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CO-OPERATION AND THE PRODUCTION ENVIRONMENT

Some explorations among social and economic factors
affecting agricultural co-operation

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CO-OPERATION AND THE PRODUCTION ENVIRONMENT*

Some explorations among social and economic factors affecting agricultural co-operation in Tanzania

I. Introduction

... the course of co-operative collectivisation is the sole course possible in our condition to introduce into peasant farming the elements of large scale farm industrialization and the state plan.¹

This statement was written with reference to the early attempts at co-operative farming in the Soviet Union, in the 1920's. Its underlying assumptions and aspirations are, however, pertinent to many situations in the developing economies of today. Agricultural co-operation has been seized upon by politicians and administrators as a solution to many of the social, economic, and technical problems faced by their societies. The continuing attraction of the idea of agricultural co-operation has led to many experiments and inevitably many failures. There has been a parallel outpouring of literature from the different social sciences to comment on these experiences and to proffer advice. Most of this has focussed on certain issues such as the role of value and ideology, and patterns of leadership and administration. This paper is an attempt to complement such studies by exploring certain functional relationships between the economic demands of agricultural systems, and the social and demographic features of particular rural societies, and the possibility of successful co-operation in agricultural production. We choose this emphasis not because the features left out are considered unimportant. Adequate institutions and administration are clearly necessary for successful co-operation. Values, either deriving from other social situations, or from contemporary political ideology may also discourage or encourage co-operation. While these factors may be necessary conditions, we do not believe that they are sufficient conditions for successful co-operation.

Analytical discussions of the conditions facilitating the success of co-operative organisations have centred on the social structure of the community in very specific ways. They

* An earlier version of this paper was presented at the I.D.S. Conference: "Social pre-requisites for agricultural co-operation held at the University of Sussex, April, 1969.

have been chiefly concerned with the structure of authority relations in the community and with the degree of cohesion or factionalism which binds or divides its members. We hope to broaden the structural framework which is considered relevant in a discussion of co-operative organisation, by relating sociological and economic attributes of the co-operating community to the farming systems in which its members are involved. Thus the foremost factor to be investigated must be the needs of the crops cultivated, and the ways in which these limit the kind of organisational forms which can be used for production. Once this is established we can examine the extent to which the characteristics of the community, demographically and sociologically, allow these organisational forms to be developed. These characteristics are the other structural factors to be considered here. They include firstly the age/sex distribution of farmers and the way in which this is related to household size and composition. Secondly, we consider the types of relationships which bind the members of the community to one another, for example, kinship relations, and the kinds of demands and expectations which these entail. Third, we discuss the problem of land tenure, and other economic interests which farmers have in agricultural co-operation. Finally, we consider factors which do not necessarily arise from the new social situation itself, but which are the results of the individual's previous life history and work experience.

The exploratory nature of this paper needs emphasis. What we present is in effect some very untested hypotheses that have been suggested from our own research and that of our colleagues. The illustrations used are therefore drawn almost entirely from Tanzania, and we are aware of the insularity that this gives to our analysis. The aim is not, however, to present proven generalizations, but rather to suggest possible functional linkage between factors, which could account for successful agricultural co-operation between producers, and it is in this respect that we hope this paper may be of some use.

It is though, particularly apposite that most of our illustrations should be drawn from Tanzania. Of all African countries its leaders, particularly Julius Nyerere, are most committed to searching for a non-capitalist approach to rural development. In his paper, "Socialism and Rural Development", Nyerere outlines how Tanzania's economic progress can be developed through co-operative institutions. It is hoped,

therefore, that our analysis could have implications for future policies.

The illustrations are drawn from agricultural developmental situations. They thus consider co-operation as it is related to commercial and technical progress, and not to 'traditional' communal subsistence systems. Two situations used are where co-operative production institutions have been set up in response to ideological aspirations. In these cases we are concerned to show what particular features of such situations might encourage or discourage co-operation to continue. The other situation is where farmers starting innovatory systems have chosen spontaneously to co-operate. We are concerned here to explain both the changes in patterns of co-operation that were observed, and how different kinds of co-operation existed in groups of individuals with different kinds of interrelationships. This will show how it is in the farmers' interests to co-operate, and how changes in those interests affect the form of co-operation. The next part of the paper will briefly describe these situations.

II. The empirical setting

The two co-operative schemes used as illustrations are Mbambara and Kwamangugu Ujamaa villages in the Tanga Region in the north of Tanzania.² The data on Mbambara and Kwamangugu villages have been collected from survey material used by a team from the Bureau of Resource Assessment and Land Use Planning of the University College, Dar es Salaam, in 1968, in the course of a comparison of twelve rural settlements in Tanzania.³

Mbambara Village was established in 1963 under the impetus of members of Tanu Youth League, by 240 people who were mostly ex-labourers on the big neighbouring sisal estates. Since that time until the survey in 1968, the membership of the community dropped to 162 settlers in 80 households. Of these 50 are children. The main crop at Mbambara is sisal, and a number of food crops are also grown. In 1967, 139 acres were under sisal, and 179 under food crops. Work is carried out both individually and communally, the main cash crop, sisal, being cultivated entirely collectively. Other communal work is scheme house-building, general maintenance of the village, the running of a co-operative shop owned by the community, a self-help scheme for improved water, as well as an experimental food farm (expanded since the survey), and a fishpond. Most food crops are grown on individual plots. The management

of the scheme is by elected members, secretary and treasurer. A work supervisor appointed by the manager is responsible for work allocation. These officials work with an elected executive council, which is divided into further committees for the purpose of work, education etc. According to the survey, communal work is carried out in the mornings for four hours, while in the afternoons people work individually on their own food farms. While all the marketing of the sisal is done on a co-operative basis, individual food crop surpluses are sold individually outside the settlement.

Kwamangugu Village was begun in a similar way to Mbambara, in response to a political appeal from 24 Tanu Youth League members. They attempted to recruit more members, and a few people voluntarily agreed to join the scheme. A majority of the thousand people who originally came to Kwamangugu in January 1963 were unemployed men and women who had been rounded up from the nearby towns. Others were sisal workers in current employment. Within 6 months, a majority of the settlers were expelled from the scheme for failing to comply with the rules that had been established not allowing people to hold outside jobs. Subsequently many others left, owing to difficult conditions prevailing at Kwamangugu, with the result that in 1968 there were only 123 settlers, in 73 households. Of these, 22 are children under 15. The village is both commercially less successful than Mbambara, and is also less developed in terms of the number of co-operative activities. Like Mbambara, sisal is the main cash crop; there are 126 acres under sisal, and it is grown collectively, although all food crops are grown individually. There is no co-operative shop, and the survey mentions that members are building their houses separately from one another, rather than in a village. The management of the scheme is very similar to that of Mbambara.

It should be stressed that these villages are both in an embryonic stage, meeting a considerable number of difficulties. They were selected not because they are in any way ideal typical in the Weberian sense, but because a certain amount of data was available about them relevant to the hypotheses put forward in this paper. They can legitimately be described as co-operative village settlements practising communal agriculture to a considerable degree.

The third situation is of a different order altogether. It is a group of tobacco smallholdings in Nduli, Iringa, about which the authors collected data between 1966 and 1967.⁴

It differs from the above two schemes in that it was not conceived of in an ideological framework. It was in no way a planned settlement; rather farmers initially co-operated together spontaneously, with varying patterns of co-operation emerging over time. There were originally twenty farmers, who in 1962 began to co-operate together for the purpose of growing tobacco. After one year they split into smaller groups. At the same time new groups were formed by other people attracted to growing tobacco. Over a few years the size of the groups continued to decline so that by the end of 1967 there were about 100 farms in the area, many of which were no longer run by groups, but instead, by the members of one nuclear family, or by a few close kin or affines. Table 1 shows the distribution of the main organisational types among the sample of farmers studied at Nduli in July 1967. In this, cooperating groups are divided into those tobacco enterprises where a crop is cultivated, processed and sold as a single unit, and those where the cultivation is done on separate plots, where co-operation extends only to common land titles, and the collective use of fixed assets such as a curing barn, grading sheds, and baling presses. Groups of kin refer to those farms where several kin wider than the nuclear family cultivate together. Individual farms refer to where there is one 'owner' who works either alone or with his wife.

Table 1

DISTRIBUTION OF MAIN CO-OPERATIVE TYPES AMONG NDULI SAMPLE

July, 1967

| <u>Type</u> | <u>No.</u> | <u>% of Total</u> |
|---|------------|-------------------|
| Co-operating group- cultivation and process | 5 | 14 |
| Co-operating group- Process only | 6 | 16 |
| Group of kin or affines | 6 | 16 |
| Individual farms | 20 | 54 |
| <u>Total</u> | 37 | 100 |

Unlike the two Ujamaa villages described above, we were fortunate in having detailed data about the changes in composition of these tobacco farms over time. Table II shows the changes in composition of the groups in the sample over a period from 1966 to 1967. It can be seen from the table that there was a distinctive trend towards the individualisation of the farms following initial co-operation.

TABLE II

CHANGES IN FARM ORGANISATION 1966 - 1967

| <u>Type</u> | <u>No.1966</u> | <u>No.1967</u> | <u>% 1966</u> | <u>% 1967</u> |
|--------------------------------|----------------|----------------|---------------|---------------|
| Co-operative farms - 4 members | 6 | 0 | 16 | 0 |
| Co-operative farms - 3 members | 6 | 6 | 16 | 16 |
| Co-operative farms - 2 members | 5 | 5 | 14 | 14 |
| Co-operative farms - total | 17 | 11 | 46 | 30 |
| Groups of kin or affines | 10 | 6 | 27 | 16 |
| Individual farms | 10 | 20 | 27 | 54 |
| Total | 37 | 37 | 100 | 100 |

III. The Socio-economic framework of Co-operation

(a) Economies of Scale

There are a number of factors, related to economies of scale of the production processes of different crops, which can account for different forms of production co-operation, and different degrees of success in achieving and maintaining designed co-operative institutions. More particularly they are related to non-synchronisation, or discontinuities, in the extent of these scale economies in the different operations contributing to a complete agricultural process. Agricultural production is a complex process involving many activities which may include investment and the first stages of manufacturing, as well as actual cultivation. For this reason, agricultural organizations have to be multifunctional. Economies of scale, or decreasing inputs per unit of output increases, can exist over given ranges for each of these activities. It is unlikely that such ranges will coincide, however, and it is this lack of synchronisation which forms a powerful incentive to co-operation. Thus it is difficult for one organisation to operate at a scale that is optimal for all the activities of the agricultural process. Co-operation allows a flexibility to accommodate this, so that separate organisations can merge for those activities where the opportunities for scale economies are greatest, and separate where such opportunities are more limited.

This argument could be extended to cover all aspects of agricultural co-operation - marketing as well as production. It is clear that agricultural marketing is best operated on a scale larger than most individual production units. At the same time producers may wish to gain the advantages of vertical

integration. The only means of achieving this, and at the same time operating a viable marketing organisation is through co-operation. Similar motives lie behind more traditional forms of co-operation which have been analysed by anthropologists in Africa. Reciprocal work groups, often based on beer parties have mainly been used for investment activities such as land clearing or housebuilding, while most cultivation activities are continued on an individual family basis.

With respect to economies of scale, there is, therefore, a testable hypothesis relating the technical processes of the agricultural system to the individual farmer's own interests in co-operation. It can be used to help explain spontaneous patterns of co-operation in situations of commercial agricultural development, and reasons for success or failure at more planned attempts at collective farm settlements.

The main illustration for this point is taken from our study of tobacco farming at Nduli. The changing patterns of co-operation there have already been briefly described. They can be partly explained by the lack of synchronisation of scale economies. Three main influences can be identified:-

1) Technical, managerial and financial difficulties that limit the amount of tobacco that can be managed by a single farmer, particularly during the early years of the development of his tobacco enterprise.

2) The reduction in the current input needed per unit of output, particularly labour, as the tobacco acreage is extended over a limited range.

3) The increased efficiency of larger processing units, curing barns and grading sheds, both in terms of construction costs per acre of tobacco capacity, and in terms of fuel costs in operation.

Most farmers are unable to operate more than one acre of tobacco in their first year of production. The new farmer generally experiences difficulties in gaining access to resources, particularly cash, labour and expertise. The first two of these are interrelated in so far as labour can be hired. Considerable amounts of cash have to be used for the development costs of the farm, in the form of land clearing, building curing barns and grading sheds, and building houses. As access to cash is very restricted, the farmer is forced to depend on his own labour supplies. The acreage he can plant will then be limited to the amount he can handle with the

family labour that is available, and the additional labour he can hire with his cash resources which are probably very low.

Lack of expertise is a further major factor limiting acreage. Flue cured tobacco is a very difficult crop to grow, process and prepare for the market. International standards are very stringent. New farmers experience considerable difficulties in learning the skills that are needed. The first three or four years of tobacco production are a process of 'learning by doing' for the new farmers. For this reason also the amount of tobacco they can handle is restricted in the early period.

The other major factor that restricts the acreage operated by a tobacco farmer during his first years is risk. Most farmers continue to maintain other economic interests, particularly other farms where food crops are grown, because of the uncertainty associated with a new enterprise. This means that substantial resources, particularly family labour supplies, farm implements and managerial inputs are not available for tobacco production. The farmers are willing to commit these resources to tobacco production only when the risks have been reduced by increasing experience.

The restrictions on the acreage grown by each farmer that have been described are paralleled by significant economies of scale, i.e. reduced inputs per unit of output, as planned output (measured in acres grown) is increased. These economies of scale arise from the increasing division of labour that can be applied to a number of the separate processes that are involved in tobacco production. They also occur in larger capacity investment inputs, curing barns, and grading sheds that are needed to process the tobacco before sales. These economies occur over defined ranges. For the purpose of analysis three scale levels were determined: 0-5 acres planted, 5-10 acres planted, and over 10 acres planted. There were no significant changes in average input-output relations after 10 acres was being produced. Table III sets out the per acre labour requirements for the different production processes for flue cured tobacco at Nduli. Table IV sets out the cash and labour inputs per acre capacity needed for different capacity capital units.

TABLE III

LABOUR REQUIREMENTS PER ACRE FOR MID-PLANTED FLUE
CURED TOBACCO PRODUCTION IN IRINGA, TANZANIA

| <u>Operation</u> | <u>Man-days per acre</u> | | |
|--------------------------------|--------------------------|-------------------|---------------------|
| | <u>0-5 acres</u> | <u>5-10 acres</u> | <u>10-100 acres</u> |
| Prepare nursery | 16 | 10 | 8 |
| Cut grass and plant seeds | 1.5 | 1.25 | 1.0 |
| Weed and cultivate nursery | 12.5 | 10 | 8 |
| Fertilize and fumigate nursery | 0.25 | 0.25 | 0.25 |
| Plough and ridge fields | 1.0 | 1.0 | 1.0 |
| Transplant seedlings | 9 | 8 | 6 |
| Fertilize fields | 6 | 6 | 6 |
| Weeding | 24 | 24 | 24 |
| Pluck and cure | 150 | 135 | 115 |
| Grade and bale | 120 | 72 | 61 |

TABLE IV

CASH AND LABOUR REQUIREMENTS - CURING BARN AND GRADING SHED

BUILDING NDULI 1967

Shillings and man-days per acre capacity

| | <u>CURING BARN</u> | | | <u>GRADING SHED</u> | |
|-------------------|--------------------|-------------------|------------------|---------------------|-----------------|
| | <u>0-5 acres</u> | <u>5-10 acres</u> | <u>10+ acres</u> | <u>0-5 acres</u> | <u>5+ acres</u> |
| Cash | 120 | 90 | 78 | 64 | 49 |
| Labour (man-days) | 32 | 28 | 26 | 10 | 6.8 |

This data was used to define an optimal growth path of output and capital accumulation based on an assumed objective of income maximisation, subject to a number of constraints related to the maintenance of minimum food stocks and cash availabilities.⁵ This output path is shown in Table V.

TABLE V

OPTIMAL TOBACCO PLANTING AND INVESTMENT DECISIONS. FIVE YEAR PERIOD

Acres Grown and Capacity

| | Tobacco planted acres | Capacity in areas Barn Building | Capacity in acres Shed Building |
|--------|--------------------------|------------------------------------|------------------------------------|
| Year 1 | 3.42 | 10.24 | 10.24 |
| Year 2 | 10.01 | | |
| Year 3 | 18.57 | 9.43 | 9.43 |
| Year 4 | 19.67 | | |
| Year 5 | 15.83 ⁶ | | |

The most significant implication for our analysis of this is that the optimum acreage in years 1-3 is considerably greater than the limit set by the restricting factor discussed above. This apparent contradiction can only be resolved by having a number of farmers co-operate together in order to obtain the cost economies of larger acreages, and at the same time accommodate the restrictions on acreage per farmer. Our data predicts that three or four farmers would work together for this purpose.

The restrictions on acreage that have been described, mainly arose from the factors with a temporary impact. Thus the limitations on access to resources will get less as the farmers accumulate experience, and improve their access to cash and other inputs. That means that the most efficient scale of operation will now become more synchronised with the acreage that the individual farmer can handle. This in turn means that the need to co-operate which arises from these factors will also disappear. Thus it would be expected that such co-operation would be of a temporary nature - mainly restricted to inexperienced farmers cultivating small acreages.

This corresponds to the pattern of co-operation observed at Nduli. There was a fissiparous tendency among those groups of farmers who co-operated together. This has already been shown in Table II. In Table VI it can be seen that the acreage of tobacco grown by individual farmers in the sample was 2.8 times the per farmer acreage of those growing in groups. The total per farm acreage of the individual farms is only 1.1 times the acreage of the group farms.

TABLE VI

TOBACCO GROWN BY INDIVIDUAL FARMERS AND CO-OPERATING GROUPS

| <u>Farm Type</u> | <u>Mean Acreage Planted</u> | |
|------------------|-----------------------------|-------------------|
| | <u>Per Farm</u> | <u>Per Farmer</u> |
| Individual | 9.9 | 9.9 |
| Group | 8.9 | 3.5 |

These figures support the hypothesis relating economies of scale to co-operation. Thus those farmers whose acreage is insufficient to gain the economies of scale, co-operate so that the total acreage of their farms is not significantly different from the acreages of the more experienced farmers who individually can operate the larger acreages.

The figures of Table V which set out optimum paths for output and capital accumulation indicate a further discontinuity of scale economies; that between output levels and asset capacity. This arises because it pays a farmer to build larger capacity curing barns and grading sheds even if this involves temporary excess capacity. This discontinuity between capital capacity and acreage planted gives rise to further opportunities for co-operation. Three individual farmers or groups of farmers, each growing three to four acres of tobacco, could co-operate by using the same curing barn and grading shed, utilising the optimum scale of processing capacity which is related to 10 acres of tobacco. Other 'lumpier' capital inputs require even larger scale co-operation if a maximum level of technical efficiency is to be achieved. Thus the farmers at present use tractors for land preparation. A co-operative organisation has been set up to include some six hundred tobacco farmers working both as individuals and as co-operating groups, which owns two tractors, and operates even more by hiring from neighbouring co-operatives. In this way co-operation for different operations can be based on different levels of organisation, and all are functionally related to the technical needs of those operations.

(b) Other economic factors in co-operation

The relationship between co-operation and particular crop needs can be extended beyond a consideration of economies of scale. There are particular crops and activities which are more suited to co-operative work effort than others. Woods has shown in his analysis of changing patterns of co-operation in a new settlement area in Rhodesia, how farmers

formed co-operative work groups for certain investment activities such as housebuilding and land clearing.⁷ Other operations such as planting, where the timing and the method of work application are more critical, are done more efficiently by smaller groups. Woods lists four reasons why co-operative groups can be effective:

1. A large labour force allows greater division of labour, and therefore specialisation.
2. The element of reciprocity in co-operative work groups means that every member is encouraged to devote his full efforts to the work group in the expectation that the other members will do the same for him.
3. There is also a competitive element within co-operative work groups by which individuals try to gain status by doing allotted tasks quicker and more efficiently.
4. A larger labour force allows a more systematic approach to work. This may be very important for such operations as weeding.

For these reasons, Woods records a labour input for land clearing of 55 man/days per acre when done by a co-operative group of 24 to 30 adults, while the same work done by an individual requires 75 man/days per acre.

These advantages are counteracted by the difficulties associated with the timing of operations where a larger number of individual farmers are co-operating together. The work groups observed by Woods were formed by approximately three adult members from each of twelve farms. They met for three days each week. At that rate each farm would be worked collectively only once each month. This could be critical at harvest time where a delay of one month could cause great losses. The large work groups created for developmental work thus broke down into smaller groups as a result of the different timing needs of cultivation operations. Even the smaller groups had a seasonal variation. They ceased to operate with the onset of the rains when planting had to be done, and resumed again for weeding which was best done collectively.

A crop which requires critical timing for each operation, and considerable care and attention as to the way any operation is carried out, is not easily grown on a co-operative basis. Tobacco falls into such a class of crops. This is a major reason why the largest number of farmers co-operating to grow

tobacco at Iringa was four. There is a further problem discouraging more extensive co-operation in tobacco production, and which may be important for other crops too. This arises from the uneven distribution of labour needs for the crop through the year. This is shown in Table VII.

Table VII

PER ACRE LABOUR NEEDS FOR CULTIVATION, PROCESSING AND PACKING
TOBACCO BASED ON A SCALE OF 5 ACRE CULTIVATION

| Man/days | | | | | | | | | | | | |
|----------|------|-----|------|------|-----|-----|------|------|------|------|------|--|
| Aug | Sept | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | June | July | |
| 3.0 | 1.5 | 1.6 | 1.75 | 2.75 | 4.5 | 4.0 | 12.2 | 12.3 | 12.0 | 9.75 | 3.0 | |

If a collective group were to meet these peak demands from their own resources, it would mean that only a small amount of tobacco could be grown per member, and that a large amount of the labour force would not be used on the group during the slack season. The organisational difficulties arising from this would be considerable. Such crops as tobacco are most efficiently grown by seasonally increasing the size of the labour force to meet the peak demands whilst relying only on the farmers' labour to cover the slacker periods. This is best organised by hiring a temporary labour force. If a co-operative labour force was maintained adequate to meet peak labour demands, it would mean that the returns from the crop are being used to support a seasonally unemployed labour force. The system becomes both inefficient and inflexible. All the tobacco farmers at Nduli, whether they farmed in groups or individually, hired substantial numbers of labourers for harvesting, curing, grading and packing tobacco.

Any procedure which evens out the labour demands through the year might thus encourage a co-operative approach to production. For this reason mechanization may be an important factor to consider. In addition to relieving peak labour constraints, mechanization also provides a standardised method of carrying out individual farm operations. This means that individual work can become less critical. An example in Tanzania, where mechanization has assisted in producing a cash crop on a collective basis has been in the Upper Kitete Settlement Scheme. This is based on the mechanized production of wheat. In this case, however, the number of co-operating families is

too large for the amount of production, and methods used. This means that a large number are not employed directly on production and the scheme is not a financial success.

Some crops are more amenable to co-operative effort than others, particularly those that are continuously harvested. These have often been cultivated as estate crops, relying on large permanent labour forces. The Mbambara Ujamaa village is an example of successful production co-operation based on sisal. Sisal requires a constant labour input, and in addition, most operations are amenable to economies of scale, through division of labour. Thus the advantages of large numbers of people working together is fairly clear. The major difficulty found in collective operations for such crops as sisal is the work discipline needed. Work norms for cutting and weeding etc. have to be set and enforced. This is considerably easier for a hired labour force than a group of co-operating farmers. In Mbambara, however, these difficulties appear to have been overcome. This point is discussed more fully below.

(c) Demographic factors

A number of demographic factors affecting co-operation are now considered. The literature on peasant farming systems indicates the importance of both the size of the farming household, and its stage in the domestic cycle, in determining the size and organisation of the farm.⁸ This is because both the **productive capacity, and the consumption needs of the household** vary with its size and composition. When farm production is mainly directed to satisfying subsistence needs, the scale of production is likely to be determined largely by the size and structure of the household. Some production for subsistence needs is likely to be retained even when new production systems are devised for the introduction of cash crops. This is due to factors such as the uncertainty about the new crops success, and the market availability of food, fluctuations in price of the cash crop, and the need to maintain rights to the land on which the food crop is grown. Even if food production is not maintained on the same level as before, the returns from the cash crop will have at least to provide for the consumption needs of the family or household. This means that the composition of the household, as well as the size of food crop production may affect the amount of cash crop production desired by different families. In view of this it is useful to examine the structure of households, and the ages of members of co-operating production

units in relation to the farming systems in which they are involved, as factors contributing to success or failure in co-operation.

The data available on this topic both from the Nduli tobacco farmers and the Ujamma villages, Mbambara and Kwamangugu, is scant, but it nevertheless gives some idea of the effect of the above factors on co-operative organisation. At Mbambara, although the members now grow a food crop as well as the cash crop sisal, communally, it is not clear from the data how much of the food crop is grown in this way. It appears that an experimental plot of 30 acres for maize and other food crops which was grown communally was successful, and this encouraged farmers to attempt communal food crop production in the 1968/69 season. Unfortunately, no data is available on the system of distribution of this crop. However, if we examine the structure of households for both Mbambara and Kwamangugu, we find that the demographic characteristics of the population may favour communal food production at the present time. It must be borne in mind, though, that these characteristics will change over time, leading to a less favourable relationship between the demographic structure and production co-operation, unless institutions develop to overcome any ensuing difficulties.

At Mbambara, when the village was established, there were originally 60 settlers of whom only 16 were married, (i.e. 8 couples). Thus almost 75 per cent of the population were unmarried. At present (1968) the proportion of single people has decreased, there being now 21 couples (42 people) out of a total community membership of 123. This is about 33 per cent of the total. Table VIII shows the distribution of household size in Mbambara and Kwamangugu villages.

TABLE VIII
NUMBER OF ADULTS (OVER 15) PER HOUSEHOLD IN MBAMBARA
AND KWAMANGUGU VILLAGES

| <u>No. of adults in household</u> | <u>No. of households</u> | |
|-----------------------------------|--------------------------|-------------------|
| | <u>Mbambara</u> | <u>Kwamangugu</u> |
| 1 | 51 | 53 |
| 2 | 25 | 16 |
| 3 | 3 | 3 |
| 4 | 1 | 0 |
| 5 | 0 | 0 |
| 6 | 0 | 1 |
| Total | 80 | 73 |

Only 20 households (25 per cent) in Mbambara have children, and between them these households account for 50 children, all under 10. Kwamangugu has a smaller proportion of households with children-- only 11 out of 73 (15 per cent), accounting for 22 children, of whom 12 are under 10 and 10 under 15.

The important point from the viewpoint of co-operation is the homogeneity of household composition in these villages, arising from the small number of dependents. There are likely to be few problems even in the allocation of a communally grown food crop, since, in the majority of cases, households are able to contribute labour proportionate to their consumption needs. This becomes more difficult as there are increases in family size and as the consumption needs of older children who are unable to contribute much labour because they are at school. (It is planned on such settlements, that primary education become universal.) The high average age of the farmers in these villages (See Table IX), associated with the small number of dependents recorded in the survey, suggests that in fact many farmers may have wives and children elsewhere, who have not been included. If such people were to be brought to the settlement, new problems of the allocation of profits and food are likely to arise.

TABLE IX

AGES OF FARMERS IN MBAMBARA AND KWAMANGUGU VILLAGES

| <u>Age</u> | <u>Number</u> | |
|------------|-----------------|-------------------|
| | <u>Mbambara</u> | <u>Kwamangugu</u> |
| 21-30 | 27 | 29 |
| 31-40 | 39 | 22 |
| 41-50 | 5 | 15 |
| 51-60 | 6 | 6 |
| 61-70 | 2 | 1 |
| 71-80 | <u>1</u> | <u>0</u> |
| Total | 80 | 73 |

The small number of women in these villages, 27 and 23 respectively, is also likely to make co-operation easier between men. This is because rights in co-operative settlements are often allocated to the householder, usually a man. As a result women are often unwilling to co-operate with others in an enterprise in which they feel they have no stake. At Nduli, for example, many women refused to work with their husbands on the tobacco farms when their husbands were co-operating with

other men because they felt the farm was not theirs. If their husbands farmed individually, though, they frequently took an active part both in work and decision making.

A further relationship between the demographic structure of the population, and problems of co-operation, can also be illustrated from the situation at Nduli. This is related to the linkage between food and cash farming. At Nduli, farmers continue to maintain food farms off the tobacco land, although they are recommended by extension workers to combine the two crops. They can do this by using fallow tobacco land the year following its cultivation under tobacco, when the fertilizer left in the soil will support a good crop of their staple food, maize. However, because of the limits on the land available for this purpose, (only the previous year's tobacco land is suitable), there is insufficient acreage for all the members of a co-operating group to provide enough food crops to meet the varying subsistence requirements of each co-operating partner's household. To share the land equally between co-operation partners, as can be done with the cash crop, would not be possible with the food crop, since what is sufficient to satisfy one family's needs, might fall far short of those of another. While food production does not put a stop to co-operative cultivation of the cash crop, it means that while such co-operation is taking place, resources such as labour and land, may not be utilized, as they are competed for by the individual production of food crops.

The age of farmers may have an effect on co-operation in a more direct way. This is especially the case in a situation like that at Nduli where co-operating groups are formed spontaneously and it is up to the individual members to find partners with whom to work. An individual's age affects his ability to call on co-operation from others. Some farmers are in a better position than others not to need to co-operate at all, since they may be able to call on the help of a large number of kin to help them at various times. This is something that a young man cannot do so easily. At the same time it is not so easy for him to draw on older kinsmen with whom to co-operate, unless the latter take the initiative. A young man therefore must either co-operate with unrelated individuals or start by himself, unless he is able to join with older kinsmen or affines as a subordinate member of their group. This particular form of co-operation with kin will be discussed below. The data from Nduli show that in fact, more r

under 40 co-operate in groups than those over 40, 69 per cent of men under 40 as opposed by 43 per cent over 40. At the same time, of 7 farmers in the sample who are related by kinship or affinity to the chairman of the group, and therefore likely to be in a subordinate position (see below), 5 are under 40.

(d) Rights and obligations among kin and non-kin

We have seen how the varying ages and household composition of those co-operating together may affect the success of their venture because of the different interests which stem simply from the demographic differences. Because of the sociological correlates of demographic characteristics, such as the greater linkages to others gained with age, we have also suggested that the types of co-operation between people of different ages may vary. We shall now attempt to show how other relationships which bind the members of a co-operating community or group, can affect the ensuing forms of co-operation. This topic has been much discussed in the literature, especially with reference to the significance which such relationships had for people in the pre-co-operative situation. Our discussion will centre not so much on this aspect, but rather on the interests which they represent for the individuals concerned in the new situation. Traditional relationships of respect and authority between individuals of various statuses represented not only obligations between the parties, but also rights, i.e. interests which they gained by adhering to them. In new situations some of these interests remain relevant. At the same time, new interests arise. It is therefore in terms of both of these that the relationships operate, and affect the pattern of co-operation, or the success with which modern agricultural co-operation can take place.

Among the Nduli tobacco farmers a difference was observed between the pattern of co-operation in groups which consisted of kinsmen or affines, and those which were formed by unrelated individuals. In the latter, co-operation was largely egalitarian: decisions on agricultural practice were taken jointly, profits and costs were shared. Outside labour was jointly recruited and used for the farm as a single entity. The equality of the members were exemplified by the fact that each year a single chairman was elected to be the representative of the group, and this post circulated between the members. There were some groups with unrelated members where there was not the same degree of collective organisation. In those there was a

division of fields, with a concomitant separation of the use of labour, and consequently, of final profit. In these too, however, it was not possible for a single individual to take decisions on behalf of the other members. Where common activities were involved these had to be discussed jointly. When one member tried to control the others, it was a major reason for dispute and the final fission of the group.

In groups of kin, on the other hand, this is precisely the organisational pattern that prevailed, and which was accepted as proper by the group members. Just as there was a circulation of chairmen in the groups of non-kinsmen, there was none in the groups of kin, the senior kinsman or affine assuming the position. The cultivation practice in such groups was always collective, i.e. there were no cases of division of fields and profits. We shall argue that it was not just because the senior kinsmen had to be respected and his wishes complied with, that this kind of organization was able to exist, but also that by compliance with them the other kinsmen were gaining certain advantages which they would not have if they co-operated with others. Such advantages include the certainty of inheriting the enterprise on the death or retirement from work of the older kinsman. Thus a father who is quite old and not capable of long hours of physical work may control the farm which he shares with his sons. This is because his experience in farming makes it in his family's interest to allow him to supervise the farm organisation in order to enable a successful farm to be passed on to the younger kinsmen. Alternatively a kinsman who is more skilled and richer than the others may farm collectively with his kin, while being the controlling partner. The younger kin accept this seemingly inequitable relationship because they know they are benefiting from their brother's skill, but it is not like a capitalistic relationship because their ties with their brother prevent it from being an exploitative one.

We suggest that because of the multiplexity of the ties linking kin who also co-operate in modern agricultural enterprises, it is unlikely that the ensuing organisational forms will correspond to the equalitarian ideals behind modern ideology of co-operatives. On the other hand, the very existence of these links may enable a form of co-operation to occur where otherwise the necessary trust and goodwill for co-operation are lacking.

It would be hard to find co-operative groupings in agriculture where no links bind the members other than their membership of that group, yet it is true that many communities are formed by people with few or no formal ties. This is particularly the case in Africa where not only urban but also rural migration is widespread. Thus at Mbambara settlement, of the heads of 80 households, 20 tribes are represented, at Kwamangugu settlement, with 73 households, there are 21 tribes represented, and at Nduli, 12 tribes are represented among a sample of 49 farmers. Such multitribal communities, are like their counterparts in towns, the result of migrations from areas with little economic opportunity, to cash earning areas. The main link which often binds such migrants is their common quest for a cash income, and also for accompanying stability. In the Handeni and Tanga Districts of Tanzania, where the two Ujamaa villages are situated, there has been no tradition of the establishment of farms by migrants. In those areas most migrants have been workers on the now declining sisal estates, and there is now a common interest in the establishment of self-managed farms. The similar life experiences of such migrants, together with the absence of any vested interest in land in the area, makes co-operative farming a possibly advantageous solution. The objective class situation of such workers makes them not only have a common interest in establishing their own farms which will generate a cash income, but also very receptive to the ideology of co-operation which opposes the exploitation of labour.

It is misleading though, to suppose that the class situation of all migrant workers is entirely similar. The functioning of extended kin groups, and the availability of land in many areas, have enabled migrants to develop interests in more than one cash generating activity. The variety of these interests, and their relative importance to the migrant, obviously affects the 'similarity' of one migrant to another, and hence also the extent of their common interest in co-operation. The Nduli farmers provide examples of workers who, far from feeling that they were an oppressed labour force, continued to work as paid labourers either in agriculture or some other activity, even after beginning independent cash farming. The same applied to some farmers at the Kwamangugu Village, who were reluctant to give up their work on the nearby sisal estates. In the latter case, those farmers were expelled from the settlement because its large scale and

formal organisation could not accommodate such conflicting interest (The sisal workers who did not give up their jobs had contributed to communal work only on Saturday afternoons and Sundays). The Nduli farmers, where the co-operating groups were smaller and more flexible, were better able to cope with the difficulties caused by the multiple interests of some farmers. However, the solution has usually been at the expense of the ideal of equal co-operation. Either the co-operating groups split into individual units, or the form of co-operation was with kin, in the manner described earlier in this paper. This suggests that where there are no links with other members of the community other than that of common membership, multiple objectives and conflicts of interest cannot be so positively incorporated into the social structure.

(f) Socio-economic interests outside co-operative production

A farmer's attitudes to his existing economic opportunities are determined not only by the immediate demands of these opportunities, but also by the interests and habits he has accumulated through previous situations. It is necessary to consider such factors arising from his previous work history and social origins in order to understand his current behaviour in the new co-operative farming situation, for the latter does not form the totality of the farmer's social environment. His commitment to the co-operative scheme is a function of its relative importance to him vis a vis other interests.

Work interests outside a co-operative agricultural enterprise have already been discussed in the way in which different kinds of co-operative structures are able to accommodate to the individual interests of their members. These individual outside interests can conflict with those of the co-operative, and as at Kwamangugu Ujamaa Village, members have to choose whether to remain in the co-operative scheme or to leave. Usually the conflict is more subtle. Outside economic interests of members can reduce the efficiency of the co-operative by keeping members' resources withheld from it, or simply by reducing members' active desire to maintain their membership of it.

Since co-operative production organisation in agriculture is often accompanied by resettlement, or at least a new location for the co-operative activity, a farmer's interest in his previous land holding will be an important determinant of his involvement in the co-operative farming system. Such interests

in other land holdings are mainly concerned with security, particularly against loss of income, but also in the way in which they represent membership of a community. We have already seen how at Kwamangugu Ujamaa Village some 700 out of 1,030 members were expelled because they were not willing to give up their outside wage work. Expulsion is a characteristic of planned communities. On the whole you are not expelled from your native village, although you may feel obliged to leave following a scandal or witchcraft accusations. Thus there are significant uncertainties associated with land holding in co-operative agricultural enterprises. At the Ujamaa villages, the final sanction for laziness, (i.e. failing to contribute to the common good) is expulsion. It is inevitable that members should take precautions against these insecurities, by maintaining outside interests, particularly in land. At the same time the cooperative scheme might not yet be in a position to provide for other essential interests such as food production, and this too, is a reason for members to maintain interests in their own land outside the scheme.

The main effect of maintaining personal farms is to withhold some resources, particularly capital and labour in favour of the private farm. Thus farmers may keep wives at their own farms and continue to invest capital in it, which may have been earned on the co-operative farm. This kind of effect is to some extent mitigated where individual farms are close by and are used in conjunction with the co-operative farm. This was common at Nduli where food farms provided rations for labourers on the tobacco farm.

At Nduli the food farms also provided for the subsistence needs of the various group members dependents. As there was not enough room on the tobacco land for all these food needs to be met by several co-operating partners, the desire to maintain the food farms was a factor encouraging the breakdown of the groups, by reducing members' commitment to them.

Just as the maintenance of individual farms must reduce members involvement in the co-operative farm, so lack of land elsewhere can be a powerful incentive to people to farm collectively. Women especially, have been known to respond to incentives offered by farming schemes which provide land, for some women may lack the very security in land which keeps others in an ambivalent position regarding involvement in new farming schemes. Both divorced women and concubines (i.e. not legally

married women) figured prominently in tobacco farming groups in the Iringa district. Young men too, from areas of land hunger, may also be in the position of having no alternative security in land. At Kwamangugu, of 18 households studied in a sample survey, only 3 farmers had land elsewhere; at Mbambara in a similar survey, only 2 farmers out of 21 had such land. These farms were being maintained by relatives. However, the data which show that many farmers left their farms on coming to the scheme are not clear about the meaning of this statement. Many farmers in fact probably have links at home which safeguard their interests in land. These may even exist in land hungry districts. Rachel Yeld, writing about land hunger in the Kigezi district of Uganda, and the effect of resettlement policy, says:

The incentives offered in the resettlement scheme were not sufficient to induce whole extended families, (usually only 10 to 20 of extended families moved), let alone whole communities to abandon their land in the home area and move elsewhere. In the early years of the scheme land was left by departing settlers explicitly in the care of fathers or brothers on the understanding that if the settler family had to return, their land would still be available to them.⁹

Thus ties with land and what these confer are an important differentiating factor between agricultural migrants in Africa, who become members of, or form, co-operative communities, and such migrants say to Israel, who in most cases have been unable, or at least very unwilling to return to their countries of origin.

Thus for farmers to become fully committed to a co-operative enterprise, it must provide material rewards sufficient to induce them to devote all their resources to it. At the same time there must be institutional safeguards which give them the security of guaranteed membership which they have in their home areas.

One further factor affecting co-operative production is the skills and experience which the farmers bring with them when they begin farming collectively. Co-operative organisation makes certain demands of discipline and co-ordination which are not required by individual farmers on their own. In co-operatives, farmers have to work in groups at allotted hours, and complete tasks within a certain time in order to synchronise with other activities. This is something that is more analogous to patterns of wage-labour than of individual farming.

Non-conformity to the required pattern not only affects the individual but the whole productive process. It is for this reason that co-operative schemes have to develop sanctions against those who fail to comply with the agreed scheme of work. At both Mbambara and Kwamangugu, most farmers had considerable experience as workers on sisal estates previous to beginning co-operative farming. Although co-operation may largely be a reaction against the exploitation of labour and the fact that discipline was imposed by an external authority for ends which did not benefit the worker, nevertheless, the ability to accommodate to such discipline is acquired through the wage labour experience.

Organisational skills are needed too for the effective running of the co-operative community, and work processes. Indeed the more democratic the community, the more widespread they must be. Many wage workers developed these by being in charge of groups of workers in their previous jobs. It is striking that attempts to recruit unemployed urbanites to both co-operative and non-co-operative settlements have generally met with failure.

IV. Conclusions

Our analysis has not attempted to account for the totality of factors affecting the possibilities for successful co-operation in agricultural production. The most significant features left out include the "traditional" values brought by the farmer to their new co-operating situations, the role played by contemporary political ideology and activity, the role of leadership in creating and maintaining the co-operative group, and the internal administrative structure of the co-operative organisations. As was emphasised in the introduction, these omissions do not mean that importance is not attached to these factors. It is felt however, that much previous discussion has concentrated on some of these issues at the expense of ignoring the features examined in this paper.

There is also a difficulty associated with testing hypotheses concerned with values, ideology and leadership. This arises both from the difficulty of 'observing' such variables, and in distinguishing between cause and effect in case studies. A co-operative that fails because of an inadequate economic base, or an unsuitable demographic structure, may also give rise to leadership conflicts. There is always a temptation to establish a unicausal factor,

generally related to the analysts' own particular discipline, which explains ex post a particular event. This is even easier if the explanation is untestable. Thus a co-operative experiment that fails is explained by a lack of co-operative ideology brought by the farmers from their 'traditional' value system; or a successful co-operative is explained entirely by the "charisma" of its leader. It is not possible to support either of these explanations unless they are accompanied by an exhaustive study of other socio-economic variables such as those described in this paper. It would also be necessary to show how different results were obtained in comparable situations where the conditions, except those used to explain success or failure, were similar.

It is tempting to believe that we have identified the ingredients necessary for successful co-operation in agriculture, and that policy implementation merely needs the correct proportion of each. It would be unjustified however, to attempt to draw significant prescriptive conclusions from our discussions. Our less ambitious concern has been to show that problems of agricultural co-operation are amenable to economic, and sociological analysis. Our paper should therefore be seen as a contribution to a check list of factors that need to be considered both in planning new co-operative institutions, and in the explanation of co-operative experiences. It is by no means a complete check list, and we hope that discussion will be provoked to extend it further.

FOOTNOTES

1. A.V. Chayanov, "The theory of the peasant economy", ed. D. Thorner, B. Kerblay, R. Smith (A.E.A. Translation series. R. Irwin. 1966), p. 267.
2. Ujamaa is the Swahili word which Nyerere has used to mean socialism. Ujamaa villages are cooperative villages, with production cooperation and communal living the ideal.
3. See R.W. Kates, J. McKay, L. Berry, "Twelve new settlements: a comparative study of success", (Mimeo paper for U.S.S.C. Conference, Kampala, 1969).
4. More complex descriptions and analysis will be found in:
 - a) D. Feldman, "The economics of ideology", in ed. C. Leys, Politics and Change in Developing Countries, (Cambridge U.P. 1969).
 - b) R. Feldman, Social Factors in Peasant Farming, (Unpublished dissertation for Diploma in Advanced Studies in Sociology and Social Anthropology, Manchester University, 1968).
5. The method used for this - separable linear programming - is described in detail in D. Feldman, "Decreasing costs in peasant tobacco farming", E.R.B. Paper 68.20, Economic Research Bureau, Dar es Salaam, 1968, Mimeo.
6. The fall in output suggested for Year 5 arises from the limiting assumption of a five year planning period. This is fully explained in D. Feldman, "Decreasing costs in peasant tobacco farming", op. cit.
7. R. Woods, "Individual, kinsman, cooperator", Mimeo paper, Sociology Dept. , University College, Dar es Salaam, 1968.
8. See A.V. Chayanov, op.cit. and ed. J. Goody, The Developmental Cycle in Domestic Groups, Cambridge U.P., 1959.
9. R. Yeld, "Land hunger in Kigezi, South-West Uganda", in ed. R. Apthorpe, Land Settlement and Rural Development in Eastern Africa, Nkanga Editions, Transition Books, 1968.

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