	-	-		8
19	43	38	18	15	12	9	6	3	-	-		8
20	44	39	19	16	13	10	7	4	1	-		9
21	45	40	20	17	14	11	8	5	2	-		9
22	46	41	21	18	15	12	9	6	3	-		9
23	47	42	22	19	16	13	10	7	4	1	-	10
24	48	43	23	20	17	14	11	8	5	2	-	10
25	49	44	24	21	18	15	12	9	6	3	-	10
26	50	45	25	22	19	16	13	10	7	4	1	11

Source : Vologda statistics : The Theory of Peasant Economy, A.V. Chayanov, p. 57.

6) Peasant family cycle pattern

The peasant family organization has no recourse to hired labor. The labor force and its composition and degree of labor activity are entirely determined by the family composition and size. Family composition means the number and variety of family membership. In any family labor-based organization, workers and consumers are determined by the number and age of family members. If the number of children in a family is high, consumers in the family increase; and if there are many young children in the family, the number of workers increases. The composition of consumers and workers in the family determines the lower and upper limits of their living standard or the volume of economic activity required for their support. Hence, family makeup is one of the chief factors in peasant farm organization. Family size and composition influence farm organization quantitatively, and qualitatively determine the level of their activity. Therefore, it is necessary to analyze formation of peasant family size and the family's generational

Table 2 . Consumers to workers ratio

Years of Family Existence	Married Couple	Children									Con-sumers	Workers	C/W
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th			
1	1.8	-	-	-	-	-	-	-	-	-	1.8	1.8	1.00
2	1.8	0.1	-	-	-	-	-	-	-	-	1.9	1.8	1.06
3	1.8	0.3	-	-	-	-	-	-	-	-	2.1	1.8	1.17
4	1.8	0.3		-	-	-	-	-	-	-	2.1	1.8	1.17
5	1.8	0.3	0.1	-	-	-	-	-	-	-	2.2	1.8	1.22
6	1.8	0.3	0.3	-	-	-	-	-	-	-	2.4	1.8	1.33
7	1.8	0.3	0.3	-	-	-	-	-	-	-	2.4	1.8	1.33
8	1.8	0.3	0.3	0.1	-	-	-	-	-	-	2.5	1.8	1.39
9	1.8	0.5	0.3	0.3	-	-	-	-	-	-	2.9	1.8	1.61
10	1.8	0.5	0.3	0.3	-	-	-	-	-	-	2.9	1.8	1.61
11	1.8	0.5	0.3	0.3	0.1	-	-	-	-	-	3.0	1.8	1.66
12	1.8	0.5	0.5	0.3	0.3	-	-	-	-	-	3.4	1.8	1.88
13	1.8	0.5	0.5	0.3	0.3	-	-	-	-	-	3.4	1.8	1.88
14	1.8	0.5	0.5	0.3	0.3	0.1	-	-	-	-	3.5	1.8	1.94
15	1.8	0.7	0.5	0.5	0.3	0.3	-	-	-	-	4.1	2.5	1.64
16	1.8	0.7	0.5	0.5	0.3	0.3	-	-	-	-	4.1	2.5	1.64
17	1.8	0.7	0.5	0.5	0.3	0.3	0.1	-	-	-	4.2	2.5	1.68
18	1.8	0.7	0.7	0.5	0.5	0.3	0.3	-	-	-	4.8	3.2	1.50
19	1.8	0.7	0.7	0.5	0.5	0.3	0.3	-	-	-	4.8	3.2	1.50
20	1.8	0.9	0.7	0.5	0.5	0.3	0.3	0.1	-	-	5.1	3.4	1.50
21	1.8	0.9	0.7	0.7	0.5	0.5	0.3	0.3	-	-	5.7	4.1	1.39
22	1.8	0.9	0.7	0.7	0.5	0.5	0.3	0.3	-	-	5.7	4.1	1.39
23	1.8	0.9	0.9	0.7	0.5	0.5	0.3	0.3	0.1	-	6.0	4.3	1.39
24	1.8	0.9	0.9	0.7	0.7	0.5	0.5	0.3	0.3	-	6.6	5.0	1.32
25	1.8	0.9	0.9	0.7	0.7	0.5	0.5	0.3	0.3	-	6.6	5.0	1.32
26	1.8	0.9	0.9	0.9	0.7	0.5	0.5	0.3	0.3	0.1	6.9	5.2	1.32

Source : Vologda statistics: The Theory of Peasant Economy, A.V. Chayanov, p. 58.

flow.

If a surviving child is born every third year to a young family, their future family composition and development can be shown by the rough scheme in Table 1.

(For analytical purposes, the death rates of grown children and any exceptionally higher birth rates were ignored). In this example of a birth every three years, the consumption level of the total family increases gradually. In the early stage, parents have to increase their working contribution to feed the family. As the children grow, they would join their parents at work, (normally a child of 15 years works as an adult). Theoretically, we only count each child's contribution when he or she attains 15 years of age. Table 1 shows the first child starting work at 15, which is also true of the second and third children. When the father is 50 years old and the mother is 45, four children can contribute as farm workers, but gradually they will leave to start families of their own on their own farm. If, when the last child joins the family work force, the father is 64 years old and mother is 59, half of the family will already have married and left the household to raise children of their own.

If we expand our analysis further we can include consumer/workers contributions in the same example (Table 2).

In the first stage when young children are unable to work, they become more of a burden to the head of the family, and contribution to rapid increase in the proportion of consumers to workers. In the fourteenth year of the family's existence, the c/w ratio reaches its highest point, 1.94. But in the fifteenth year, as the first child reaches semi-working age, the c/w ratio immediately falls to 1.64. In the twenty-sixth year of the family, the ratio falls to 1.32. In reality, no such sudden leaps occur, since the transition from a child unable to work to that of a half-time to full worker is a gradual one. Basically, the burden of the head of the family becomes lighter each year the children take a greater part in the work. This demographic cycle is a common feature of peasant societies in rural areas, as Chayanov noted.

7) Economic activity of a peasant family

In every peasant farm organization, family composition primarily defines the upper and lower limits of the volume of its economic activity. The labor force of households is entirely determined by the availability of able-bodied family members. The highest possible limit for volume of activity depends on the amount of work a labor force can give working at its maximum. On the other hand, the lowest activity level is determined by the sum of material benefits absolutely essential for the family's mere existence. The volume of economic activity considered here includes all forms of economic activity, both agricultural and in the form of crafts and trades. In adopting the volume of economic activity as an economic concept, we have to take into account all the elements of the household's economy in order to measure it quantitatively. Many

Table 3 . 1911 sown area by 1882 sown groups(%)

Desyatinas Sown in 1882	Desyatinas Sown in 1911					Total
	0 - 3	3 - 6	6 - 9	9 - 12	> 12	
0 - 3	28.2	47.0	20.0	2.4	2.4	100.0
3 - 6	21.8	47.5	22.3a	6.0b	2.4	100.0
6 - 9	16.2	39.0c	26.8	11.3	6.7d	100.0
9 - 12	9.6	35.8	26.1	12.4	16.1	100.0
> 12	3.5	30.5	28.5	15.6	21.9	100.0

Source : The Theory of Peasant Economy A.V. Chayanov, p. 67.
Note : Since table figures do not match total, I have altered them as follows:
    a) 24.4 - 22.3
    b) 8.2 - 6.0
    c) 37.0 - 39.0
    d) 2.4 - 6.7
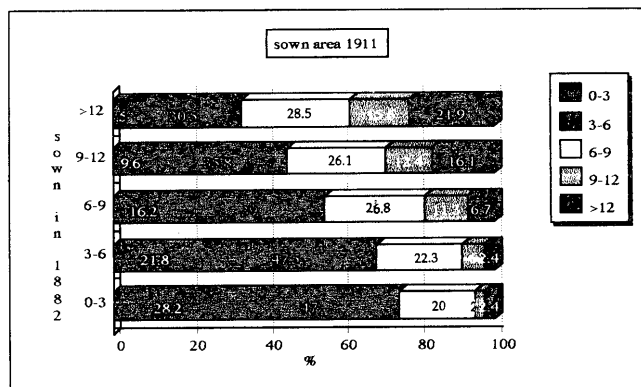
Source : The Theory of Peasant Economy, A.V. Chayanov.

Graph 1

empirical investigations have made use of production factors such as sown area, number of livestock, size of arable land, etc. that can serve to measure the volume of economic activity quantitatively. Among them sown area is often taken as a measure to arrive at many conclusions as to economic activity since land area is a material security of the peasants. Family size and the number of family members determine their sown area, and thus their level of economic activity. For example, in Novorod Guberniya (according to recorded budgets), the percentage of young families consisting of a married couple and children below working age in categories sowing different areas amounts to the following.

Sown area (Desyatinas) ....   0 - 2   2 - 4   > 4

Percentage of young families 42.9   20.8   0.0

Source :   The Theory of Peasant Economy, A.V. Chayanov p. 66

    The increased percentage of young children in groups that sown a small area and the family size depend on the farm size. In other words a small sown area consists of young families with a large number of young children, whereas larger areas consist of older families in which small children do not play a great part. Another detailed analysis of sown areas in fifteen years time will help us to reach a conclusion; cf. Russian Kushchenko s data (Table 3) which compares the 1882 and 1911 census data for Surazh Uezd, Chernigov Guberniya (graph 1 is drawn from table 3 data).

    Table 3 shows that farms cultivating small area will, in the course of 15 years, continue to cultivate the same small areas, and that farms well endowed will, as before, cultivate large areas and raise large families. We can see from the table that many of the farms that cultivated very small areas gradually acquired a labor force as family age and size increased and, by expanding the total cultivated area, passed onto a higher level and increased their economic activity. Conversely, former large farms passed into lower groups corresponding to the small families created after division. This tells us that the demographic processes of growth and family distribution by size also determine to a considerable extent the distribution of farms by size of cultivated area and numbers of livestock[8].

8) Measure of self-exploitation of the peasant labor force

    As a peasant farm develops, the number of family working hands into farm size, the income has to be determined additionally. Thus, to what extent these hands are utilized, and what part of potential working time is actually expended, the intensity of their labor or degree of self exploitation must also necessarily be analyzed.

    The gross production of peasants consists of all income the family receives in the course of a year both in agriculture and other applications of its labor in farming, crafts and trades. After calculating the gross product, we deduct all annual overhead connected with capital renewal and annual expenditures on the farm. Net production means the annual payment to the farm family for labor expended on all economic activities.

The many factors influencing the size of agricultural production include the degree of its labor and capital intensity, size of the family, the market, natural condition, technological factors, and the availability of resources. Since the peasant theory is based on family labor, here we are going to analyze the economic activity involved in family labor and farm productivity. A family farm worker's annual labor depends on two factors which determine his annual productivity, i.e., the degree of intensity of his annual work (the quantity of labor energy the peasant worker wants to expend in one year) and the labor productivity of each labor unit expended (economic and technical conditions that assure his labor of a particular productive effect). Most intensive daily labor gives significant annual income if rise in the market price and fertile soil. Conversely, an unfavorable market situation and poor soil discourage labor intensity. On the other hand, the level of productivity depends not so much on farm factors as on general economic factors like soil fertility, advantageous location of the farm in relation to the market, current market situation, and local land relations. Here we deal only with labor intensity or the measure of self-exploitation of peasant labor because the factors determining the labor productivity depend more on management aspects than on economic aspects.
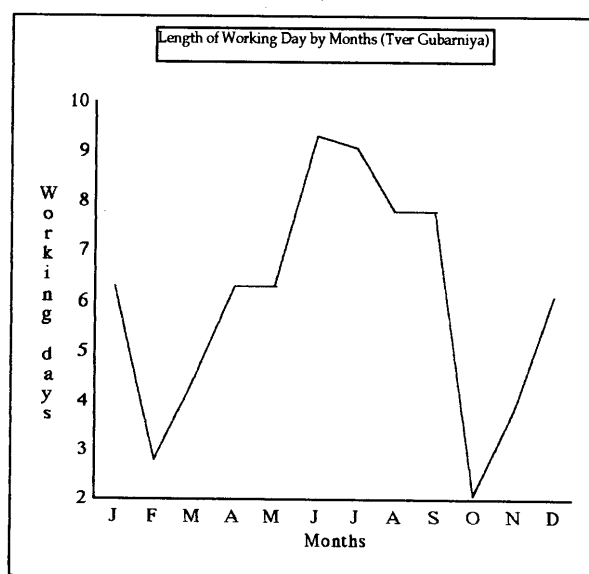
The particular feature of labor organization in agriculture is its seasonal nature, demanding particularly favorable weather conditions. Therefore, the labor intensity curve in agriculture always reflects realities such as uneven cultivation, mowing, harvesting, and amount of work on specialized crops which sometimes demands an exceptionally large number of workers. For example, the Tver farm in Russia recorded the following monthly average length of a working day in actual hours worked.

January	6.3	July	9.1
February	2.8	August	7.8
March	4.5	September	7.8
April	6.3	October	2.1
May	6.3	November	3.8
June	9.3	December	6.1

Source : The Theory of Peasant Economy, A.V. Chayanov p. 75.

(These data are the basis of the labor intensity curve in graph 2).

The measure of self-exploitation depends mostly on how heavily the worker is burdened by the consumer demands of his family. The number of consumers depends on the structure of the family. The larger the number of consumers the faster the consumer demand grows. Therefore, the volume of economic activity depends on the number of consumers and not the number of workers. As we know, the economic activity of labor differs from any other activity in that the quantity of values that become available to the person running the farm corresponds to the quantity of physical labor expended. But the expenditure of physical energy is not limited by the human organism. A small expenditure is accompanied by little satisfaction, and further expenditure of energy brings more satisfaction. The greater the quantity of work carried out by a person within a definite time period, the greater the drudgery involved in the last (marginal) unit of labor expended. On the other hand, subjective evaluation of the values obtained by this marginal labor will depend on the extent of its marginal utility to the farm family. But since marginal utility falls with the growth of the total sum of values that become available to the subject running the farm, there comes a moment at a certain level of rising

Length of Working Day by Months (Tver Gubarniya)

Source : The Theory of Peasant Economy, A.V. Chayanov, P. 75

Graph 2

labor income when the drudgery of the marginal labor expenditure will equal the subjective evaluation of the marginal utility of the sum obtained by this labor.

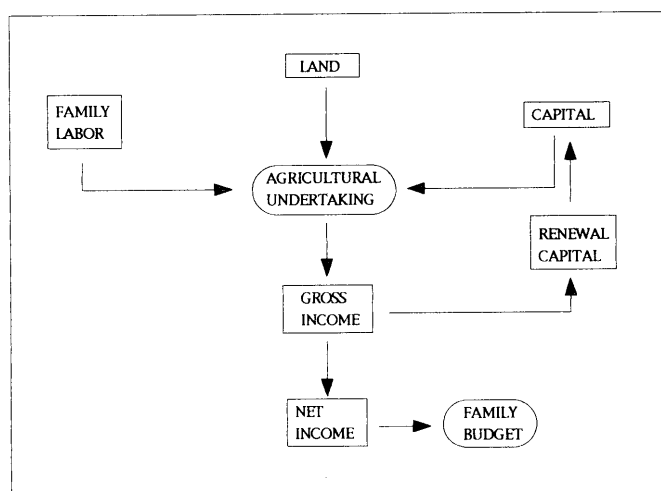## 9) Basic principles of peasant farm organization

Any agricultural organization or undertaking is a combination of land, labor, and capital. Normally, a peasant farm means any family economic unit in which work is connected with the expenditure of physical effort, and where earnings are proportional to this expenditure, whether the economic unit be an artisan, a cottage, or simply any economic activity involving family labor. When the organization is based on the principles of the family labor farm, the peculiar feature the labor force is fixed by being present in the composition of the family. The labor force cannot be increased or decreased at will in the short run. Therefore, this type of organization is necessary to keep the factor of production in an optimal relationship to

Source: The Theory of Peasant Economy, A.V. Chayanov.

Figure 1 . Structure of the Peasant Family Organization

Source: The Theory of Peasant Economy, A.V. Chayanov.

Figure 2 . Structure of the Complex Peasant Family Organization

this fixed element. This confines the total volume of economic activity to quite narrow limits. Family labor based on an agricultural organizational structure is depicted in figure 1 .

If the agricultural organization consist of both agricultural and non-agricultural activities, the basic structure is somewhat more complex (figure 2).
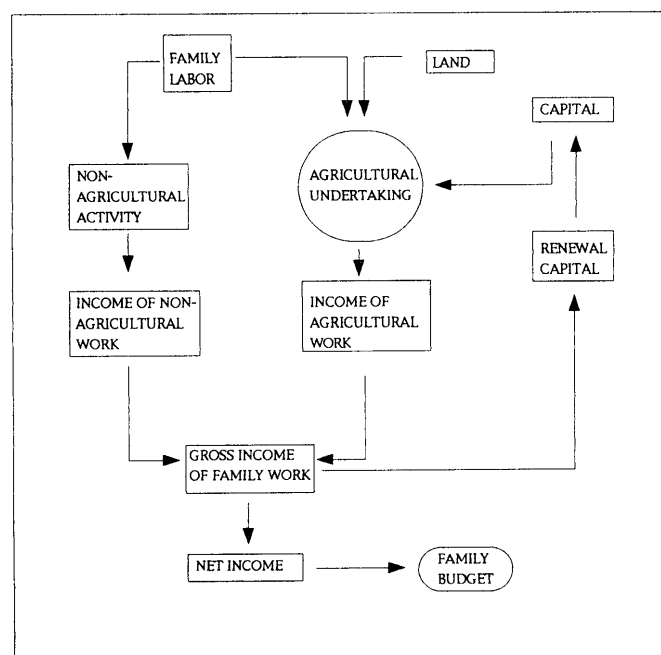
Family labor based on agriculture undertaking , the labor force of the family is something given, and the farm's production are fixed accordance with it in the technical harmony usual among them. Given the freedom to acquire the necessary area of land for use and the possibility of having available the necessary means of production, peasant farms are structured to conform to the optimal degree of self-exploitation of the family labor force and in a technical optimal system of production factors as regards their size and the relationship of their parts. Any excess of production means that available labor or land above the technical optimum level will be an excessive burden on the undertaking. It will not lead to an increased volume of activity, since increasing the intensity of labor beyond the level established for the family's self-exploitation is unacceptable. Family productivity due to an increase in capital intensity naturally cannot be raised once the achieved rate of provision is itself optimal.

Apart from this, it is essential to note that very frequently, due to both predictable and random causes, land or the means of production available is less than the optimum demanded, and is insufficient for full use of the farm family's labor. It is then natural that the production element, the

Table 4 . Fixed capital (rubles) per worker

No. of workers in family	Novgored Gubarniya family fixed capital				Tambov Gubarniya family fixed capital			
	0 - 500	500 - 1000	1000 - 1500	1500 - ∞	0 - 500	500 - 1000	1000 - 1500	1500 - ∞
0 - 2	187	349	-	-	154	360	-	-
2 - 4	122	202	355	692	120	243	385	747
4 - ∞	71	146	213	309	86	139	208	368

Source : The Theory of Peasant Economy, A.V.Chayanov, p. 95.

Table 5 . Influence of capital and family size on cultivated area

No. of workers in family	Novgored Gubarniya family fixed capital				Tambov Gubarniya family fixed capital			
	0 - 500	500 - 1000	1000 - 1500	1500 - ∞	0 - 500	500 - 1000	1000 - 1500	1500 - ∞
0 - 2	1.7	2.1	-	-	3.4	3.6	-	-
2 - 4	2.3	3.3	4.5	5.1	3.1	4.6	7.7	8.1
4 - ∞	2.9	3.7	5.1	6.9	4.6	6.1	8.6	14.1

Source : The Theory of Peasant Economy, A.V. Chayanov, p. 96.

availability of which is less than the norm demanded by the technical environment, becomes to a considerable extent a determining factor in the agricultural undertaking. As long as the farm does not succeed in transferring this factor from the minimum to the optimum, the volume of activity will closely conform to its size.

The optimum level depends upon how peasant households allocate their factors of productions to achieve the total production. Although labor is fixed for peasant households, they can alter other factors of production such as land and capital to achieve optimal production. If we refer to sample investigations, it is easy to understand how peasant households allocate their factors of production to achieve the optimum level. Novgorod Guberniya and Tambov Guberniya budget investigations are shown in Table 4 .

In the table, it is explained that fixed capital varies with the number of persons in the family. The capital intensity of labor falls sharply with an increase in the number of workers given the same amount of capital. Conversely, with an increase in capital, given unchanged family size, there will be an increase in capital intensification. The influence of capital intensification with constant family size does not allow us to trace the influence of family activity on the farm, given the same rate of capital intensity. Therefore, we have to compare using a somewhat altered form of analysis. Table 5 compares the influence of family size, the amount of capital, and the cultivated area.

It shows that when the family increases its capital, it naturally generates a greater volume of agricultural activity. On the other hand, it also shows that, as the peasant family's work force increases, it succeeds in raising the level of agricultural activity with the same amount of capital, compensating for its lack of additional capital by its labor intensity.

Since the amount of capital remains the same as the family increases, its workers are in a worsening situation as regards the availability of fixed capital. Naturally, the equilibrium of basic economic factors is attained at a lower level of worker activity (Table 6).

As we see, the worker, encountering ever worse conditions, starts to reduce his output. This reduction in production influences the volume of activity, and this then affects the basic economic equilibrium, causing the worker to reduce his output due to the increasing drudgery of his work, thus leading to a reduction in the family's well-being, i.e., less satisfaction of demands, despite the possibility of making use of earnings from crafts and trades.

Table 6 . Influence of family size and fixed capital on cultivated area (Desyatinas)*per worker

No. of workers in family	Novgored Gubarniya family fixed capital				Tambov Gubarniya family fixed capital			
	0 - 500	500 - 1000	1000 - 1500	1500 - ∞	0 - 500	500 - 1000	1000 - 1500	1500 - ∞
0 - 2	1.01	1.17	-	-	1.91	2.02	-	-
2 - 4	0.83	1.01	1.35	1.66	1.01	1.48	2.49	2.53
4 - ∞	0.56	0.75	0.89	0.98	0.94	1.23	1.56	2.38

Source : The Theory of Peasant Economy, A.V. Chayanov, p. 96.
*Note: Desyatina is a Russian unit of area measure; 1.1 hectares = 1 Desyatina.

Suppose that, in a particular year, the farm does not have the land or capital needed to develop an agricultural undertaking optimal as to the relationship between the farm and the family size. In such a situation the farm has to reduce the volume of agricultural activity, and this minimizes the supply. How far to reduce the volume is a complex process involving the influence of deteriorating conditions for agricultural production on the basic equilibrium the economic factors. In such a situation, the farm inevitably transfers its unutilized labor into crafts, trades, and other extra-agricultural livelihoods. The whole of its income from agriculture, crafts and trades is in conflict with its demands, and the drudgery of acquiring leads to an equilibrium with the degree of satisfaction of these personal demands.

Therefore, all forms of the influence of family composition and size on the family worker's output, and the other consequences income are added to derive the family income.

10) Graphic illustration of Chayanov theory

The central elements of the Chayanov theory of peasant household behavior are depicted in Graph 3 . The gross output of the peasant farm, which equals gross farm income, is measured on the vertical axis. Here income is measured in money terms. The horizontal axis measures the total labor time available to the household, which is determined by the number of its workers. Since there is no labor market, the total time can be allocated either to farm work or other activities (leisure). In the graph, the number of working days on the farm is measured from left to right, OL, and the number of days engaged in other activities is measured in the opposite direction, from right to left, LO.

The graph depicts both the production and consumption aspects of household decision making. The production function describes how the output responds to varying level of labor input. The total variable production (TVP) represents the production function. The TVP curve displays diminishing marginal returns of labor in various stages. Since output and income are the same, the TVP curve can be labeled as a family income curve. Therefore, we can build a production function notation.

$$Y = Py. f(L)$$

The consumption function represent the indifference curves in the graph, which are labeled as

Source: Peasant Economics: Farm Household and
Agrarian Development, Frank Ellis, p. 107.

Graph 3 . Chayanov model of farm household

I₁, and I₂. These indifference curves describe the amount of total utility in the alternative combination of the consumer, where combinations are leisure and income. All the indifference curves are convex to the origin at L, since leisure is measured from right to left along the horizontal axis. The utility function can thus be described as follows:

$$U = f(Y,H)$$

The slope of the indifference curves explains the marginal rate of substitution of one thing for another (in this case income for leisure hours), and point B explains the amount of income, dY, which the household needs to obtain, has to compensate for the loss of one unit of leisure, dH. In other words, from the loss of one unit of leisure the household gains some income (subjective wage level) since output and income represent the vertical axis, L. In the graph the I₁ indifference curve combination is higher than the indifference curve I₂. The relative wage level of different combinations indicates the slope and position of the indifference curve.

In the graph, Y_{min}. indicates the minimum acceptable standard of living for the household. In other words, the household must earn Y_{min}. level of income for survival. Therefore, any indifference curve hitting the minimum consumption curve (Y_{min}.) at the bottom left will become horizontal at that level; and the marginal utility of leisure becomes zero (no amount of leisure could compensate for a fall in income below the minimum survival level). On the other hand, L_{max}. line shows the maximum number of full working days feasible for the household, meaning that the marginal utility of income becomes zero (no more income could compensate for a fall in leisure above the maximum income level). Therefore, any indifference curve hitting the maximum working days (L_{max}.) at the top right will become completely vertical at that level. Both these maximum and minimum levels are determined by the demographic structure of the household family size and the number of workers in the family.

The equilibrium position is seen at point A, where TVP touches the highest possible indifference curve. At equilibrium point A, the combination of the labor input is labeled as L_e, and the combination of income is labeled as Ye. At point A the marginal product of labor (MVPL) equals the family labor time (dY/dH) i.e., the amount of income required to compensate for the loss of one unit of leisure. Thus, at the equilibrium point of the graph, it can be listed as follows.

$$MU_H MU_Y = dY/dH = MVP_L$$

Finally, we can summarize the microeconomic behavior of the peasant household formulated in the Chayanov model as maximizing the utility subject to three main constraints.

      (a) the production function;

      (b) the minimum acceptable income level;
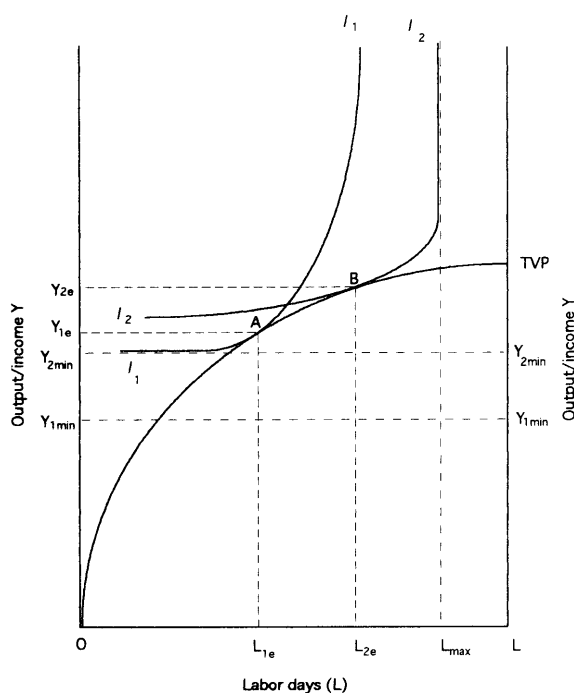
      (c) the maximum number of working days available.

The following notation can be used to summarize it.

      max U = f(Y,H)

subject to: $Y = P_Y.f(L); Y \geq Y_{min}; L \leq L_{max}$

This Chayanov model is in stark contrast to profit maximization in capitalistic enterprises, in that its marginal labor product is essentially synonymous with the market wage. Furthermore, Chayanov considered the microeconomic equilibrium of the household as a unique economic calculus of the peasant household which is quite different from capitalist enterprises. The most important part of the theory family size and family composition is relevant to peasant decision making. Maximum and minimum levels of output depend on family size and the family work force. In addition, peasant communities as a whole and their average levels determine the lower and upper limits of economic activity. Family size and composition are also determinant of leisure hours and income in the household utility function. If we analyze this model further, the proportion of farm output which is kept for household consumption has no influence on either the slope of the income leisure or on the equilibrium position. (Graph 4)

Like Graph 3 , gross output or gross farm income is here measured on the vertical axis. Total labor time available to the household is measured on the horizontal axis (available time depends on family size and

Graph 4 . Impact of higher consumer worker ratio

composition). The total time can be allocated to either farm work or other activities (drudgery). The number of work days on the farm is measured from left to right, OL, and the number of days engaged in other activities is measured in the opposite direction, LO. The TVP curve explains the production function of the household. Since the output and income are (according to the assumption of the Chayanov model) synonymous, the TVP curve also represents the family income curve. The I_1 and I_2 curves represent the indifference curve of the households. As the family size and structure increases, the c/w ratio will rise the minimum consumption constrain is risen from Y_{1min} to Y_{2min}, reflecting the increased consumption needs of a larger family. Thus, the shape of the position of the income-leisure indifference curve changes. The curve will assume a shallower slope because the marginal utility of income has increased and the marginal utility of leisure has decreased at all points of the curve. In other words, the preferences of the household change due to the need to feed a larger family. This means that the household is prepared to accept a smaller rise in income (dY) in order to compensate for the loss of one unit of leisure (dH) than before, at all points of the curve[9].

The new equilibrium is established at a higher output, Y $_{2e}$, and a higher labor input, L_{2e}, than the former equilibrium (Graph 3). On the given production function, this also implies that the marginal product of labor, (MVPL), is lower at B than it was at A, consistent with optimization at a lower subjective wage. This ability of the farm family to intensify labor use by lowering the subjective wage Chayanov termed the capacity of the peasant household for self-exploitation. Here again a contrast is made between the self-exploitation of the peasant household and the exploitation of labor by capital in a capitalistic enterprise, thus reinforcing the idea that the peasant household operates by a distinct mode of economic calculation.

Chayanov model demographic structural change in the farm household on equilibrium output and labor use in change in production function. But there are many alternative factors which may alter the production function, such as:

(a) a change in the technology of production;

(b) a change in the market price of output;

(c) a change in other resources which combine with labor to produce output.

If we consider that any of the above changes will tend to shift the family income curve upward, it puts households on a higher indifference curve than before. However, since their impact on labor use is neglected by the Chayanov model, a further positive substitution effect and a negative income effect cannot be predicted by this type of model.

Another weakness of the Chayanov theory is that it does not predict the factors which affect the production function relative to the infrastructure of the household. The main factor influencing the production function is the demographic structure of the household (composition of working and nonworking members in the family). Chayanov called this the ratio of consumers to workers in the household, or the c/w ratio.

In brief, Chayanov constructs a model theory of the peasant household that includes both consumption and production components. The key elements are the size of the peasant family, the absolute number of workers in the family, the social norms for a minimum acceptable standard of living, and the c/w ratio. These

elements lead to a change in the production function of the household. The size of the area cultivated varies directly with family size. According to the model, family size will lead to a larger area to be cultivated, but land being scarce in a peasant economy, the size of the farm imposes limits on family size[10].

DISCUSSION

The Chayanov model sets up a theory of the peasant household which integrates both the consumption and production decisions of the peasant family. The key elements of the theory are the size of the peasant family, its demographic structure, its consumer/worker ratio, the absolute number of workers in the family, and the social norm for a minimum acceptable standard of living. These elements lead to a distinctive type of economic calculation for peasant households. There are advantages and disadvantages of this model and some vague points which are somewhat questionable. (a) According to the theory, the marginal and average products of labor should vary significantly between household composition in relation to their demographic structure. This emphasis varies with labor efficiency in each society. (b) The number of days or hours devoted to farm work per family should vary directly with the consumer/worker ratio. As the c/w ratio rises, the amount of time devoted to farm labor by each worker should increase. (c) According to Chayanov, increasing family size causes a larger area to be cultivated, meaning that the size of the area should vary directly with family size. But in the actual world of a land scarce peasant economy, the size of the farm might impose limits on family size. (d) The lower the c/w ratio, the higher the average income per person in the household, because a low c/w ratio means a higher subjective wage, placing the family in a position on the production function with a high marginal returns for labor. (e) This type of model has not generally been found very useful in formulating policy due to factors affecting households decision patterns and, subsequently, the production function. Some thought has been given by policy analysts to a way of influencing the income-leisure trade off so as to raise the marginal utility of income and then decrease the level of utility. This causes peasant households to operate at a higher output and for a lower wage on their production function. For example, crop taxes reduce cash income, consequently reducing the subjective wage, resulting in higher labor input at a lower wage. (f) There is an implicit assumption in the theory that both males and females are equally interchangeable for farm work. However, in reality a woman s allocation of time is mainly for reproductive activities (child bearing and rearing), productive activities (animal husbandry, cultivating food crops), leisure activities (meals, personal hygiene). Therefore, women have a role distinct from men, and illusions of interchangeability are misleading when calculating the c/w ratio and the economic activities of peasants. (g) The uniqueness of household decision making in the model is solely attributable to the lack of a labor market, but it disappears when a labor market is introduced.

There are wider issues arising from the Chayanov theory of peasant economy concerns theoretical merits, that the theory concerning separate peasant mode of production which is distinct from the capitalistic mode. In the peasant household, buying and selling does not occur independently as in the capitalistic model. Peasant transactions are limited to family survival. In such a situation the Chayanov model is ideal because it is a theory based on family labor and family structure. In modern societies, the rural economy is organized around either simple farms, extended families, landless laborers, sharecroppers, or around plantations and estates. The Chayanov concept is ideal for simple peasant farms run by family based labor.

In Sri Lanka, peasant family economy characteristics fit the Chayanov model, e.g., family based labor, a labor consumer balance, a peasant family cycle pattern, economic activity and optimum level of labor. But though the basic characteristic match the Chayanov model, they carry less weight for the following reasons. (1) In Sri Lanka, rural hired labor plays an important role, rendering the main assumption of the Chayanov model less important. (2) The Chayanov model of labor consumer balance cannot be applied to Sri Lankan peasant families as is because those peasant households have not only basic needs but also a wide range of complex needs. Thus they are not in a position to balance labor and consumption by using leisure. Instead, they will look for work either on or off the farm. (3) As Chayanov mentioned, the peasant family cycle

pattern is not common because most people look today for industrial sector employment due to ongoing problems in the agricultural sector. (4) Allocation of the optimum level of labor cannot be applied to Sri Lankan society due to a labor surplus in the rural labor market and to technical innovations.

Though the above arguments reduce the validity of the Chayanov model, it remains important for labor-intensive agriculture-based countries with a small industrial sector due to the theory to concentrate on the utility maximization type and the household decision making relative to family size and composition.

To what extent this theory is applicable to the Sri Lankan economy depends on the importance of family labor in the rural labor force and the availability of work in the agricultural sector. If, in the rural labor force the proportion of family labor is reduced, or if labor intensive agriculture is transformed into capital intensive agriculture, the model become less applicable. In present day Sri Lankan society, family labor is still an important factor in the rural labor force, and the proportion of labor intensive agriculture is high. Until changes, occur in the above two factors, this Chayanov type of model can be used, but only with the necessary adjustments whenever it seems inapplicable.[11,12,13]

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チャヤノフ小農経済理論の検討

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要　　約

スリランカの人口の74％は農村住民であり，そのほとんどは，家族農業かプランテーション農業に従事している。スリランカ農業は，労働集約産業であり，専ら農村の労働力に依存して農産物その他の生産を行っている。農村労働力は基本的に家族労働力（家族農業）と農村労働力市場の雇用労働力（プランテーション農業）の2種類からなっている。この農業の発展は，スリランカ経済発展の主要な構成部分であるため，小農経済理論の研究が必要である。小論は，ロシアの経済学者チャヤノフによって展開された「小農経済の原理」を取り上げ，その理論的特徴を検討した。

チャヤノフの小農経済理論は，農業部門では労働市場が存在しないものと仮定し，それ故，農家はもっぱら家族労働に依存していると仮定し，この労働市場の欠如が，家族労働の次の二つの区別を既定していることに基づいて展開されている。すなわち(1)農場の仕事，(2)農場の仕事以外である。これらの二つの区別は相互に排除しあうが，「農場の仕事」は消費需要を充たす所得を得る労働であり，生活時間を含む。「農場の仕事以外」は「農場の仕事」よりも家族はよりバラバラの行動を取ることを意味している。家族の行動に影響を与える主要な要因は，家族の人口論的な構造である。この要因は，c/w ratioと呼ばれる家族の働き手たちに対する消費員数の割合に要約され，図解されている。この原理を基礎として，小農家族の規模や構造を通して人口論的周期を説明し，また，これに基づいて農業部門では小農経営が優勢であることを根拠づけている。

チャヤノフの原理は，賃労働市場の低度の発達を前提し，自家の農業経営で労働の完全燃焼を目指す技術段階まではより純粋に作用する。しかし，賃労働市場が展開し，農業を雇用労働に依存して経営する者や農外の被傭労働によって所得を実現する者が出現するような農村労働力が市場原理で移動する段階になると，原理は撹乱され変異する。生産（労働）と消費（家計）の補完関係，すなわち労働力の再生産が自己完結する閉鎖系のチャヤノフの原理は技術・資本の蓄積を排除した原理であり静態原理である。それ故，現実の動態過程の基礎として作用しながらも，絶えず撹乱されて純粋な形では現象しない。