SOME ECONOMIC ARITHMETIC OF POVERTY: PRELIMINARY FARM DATA FROM BUKURA AND SHITOLI SUB-LOCATIONS OF KAKAMEGA DISTRICT, WESTERN KENYA.

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ABSTRACT

This paper reports initial findings on the structure of productive resources that are found on small farms in two sub-locations of Kakamega District, Kenya. The report is part of a larger and on-going study which aims at identifying profitable production techniques that would significantly raise labour productivity and farm incomes in Kenya's small-scale agriculture. This portion of the study concentrates on the stocks of available resources rather than flows of services from these resources. The latter aspect is the focus of the study in progress.

The analysis of the preliminary data gives an insight into the widespread poverty in the area. It is shown that the effective labour stock is insufficient to provide adequate subsistence for farm families as well as a significant surplus for sale. In addition, farm tools in use not only reflect a very low level of technology, but they are also quantitatively and qualitatively inadequate. Thus the joint technology/ labour constraint ensures a severe degree of poverty.

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I. INTRODUCTION

Increasing agricultural production is an explicit policy goal of the Kenya Government as reflected in documented statements as well as almost daily pronouncements by various government officials exhorting farmers to increase production. It is also reflected in various programmes and projects designed to accelerate output and rural development generally.

However, pronouncements exhorting farmers to increase production without a clear understanding of various constraints facing these farmers are not likely to produce significant results. Nor are they likely to impress the farmers as meaningful.

II. STUDY OBJECTIVES

My study is primarily concerned with exploiring possibilities for raising labour productivity on Kenya's small-scale farms. The research is located in Kakamega District, an area typified by a relatively high population density, small farms and a preponderance of the hoe technology. These characterising elements, together with the fact that the district is classified as a "high potential" area,[1] were largely responsible for the selection of the area for the study. An additional influence on area choice was the existence of oxen use, however limited, in the district.

In the recent past, economists interested in agricultural development, together with some policy-makers, have advocated 'intermediate technology' as the most appropriate approach to increasing labour productivity and farmers' incomes in the small-scale agricultures of the LDCs. 'Intermediate technology' is broadly defined as that range of production techniques between the hand-hoe on the one extreme and the modern four-wheel tractor on the other. A major aim of the study is to examine the relevance and applicability of this technology to the farm conditions prevailing in Kakamega District. In particular, it is intended to analyse the economic implications of the introduction and/or widespread use of ox-drawn equipment.

Although the district as a whole has a relatively high population density (220/Sq.Km), there is oonsiderable variability in this density

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1. Somewhat similar studies in the past have concentrated on the "medium potential" areas, particularly Machakos District.

within the district. This directly implies variability in farm size. Thus, one of the questions to be examined will be the implications of different farm sizes on the economics of the new technology. For instance, can a one- or two- acre farm produce enough food and feed for the family and a team of oxen? If not, what are the economics of supplementary feeding or alternative arrangements that will afford access of such families to oxen services?

However, these and other questions can only be answered if we have a clear understanding of farmers' real capabilities and limitations. For this reason, there is in progress a study of various uses of labour, types of labour available, income and expenditure flows, rural credit flows, use of oxen (ownership and hire arrangements) and factor and product prices. This study started in October and is expected to be completed in one year.

III. METHODOLOGY

After the selection of Kakamega District on the criteria mentioned above, there remained the question of choosing sample areas and sample farmers. In accordance with our concern with the implications of varying farm sizes for intermediate technology, two sample areas were selected on the basis of differing population densities. These are Bukura and Shitoli sub-locations which are roughly ten miles apart. According to the 1969 Kenya population census, Shitoli had a population density of 714 persons per Sq. Kilometre, while Bukura had only 189 persons per Sq. Km.

Having decided on these sub-locations, barazas were arranged with the assistant chiefs of these sub-locations to meet the farmers and explain the purpose of my mission.[2] Since a sub-location was too large an administrative area for the kind of study I was planning to do, I asked the assistant chiefs to provide me with the names of various villages in their sub-locations. From these village names, I randomly selected two from Shitoli (called Musingu and Lirhembe) and one from Bukura (called Muyenga).

The final stage was the selection of sample farmers. The weaknesses of using such existing lists as tax lists, etc. as sampling frames are well known. To avoid these pitfalls, it was decided to conduct an enumeration of all heads of households in the chosen villages. A

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2. I must commend these assistant chiefs and the farmers for the extremely good reception I received.

simple questionnaire detailing name, sex and whether or not the household head lived at home, had been developed for the purpose. A total of 324 heads was enumerated in the Shitoli villages while 122 were enumerated in Muyenga. From these lists of household heads, a random sample (using a table of random numbers) of 42 farmers from each sub-location was taken.

Seven questionnaires have been developed for the study. They are as follows:

Form 1 - Listing of heads of households
Form 2 - Stock questionnaire
Form 3 - Weekly input record
Form 4 - Field questionnaire
Form 5 - Yield recording form
Form 6 - General: various statistics gathered by enumerator
Form 7 - Supplementary questionnaire

To date only forms 1, 2, and 3 have been put into use. The data presented in the next section were collected from the 84 sample farmers using Form 2.

IV. THE RESOURCE STRUCTURE OF THE SAMPLE FARMS

At the start of study an attempt was made to obtain the stock of resources possessed by the sample farmers. The following are the results.

1. LAND[3]

Farmers in Bukura have had their land registered whereas nothing of the sort has taken place in Shitoli. Consequently, it is easier to obtain information on total farm size in the former area than in the latter. Unfortunately, even in Bukura it was difficult to obtain complete information on farm size because in a number of cases the respondents were women who did not know the exact figures as relevant documments were kept by their absentee husbands. In a few cases the little deeds had been lost. But from the information obtained and this writer's visual impressions, the average farm size in the Bukura sample area is somewhere between 10 and 15 acres. Some farmers reported as much as 30 acres.

In the case of Shitoli sample area I had to rely on my impressions as well as informed opinion of officials in the area. It seems that

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3. Henceforth, I shall refer to the sample village in Bukura as "Bukura" and those in Shitoli as "Shitoli".

average farm size falls between $\frac{1}{2}$ acre and $2\frac{1}{2}$ acres. The smallness of holdings is simply visible.

2. LABOUR STOCK

In traditional agriculture land and labour are the most important resources. This is just the case in our sample areas. The decomposition of the labour stock in the two samples is both revealing and, I think, alarming.

(a) Shitoli:

The 42 households contained a total of 299 members. Thus the average household has just over 7 members. The range was 10 (i.e. 3-13). Of the 299 members:

(i) those outside in wage employment were 52
(ii) those outside who were heads were 21
(iii) Number of widows 3

From these figures we can see that

(i) the number of household members actually living at home full time is 247 (i.e. 299-52);
(ii) the majority of sample farms (57%) are managed by women.

(b) Bukura:

The 42 households contained 263 members. Thus, on the average, each household has about 6 members. The range was 10 (i.e. 3-13). Of the total household members

(i) those working in paid employment outside were 8
(ii) those in paid employment who were heads 8
(iii) Widows 2

The number of members actually living full time at home is therefore 255 (i.e. 263-8); and the fraction of female-managed farms is 24%.

Age Distribution

A further insight into the structure of farm labour in the two areas is gained by disaggregating the total number living at home into certain age categories.

TABLE 1. AGE DISTRIBUTION OF HOUSEHOLD MEMBERS

	under 15	16-60	over 60	Total
Bukura	142 (56%)	93 (36%)	20 (8%)	255
Shitoli	135 (55%)	97 (39%)	15 (6%)	247
Total	277 (55%)	190 (38%)	35 (7%)	502

It will be seen from the table that the majority of household numbers in both sample areas are under 15 years of age. If we assume that only the people in the age range 16-60 contribute significantly to farm output, we then see that, overall, only 38% of the total household members constitute the productive labor force.

However, this is not the whole story. Within this potentially productive group we find that there are people who do not work on the farm for various reasons, as Table 2 below indicates.

TABLE 2. NON-WORKING MEMBERS WITHIN THE AGE RANGE 16-60.

	Schooling	Crippled etc.	Total
Bukura	12	3	15
Shitoli	16	5	21
Total	28	8	36

Thus, adding together the young, the aged, the schooling and the invalids, we find that the effective labour force is as follows.

(i) Bukura - only 78 members are available for farm work.
The dependency ratio is $\frac{(142 + 20 + 15)}{78} = 2.26$

(ii) Shitoli - only 76 members are available for farm work.
The dependency ratio ratio is $\frac{(135 + 15 + 21)}{76} = 2.25$

In other words, each producer in Bukura and Shitoli, on average, works to feed himself or herself and more than two others. In just plain numbers, this is saying that out of

(i) 255 household members in Bukura, 78 produce (and consume); 177 are just consumers.

(ii) 247 household members in Shitoli, 76 produce (and consume); 171 just consume.

Of course these numbers would not tell us much about the material welfare of the farm population if the productivity of those who produce were high. This is certainly not the case in our sample areas.

Before leaving the question of the labour stock, let us make one or two comparisons between the sample areas. The first one which has already been touched upon is that average farm size is much larger in Bukura. Secondly, there are more female-managed farms in Shitoli, (57%) than in Bukura (24%). These two comparisons are likely to be functionally related: because of land shortage in Shitoli, men go out in search of wage employment, leaving their wives to take care of their small farms.

3. FARM TOOLS

In a word, the area is a hoe-and-panga economy. The following tables will illustrate this assertion.

(a) Hoes

TABLE 3. NUMBER AND % OF SAMPLE HOUSEHOLDS POSSESSING

	1 hoe	2 hoes	3 hoes	4 and over	Total
Bukura	5(12%)	7(17%)	9(21%)	21(50%)	42(100%)
Shitoli	2(5%)	30(71%)	9(21%)	1(3%)	42(100%)
Total	7(8%)	37(44%)	18(21%)	22(27%)	84(100%)

Each household has at least a hoe. However, the majority in Bukura (71%) have at least three hoes, while the same number in Shitoli (71%) have only two hoes. Notice that a full 50% of Bukura households have at least 4 hoes while only 3% in Shitoli fall under this category. This seems to confirm the impression that the two areas are at different levels of poverty.

(b) Pangas

TABLE 4. NUMBER AND % OF SAMPLE HOUSEHOLDS POSSESSING:

	None	1 Panga	2+ Pangas	Total
Bukura	5(12%)	24(57%)	13(31%)	42(100%)
Shitoli	2(5%)	36(86%)	4(9%)	42(100%)
Total	7 (8%)	60(71%)	17(21%)	84(100%)

An overwhelming majority of households in Shitoli (86%) possess only one panga each, whereas 88% in Bukura have between one and two pangas each. Overall, only 8% of the total sample have no panga at all.

(c) Ox Ploughs

TABLE 5. NUMBER AND % OF SAMPLE HOUSEHOLDS POSSESSING:

	None	1 Plough	2 Ploughs	Total
Bukura	32(76%)	10(24%)	0(0%)	42(100%)
Shitoli	39(93%)	2(5%)	1(2%)	42(100%)
Total	71(85%)	12(14%)	1(1%)	84(100%)

Overall, only 15% of the sample households possess a plough. Again, differences between the two sample areas are evident: there are 10 farmers in Bukura with a plough as compared to only three in Shitoli.

(d) Shovels

TABLE 6. NUMBER AND % OF SAMPLE HOUSEHOLDS POSSESSING:

	None	1 Shovel	Total
Bukura	26(62%)	16(38%)	42(100%)
Shitoli	30(71%)	12(29%)	42(100%)
Total	56(67%)	28(33%)	84(100%)

Only 33% of the total sample possess a shovel. However,.there are more shovel owners in Bukura (38%) than in Shitoli (29%). None had more than one shovel.

(e) Felling Axe

TABLE 7. NUMBER AND % OF SAMPLE HOUSEHOLDS POSSESSING:

	None	1 Axe	Total
Bukura	10(24%)	32(76%)	42(100%)
Shitoli	5(12%)	37(88%)	42(100%)
Total	15(18%)	69(82%)	84(100%)

Shitoli seems to fair better than Bukura with respect to felling axes.

(f) Wheelbarrows

Only two people from Bukura had a wheelbarrow.

None had one in Shitoli.

(g) Ox Carts

None of the sample farmers has an ox cart. One might add here that this is a serious drawback as one frequently observes a team of oxen dragging heavy loads (e.g. building materials such as logs) on the ground. Poor beasts.

(h) Other

Another frequently observed tool is the slasher. This is a longish knife used to clear tall grass or weeds.

The Ages of Tools

Mere quantities of tools do not provide us with information about their usability. It is important to have an idea about their ages and hence their practical usefulness to the farmers. Althoggh information was obtained in this regard for all the tools mentioned above, the age composition of hoes and ox ploughs will be reported here.

(a) Hoes

TABLE 8. NUMBER AND % OF HOES IN SPECIFIED AGE RANGES

	Under 5 years	5-10 years	Over 10 years	Total
Bukura	67(44%)	36(24%)	49(32%)	152(100%)
Shitoli	51(55%)	20(21%)	22(24%)	93(100%)
Total	118(48%)	56(23%)	71(29%)	245(100%)

In Bukura, 44% of the available hoes are under 5 years old while the corresponding figure for Shitoli is 55%. If it is assumed that 10 years constitute the most useful life of a hoe, then

(i) 32% of available hoes in Bukura are of little use

(ii) 24% of available hoes in Shitoli are useless

(iii) Overall, 29% of the hoes are of little productive value. On the other hand, if it may be assumed that a hoe is most productive in the first five years of its life, then more than one-half (52%) of the available hoes in the two sample areas have passed this stage.

It must be pointed out that some of the hoes over 10 years old were practically useless. Some were reported to be in their 20's. Others are only used for weeding as they are too worn down to penetrate the soil.

(b) Ox ploughs.

As may be seen from Table 5, only 13 of the 84 sample farmers own ox ploughs.

TABLE 9. NUMBER AND % OF PLOUGHS IN SPECIFIED AGE RANGES.

Under 15 years	Over 15 years	Total.
6 (43%)	8(57%)	14 (100%)

Thus, the majority of the ploughs (57%) are over 15 years old. Just like some hoes, some were in their 20's and even 30's. At least 3 were reported out of working order for lack of repair.

4. Livestock: (a) Cattle.

Oxen are a major component of intermediate technology. In fact, one frequently hears statements to the effect that most African farmers own cattle as well, so that the new technology need not involve a cash outlay for purchasing oxen. It is therefore fitting to examine the extent and problems of cattle ownership in our areas of study.

TABLE 10. NUMBER AND % OF SAMPLE HOUSEHOLDS OWNING CATTLE

	None	1-2 head	3-4 head	5 +	Total
Bukura	24 (57%)	7 (17%)	4 (9%)	7 (17%)	42 (100%)
Shitoli	6 (14%)	10 (24%)	10 (24%)	16 (38%)	42 (100%)
Total	30 (36%)	17 (20%)	14 (17%)	23 (27%)	84 (100%)

The information in the table is interesting in the sense that it is contrary to what one expects in each of the two sample areas. Shitoli with its limited land has more cattle that the better endowed Bukura. In addition, 57% of the sample farmers in Bukura own no cattle as compared to 14% in Shitoli. Also, whereas only 17% of Bukura farmers own five or more heads of cattle, the corresponding figure for Shitoli is 38%. Overall, 64% of sample farmers own at least one cattle.

The explanation for Shitoli's relative standing in this aspect is simple. A considerable number of members of Lirhemba Co-operative Society own grade cattle which were bought with loans financed by a

Dutch Government grant to the Society. The terms of repayment stipulate that the borrower must pay back to the society a grade heifer which will in turn be given to another member on the same terms. There is no such programme in the Bukura sample area.

The farmers owning cattle in both sample areas were asked to state the problems they face with their cattle. Among several problems reported, inadequate grazing land was one, as shown below in Table 11.

TABLE 11. NUMBER AND % OF SAMPLE CATTLE OWNERS REPORTING THAT LAND LIMITATION CAUSES GRAZING PROBLEMS.

	Yes	No	Total
Bukura	7 (39%)	11 (61%)	18 (100%)
Shitoli	24 (67%)	12 (33%)	36 (100%)
Total	31 (57%)	23 (43%)	54 (100%)

As expected, the problem is more common in Shitoli (67%) than in Bukura (39%). The problem is also reflected in the fact that, as a rule, Shitoli cattle owners tether their animals, bringing them grass and crop residue,[4] whereas open grazing is more common in Bukura.

(b) Other Livestock.

Except chickens, the number of other livestock owned in the two sample areas is negligible. Only two sample farmers in Bukura and none in Shitoli owned goats. Similarly, only four sample farmers in Bukura and ten in Shitoli owned at least a sheep. On the other hand, 83% of farmers in Shitoli and 79% in Bukura had one or the/more chickens. The mean number of chickens per household was 9 in Shitoli and 10 in Bukura.

5. Summary and Concluding Remarks.

This paper reports the resource structure on a sample of 84 peasant farms in two areas of Kakamega District. The report is a part of an on-going study which aims at exploring alternative possibilities for raising labour productivity on small-scale farms of Kenya. The paper is an inquiry into stocks rather than flows. The latter aspect is the focus of the work now in progress.

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4. Those with grade cattle have fenced a piece of their farms (with the same loan arrangements) and some have planted improved pastures.

A number of observations can be made from the information presented.

1. The overall impression one gains is that the stock of resources both reflect and imply a severe degree of poverty in the sample areas. However, the two areas appear to be at slightly different levels of poverty mainly because of differences in land availability.

2. The effective farm labour available in the two areas is just not sufficient to produce adequate home supplies and a surplus for conversion into off-farm consumer and capital goods. There seem to be too few producers and too many consumers. Hence, a low level of consumption and investment must necessarily result.

3. A very low level of technology characterises the sample farms. Within this technology, the tools used are both numerically inadequate and qualitatively poor. When this level of technology is superimposed on insufficient farm labour, the consequence can only be poverty.

4. It would appear that differences in farm sizes will have a significant influence on both the introduction and organization of the suggested intermediate technology.