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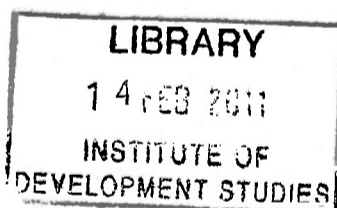
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THE DYNAMICS OF RURAL INCOME DISTRIBUTION:  
A RESEARCH PROPOSAL

by

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The Dynamics of Rural Income Distribution:  
A Research Proposal

There are many causes of economic differentiation in rural society. The causes include debilitating old age, permanent physical disability and poor mental health of the household member(s) responsible for production; localised climatic disaster, temporary illness, crises leading to economic stress and consequent sale of productive assets, subdivision of assets through inheritance, uneven distribution of water and high fertility soil, the amount of assistance provided to young males in setting up their farms, educational status of the household head and possible consequent experience of off-farm employment leading to accumulation of savings for farm investment and to increased understanding of how to contact and use government extension services, access to sources of credit, contact with the extension services irrespective of formal education, and, if we accept Chayanov's analysis of economic differentiation in peasant societies, the ration of productive to non-productive members in the farm household.

The immediate causes of poverty are various but they may be grouped in two classes: Those that still leave scope for improving the economic status of the poor through policies acting on their farm systems and those which do not. The first three causes of poverty listed above/fall into the second category; if the poverty /usually of these people is to be alleviated this should be through other social welfare measures. But the other causes of poverty are, not for any farm household, necessarily permanent. It should be possible to raise the incomes of these families through policies designed to increase their farm production.

Although since the adoption of the current five Year Development Plan the Kenya Government has been committed to a reduction in economic inequality through increased emphasis on the rural sector, policy measures designed to reduce inequality within the rural sector are still rare. Apart from the transfer of European farms per se they include the high density sector of the million acre settlement scheme, which provided land to the landless, the continued policy of making certain "estate crops" such as sugar and tea accessible

to small farmers (though these are sometimes the relatively rich in their own communities) and the recently initiated Tetu hybrid maize extension project. While policy measures in this area are limited so are the research efforts of agronomic and livestock specialists and of social scientists specialising in the rural sector. Apart from the major work in development of Katumani and hybrid maize and the current Katumani maize and Mexican 142 beans SRDP research program in Ibere (which is investigating fertilizer response and the merit of mixed planting) few agronomic research programs have emphasised the type of crops (i.e. food crops) and farming techniques (e.g. mixed planting) that are of particular importance to the low income, low asset farmer aiming to meet his subsistence needs and to minimise the risk of failing to do so.

Recent research by social scientists in Kenya designed to enhance our understanding of why certain individuals in rural communities are relatively poor, and remain so, has focussed on the farmer contact pattern of the extension services. The following quotations illustrate the research emphasis and the main findings.

" The most progressive farmers are in receipt of a disproportionate amount of attention (from the extension service), and the laggards are conspicuous by the paucity of attention received.

Ascroft et.al.      The Kisumu SRDP Survey of farm level Enterprises:  
A Preliminary Report of Findings I.D.S. Working  
Paper No. 5. p.33

" Tables 75 -79 clearly confirm what we might expect to be true,  
that more progressive farmers are in greater contact with change  
agents than are less progressive farmers"

Peter Mook      The Vihiga S.R.D.P. Farm-Level Survey:  
A Preliminary Report of Findings.

"Nearly two fifths of the laggards, compared to none of the most progressives, have never visited by an extension officer of any kind during the last year....."

" Crop and animal husbandry demonstrations are primarily attended by the more progressive farmers ....."

" demonstration plots are only placed on the more progressive farmers farms."

J. Ascroft: The Tetu Pilot Extension Project in Strategies for Improving Rural Welfare, IDS. Occasional Paper No 4, pp 65 and 66.

" Extension work seems to be very largely directed to male farmers with cash crops and above average acreages."

D.K. Leonard Some Hypotheses Concerning the Impact of Government Agricultural Extension on Small Farmers, I.D.S. Staff Paper No. 71

" In the Province as a whole, the average extension agent spends 57% of his visits with progressive farmers (who are 10% of all farmers) and 6% of his visits with non-innovative ones (47% of of the total)."

D.K. Leonard: The social structure of the Agricultural Extension Services in the Western Province of Kenya, I.D.S. Discussion Paper No. 126, P.4

These studies have ignored two important factors which may also help to explain why the relatively poor often remains so. While the results to date of the Tetu hybrid maize extension experiment suggests that extension service contact can indeed be an important factor in determining the rate of farm innovation, I suggest that the opportunity cost of innovation and the existence of relatively high aversion to risk are also important factors in determining adoption rates of innovations on low income, low asset farms. Evaluation of the importance of these two factor represents the main focus of the proposed study.

The opportunity cost of innovation is important in economic decision - taking on these farms when considered (1) in relation to the return which incurring it can generate and/ (2) in relation to the way in which the nature of the cost affects the farmers aversion to risk. In considering the opportunity cost of farm innovation we must distinguish four ways of identifying these costs each of which may lead to a different estimate:

- 1) Opportunity cost as perceived by the farmer unverified by him.
  - 2) Opportunity cost identified by the farmer using a production method not recommended by the extension service.
  - 3) The opportunity cost of innovation using the economically optimal production method; i.e. that method which maximises the return per unit of production cost. This may or may not coincide with types (2) and/or (1).
  - 4) The opportunity cost of innovation using the production method recommended by the extension service. This could coincide with 1 and/or 2, and/or 3
- Types 1 - 4 are all of interest because they either do or should (or both) influence the farmer in his decision-taking.

In evaluating the importance of opportunity cost and risk aversion in influencing adoption rates of innovations on low-income farms we should therefore distinguish:

- A: the opportunity cost (types 1-4) in relation to the Net Farm Business Income. (income net of the cost of purchased inputs) which incurring it will generate, and
- B: the opportunity cost (types 1 - 4 ) in relation to the real nature of the cost on a given farm and hence the manner in which it affects the farmers' assessment of the risk of innovation.

Since we are in effect to consider two distinct hypothesis (A and B) I will discuss them as such. In hypothesis A I assume that the returns obtainable by poor farmers in adopting some of the innovations recommended by the agricultural extension service are not sufficiently high to justify the opportunity costs that must be incurred in adopting them. A rich farmer may be able to expand at the margin without cutting back production elsewhere because he has underutilised resources. In some areas land is not a limiting factor; rich farmers may also have the necessary capital to finance purchased inputs and the hire of labour and machines. If they perceive limited alternative uses for this capital they may recognise only a low opportunity cost to the investment. Poor farmers do not have such surplus resources.

Since four forms of opportunity cost have been identified we must ask whether hypothesis A can be tested for any or all of the four definitions given.

Whether Hypothesis A can be tested is dependant on whether the relevant opportunity cost (O.C.) and N.F.B.Y. data can be measured, and if not, whether convincing alternative evidence of profitability can be obtained. The degree of precision that can be achieved in evaluating O.C.s 1 and 2 and the relevant N.F.B.Y.s will be a function of the degree of precision that the farmers themselves have been able to achieve in their own estimates and of the precision with which they report these estimates. The farmers perception of O.C. type 1 which may be more or less precise, and of the related N.F.B.Y. can be established by farmer interview. A preliminary survey of 49 farmers in the Mbere Division of Embu District suggested that information pertinent to O.C. type 2 and the related G.F.B.Y. and N.F.B.Y. can also be obtained from a single interview but can normally only be provided for one of the three possible rainfall situations (below average, average, and above average). Farmers' responses to this survey also suggest that farmers find it hard to recall both O.C. and G.F.B.Y. (and N.F.B.Y.). The information that can normally be provided is

- (i) production method used
- (ii) farmer's conclusion as to the attractiveness of the innovation and the reasons(s) for reaching this conclusion.

Opportunity costs 3 and 4 and related N.F.B.Y.s can be identified only by comprehensive on-farm studies of output response to and resource reallocation implications of different combinations of production techniques for different products.

A proposed approach to testing Hypothesis A will be outlined in the section on research methodology.

Two models may help to clarify the risk aversion hypothesis (Hypothesis B).

#### Model 1

In this model the low income, low asset farmer in whom we are interested is a pure subsistence producer just able to meet his subsistence needs in an average rainfall season. Adoption of a recommended innovation will entail some change in a cropping pattern which till now he has regarded as optimal given his resources. Often, one of the first consequences of adoption will be a resource shift away from other enterprises.



Whatever the perceived success probability of such an innovation, for a given probability the adoption rate will be lower on the farms of low economic status (i.e. the subsistence farms defined above) than on farms of higher economic status. This can be ascribed to the nature of the opportunity cost on the low income farm (loss of subsistence output). The high utility of such output to the farmer in relation to its market price, and his high aversion to a possible failure to achieve his minimal subsistence needs make him particularly cautious.

Model 2. Is similar to Model 1. The only distinctions are that in this case the farmer has already entered the cash economy. Some of his subsistence requirements are now met through exchange in the market and he has some economic surplus in an average year. But the surplus is low and in poor rainfall years he still runs the risk of failure to meet his minimal subsistence needs. The same argument applies. It is assumed that this model is applicable to low income farmers in the proposed study area (see below).

The question then arises as to whether the validity of this simple model of the negative causal role of risk aversion can be tested. Unfortunately a number of difficulties inhibit such a test. They derive from the need to hold ceteris paribus and would apply unless it were proposed to mount a survey on a scale substantially greater than that indicated here. To test the hypothesis it is necessary to identify groups of farmers of different economic status but identical anticipated net return from a given innovation, where the anticipated net return is defined as  $G.F.B.Y. - O.C.$  Type 1.

But because the farms on which the innovation might be adopted will not be identical in terms of existing enterprise combinations, soil fertility, water availability and quality of management the following possibilities must be anticipated;

- (a) Anticipated  $G.F.B.Y.$  is constant but  $O.C.(1)$  varies between farms.
- (b)  $O.C.(1)$  is constant by  $G.F.B.Y.$  varies between farms.
- (c) On some farms both  $O.C.(1)$  is lower and  $G.F.B.Y.$  is higher than on others.

The testing of Hypothesis B is further complicated by rainfall variability.

of a crop's viability must take account of good, average and poor rainfall situations. This means that in order for farms of different economic status to be strictly comparable three M.F.B.Y. probability estimates must be equal.

1. Purpose of the study

The proposed study has three objectives:

1. To identify the particular problems confronting low income, low asset farmers in two areas of Mberere Division, Embu District in adopting the innovations recommended by the agricultural extension service.
2. To provide data that will be of general use in evaluating the relative profitability of different crops in the higher and lower areas of the Division.
3. To collect and analyse data on economic mobility in rural society in the Division.

In the selected study areas (see next section) the innovations recommended by the extension service take the form predominantly of the introduction of new cash crops and of Katumani maize. The main innovations are

- (a) Higher zone: cotton, mexican pea beans, Katumani maize, tobacco and bananas.
- (b) Lower zone: castor, Katumani maize, cotton, honey.

There is some emphasis too on the adoption of improved techniques for existing enterprises, particularly the correct spraying of cotton on farms where this enterprise is already established.

These innovations require different levels, combinations and timing of resource inputs - and these differences are likely to influence their relative attractiveness. However, in Mberere there is a marked lack of reliable data on the profitability of the crops which are being pushed by the extension service. This is particularly important in the case of cotton - a crop which takes up a considerable amount of extension time (including normal farm visits, supervision of demonstration plots, organisation of spray-pump hire and loan collection). Cotton is an annual crop which on most farms displaces two seasonal crops (often green grams

followed by millet or beans). It has been suggested that the pulse/grain combination may be more profitable and there is no doubt that many farmers prefer it. (Out of 49 farmers interviewed throughout Mberere in August 1972 at least 11 had tried cotton and abandoned it and a further 22 did not grow it though they all apparently knew of the crop.) If the proposed study can identify the relative profitability of cotton and the grain/pulse combination in two parts of Mberere this should be of some importance in the future planning of extension service emphasis in the Division.

II. Location of the study areas

Mberere has been selected as the area of study for four reasons:

- (a) It is an area of medium and low agricultural potential relatively poor in economic and social infrastructure. In the lower zones annual rainfall is likely to be less than 30 inches, approximately 4 years in 10, and crop failure is a major hazard. Hence one might expect that those who fall at the lower end of the income distribution scale in Mberere would also be regarded as poor when considered in an all-Kenya context.
- b) It is an area into which there is apparently substantial migration particularly in the higher areas.<sup>(1)</sup> As population pressure increases the problems of farming in the medium potential areas will assume increasing importance in Kenya. Mberere constitutes one of these areas.
- (c) It is one of the first six SRDP areas. A recent SRDP evaluation report<sup>(2)</sup> suggests that detailed farm enterprise studies of the type conducted by Heyer in Machakos could play a useful role in development planning for the Division in view of the paucity of data on the profitability of different crops.
- (d) The area is reasonably accessible from Nairobi.

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1) Eastern Province Provincial Planning Team, Mberere Rural Development Program, 1969, p.4.  
2) G. Gwyer, Mberere SRDP: An Evaluation, 13 July 1972, mimeo.

Within Mbere SRDP area two areas have been chosen for the study: the area around Siakago, situated in Siakago, and Gitibore Sublocations and the area around Ishiara situated in Evurore Sublocation. These areas have been chosen

- a) to represent the high (Siakago) and low (Ishiara) zones
- b) because they are reasonably accessible both for enumerators and the project supervisor
- c) a preliminary visit to the Western part of Gitibore identified a wide range of cash earning enterprises including tobacco, cotton, mexican pea beans, green grams, bananas, sugar cane, miraa, and honey.
- d) the main cash enterprises of the lower zones are represented around Ishiara, i.e. Castor, green grams, sorghum, mangoes and honey; a little cotton is also grown in the sub-location.

### III Proposed research methodology

Two surveys are proposed. The first survey will be an intensive study of two groups of 12 farms, one group to be situated in the higher zone around Kambuŭ Primary School about five miles South - South East of Siakago (altitude approximately 3,500 feet), the other group to be dryland farms situated in one of the lower and drier areas of Mbere Division lying around Ishiara. The survey will be conducted over a 13 month period starting in September 1972. Over the period comprehensive farm input-output data will be collected on the 24 farms together with household expenditure data and data on off-farm sources of income. The second survey will cover two groups of approximately 100 farmers each: one group in the higher zone near Siakago, and one in the lower zone near Ishiara.

In testing hypothesis A the intensive 24 farmer survey and the broader survey will both be employed. As pointed out above the hypothesis should be evaluated using four different definitions of opportunity cost. The information relating to farmers estimates of O.C.s Types 1 and 2 and the related NFBYs will be obtained from the broader (200 farmer) survey. Farmer responses to the preliminary

survey conducted in Mbera in August 1972 suggest that information concerning O.C. Type 2 and the related GFBY and NFBY will usually only be available for one out of the three possible rainfall situations. Farmer responses to this survey also suggest that farmers find it hard to identify both O.C. 2 and the related GFBY and NFBY with any precision. The information that can normally be provided is

- a) production method used
- b) farmers conclusions as to the attractiveness of the innovation and the reasons for reaching this conclusion.

Those who try and abandon an innovation have normally found it uneconomic. I do not expect to measure the precise economic cost involved but through collection of information on points (a) and (b) and on successful adoption of innovations I hope to identify whether final adoption of an innovation after the first trial is more frequent on farms of higher economic status than on poor farms, and if this is so, then to identify the reasons for this difference. The findings from the preliminary survey also suggest that farmers will not normally be able to identify O.C. type 1 and the related NFBY with any precision, but that here also they will quite often be able to give estimates of relative profitability and of the basis from which they reach their estimates. Some farmers may not have heard of particular innovations or only in some vague form. The survey will aim to establish how much farmers know about different innovations and the sources of their information.

The information relating to O.C.s Types 3 and 4 and the related H.F.B.Ys will be obtained from the intensive farm survey. The need to obtain information on as broad a range of production methods as possible, including those recommended by the extension service will be born in mind when selecting farmers for the survey.

In view of the difficulties outlined above in testing hypothesis B it is proposed to use the following approach in investigating the hypothesis. The 24 farmers in the intensive farm study (to be purposefully chosen to represent a cross-section of economic statuses) will be asked to discuss their attitudes towards the various innovations being recommended for their area by the agricultural extension service.

Where the innovation entails the introduction of a new crop, they will be asked to think in terms of planting  $\frac{1}{2}$  acre or a full acre. They would be free to consider planting a mixed or pure stand.

The farmers will be asked to outline what they consider would be the implications for their farm of adopting the innovations, whether they consider the implications acceptable, and if so why the innovations have not been adopted. The validity of the farmers' evaluations will be checked through the use of linear programming to evaluate the implications for the farmers of adopting the innovations subject to any constraints which they may wish to impose. The adoption implications for low and higher income farms will then be contrasted in terms of (a) the farmers own evaluation and (b) linear programming analyses of the implications of adopting the innovations using (i) production methods recommended by the extension service (ii) other production methods already employed by farmers in the sample (where this occurs). In so far as the implications identified under head (b) differ from those identified under head (a) the farmers of low economic status in the sample will be asked for their evaluation of the ~~se~~ too.

In the broader (TC farmer) survey, farmers will also be asked to give their evaluation of the implications for them of adopting innovations recommended by the extension service for their areas which they have not already accepted, with a view to identifying whether their perception of the risk involved (as outlined in models 1 and 2) is a significant determining factor. In making their evaluations farmers will be asked to take into account the likely success of the innovation in different rainfall situations (poor, average, and good) and their estimate of the frequency with which poor, average and good rainfall seasons occur. Their estimates of the latter will be compared with available rainfall records.

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(1) Cf. Heyer, The Economics of Small Scale Farming in Lowland Machakos, I.D.S. Occasional Paper No. 1., 1967.

If Hypothesis B is correct one would expect to find that the lower the resource allocation required for an innovation, the greater its adoption speed. In the 200 farmer survey, farmers will be asked series of questions designed to identify (i) adoption dates of innovations and (ii) the information sources through which the farmer had heard of each innovation before adopting it.

Research findings to date certainly show no reason for rejecting the hypothesis that there is a causal relationship between extension service contact and farmer progressiveness. In the 200 farmer survey data will be obtained on extension service contact and will be correlated either with an economic status index or with that and a farmer progressiveness index if time and resources permit the development of the latter as well. It is hoped that this will be possible.

- f) farm capital at the outset and end of the recording period.
- g) selective household inventory at the beginning and of the recording period.
- h) estimates of the amount of land under different crops.
- i) crop yields: it is anticipated that these will usually have to be estimated through sample weighing by the enumerators.

It is not possible to say in advance whether the survey households will be willing to provide full information on 'e'. However, if, as is hoped, the households become really interested in the survey there is reason to expect that they might. Even if they don't it should still be possible to estimate the relative importance of the households' different sources of cash income and to make approximate estimates of the income generated given the degree of familiarity with each household's economy which will be built up over the survey period. This information is required in order

- (i) to identify optimal resource allocation patterns.
- (ii) to establish whether the farmer's off-farm sources of income afford him some additional protection against risk-taking.

#### Definition of a household.

For the purposes of the study a household will be defined as a group of family members who all enjoy a right to the produce of the farm and who all normally live together and share the same food.

#### Measurement of Economic Status.

It is proposed to use two indicators of economic status both of which were used by Heyer, et.al. in their 1968 SRDP baseline survey.<sup>(i)</sup> The first will be a limited household inventory focussing on specified items purchased for cash; the second will be school fees paid in the current year. Each household will receive a score for each of the two

(i) J. Heyer and J. Ascroft, The Adoption of Modern Practices on Farms in Kenya: Preliminary Results of a 1968 Survey of Farms Across Kenya, Universities of East Africa Social Science conference 1970: Conference Proceedings. Vol. V. p. 311.



indicators. For the first indicator I propose to use the list of household possessions and scoring index employed by Heyer (one point for each of fifteen items owned). For the second indicator the household will receive a score of one point per shs.100/- spent. The scores for the two indicators will be conflated and an economic status ranking thus obtained.

Timing of the study.

Primary data collection should be completed by the end of September 1973, and on some farms possibly earlier. Analysis of this data will be completed during 1974.

Conclusion.

There has been only limited study in Kenya of the problems confronting low income, low asset farmers in any attempt to improve their economic status. It is hoped that the study proposed here will lead to an increase in our understanding of these problems. It is also intended to provide specific crop profitability data which will be of use in a future agricultural development planning in Mbere Division.

APPENDIX 1.

Preliminary Budget Estimate.

It is not possible to provide a precise budget estimate at this stage. Various points have still to be established such as the relative importance of full-time paid enumerators and school-children in data collection for the intensive (24 farm) survey. The following budget outline is intended to provide some indication of the order of magnitude of anticipated outlays.

<u>Item</u>	<u>Cost in kenyan shillings.</u>
a) 4 enumerators at 300/- per month = 1200/- per month over 13 months.	15,600.00
b) 8 school children at 10/- per month = 80/- per month.	1,040.00
c) 4 push bicycles at 500/- each	2,000.00
d) Accommodation and transport costs for project supervision	
(i) per diem allowance for 90 days at 60/- per day	5,400.00
(ii) 7200 miles at -/50 per mile	4,220.00
e) Stationery and other miscellaneous items	<u>1,500.00</u>
Sub-total	<u>29,760.00</u>
f) Cost of data processing including use of computer time.	not available.