

The Rationalization of Peasant Agriculture

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AN efficient agricultural system is an essential prerequisite for a country's economic development. It should be productive and at the same time conservative of land and soil. The system should be flexible and should contain within it adequate provision for the extension of short and long term credit at reasonable rates of interest. The reform of a country's agriculture is difficult, and often at first unpopular, but there are many countries, especially those of the tropics, where it has become necessary.

The peasant agriculture of most tropical, and some European countries is characterized by the inefficient farming of small fragmented holdings of land. Brown (1957) gives two examples from Kenya: One landowner's aggregate holding was nine acres divided up into 29 small plots, the furthest of which was 14 miles from his house; another had eight acres divided into 43 separate plots. Papua and New Guinea contains numberless similar examples. Besides being fragmented, many holdings are held only on tenuous traditional claims which are subject to considerable litigation. Swynnerton (n.d.) states that prior to the Mau Mau Emergency the cost of land litigation amongst the Kikuyu of the Kiambu district of the Central Province of Kenya ran at a rate of £10,000 stg. per annum, bribes apart. Beckett (1943) reports that a survey village of 1,100 inhabitants in the Ashanti region of Ghana had outstanding debts of £2,000 due to lawsuits concerning disputed land boundaries.

Land is often held on a communal basis in Africa as well as Papua and New Guinea. Under this system, individuals have rights to land by virtue of their membership of the land-holding community which may be a tribe, village, kindred group, family, or other social group. The normal unit of land ownership is generally the extended family. The most common method of land use under this system of ownership is shifting cultivation or "bush fallow" and this requires a relatively plentiful

supply of land—as the population density increases there must be a corresponding increase in the intensity of cultivation. This eventually leads to a deterioration in fertility and an increase in soil erosion.

Gourou (1958) states that "To raise the standard of living of tropical peoples the first step is to abolish the . . . system of shifting cultivation . . . since it is incompatible with a high standard of living."

Shifting agriculture in Africa has been found incapable of withstanding the economic pressures arising from the increasing invasion of the subsistence economy by an economy based on exchange. To be satisfactory, any new system must lead to economic development without in the long run destroying much of the land for agricultural production, or resulting in abuses detrimental to the social and economic welfare of the community.

Thus the ultimate aim of the re-organization of a country's agriculture should be the improvement of the standard of living of the nation as a whole and the farming community in particular. Due consideration must, however, be given to various social factors including ownership of land and size of holdings. These will depend upon the cropping programme envisaged. For several reasons the family farm is often considered to be the model unit on which to establish an agricultural system but some crops, such as sugar, are said to be most efficiently produced on an estate scale. Whether this is so, will, of course, depend upon the crop and the size of the holdings—the optimum size will permit the best use of all agricultural resources—capital, and labour, as well as land. Farms can be too small or too large and the optimum size will be subject to continuous changes as the economy develops and more intensive land use becomes possible.

Gourou (1958) believes that if small-scale native holdings replace large-scale European plantations the yield and the quality of the

produce, and the prime costs, will be detrimentally affected. He also doubts that it is a good step to direct tropical farming towards a system of peasant proprietorship, and suggests that a system of co-operative or collective farming would be more efficient. This is not, however, necessarily so. For example small scale production of coffee in Kenya has proved completely competitive when compared with European production. However, to be efficient, small scale farms must be of a minimum economic size, and credit facilities must be available for the farmers.

Land can be held under three forms of tenure—tenancy, owner-occupancy and group tenure. Generally owner-occupiers are more efficient farmers than tenants as they are less likely to "mine" the land, but tenants may be as efficient if they are provided with security of tenure and are not burdened with excessively high rentals. One particular advantage of tenancies is that they can be made subject to the tenant's satisfactory farming of the land. This is virtually impossible with freehold land. The group-ownership of land at present applying in Africa has already broken down in many areas. In parts of Ghana and Uganda, for example, the traditional system has changed in response to the desire to exploit land for commercial purposes, to one of individual private holdings (United Nations 1951). Similar changes can be expected to take place in Papua and New Guinea.

Various efforts have been made to rationalize peasant agriculture in Africa and elsewhere and these may be classified under the following headings:—

1. Consolidation schemes;
2. Resettlement schemes; and
3. Co-operative or Partnership schemes.

CONSOLIDATION SCHEMES.

Consolidation schemes aim at the elimination of fragmentation of farms by the creation of larger contiguous units. According to Jacoby (1959) they may consist of:

- (a) Re-allocation of scattered plots without expanding the size of the individual farms ("equivalent exchanges");

- (b) Enlargement of individual farms (without re-allocation); or
- (c) Consolidation in the wider sense, re-allocation of plots into larger contiguous units combined with the expansion of individual farms.

Consolidation by itself cannot lead to an increase in productivity. To do so it must be accompanied by an improved land use system. Once such a system has been determined it will become apparent that holdings below a certain size are sub-economic, and some measure must be decided upon to deal with them. This may entail re-settlement to other agricultural or industrial areas, or increasing the size of the sub-economic holdings through a local re-distribution of land.

The main problems associated with consolidation are social rather than technical. Unless it is entered into voluntarily, consolidation is unlikely to be successful and so its advantages should be pointed out to the people over a preparatory period. The decision to consolidate must apply to the entire area and it is best if complete support for it can be obtained. There should be at least 75 per cent. of the farmers in favour before any steps are taken, and then attempts should be made to persuade the remaining farmers of the advantages of the scheme. Whether to proceed with less than 100 per cent. support from the participating farmers must be an administrative decision. It is probably best to wait until complete support is forthcoming.

One of the best ways of obtaining support for consolidation is through example, and herein lies the great challenge to the early schemes. They must succeed if other areas are to be won over to consolidation. Thus the first areas selected should be chosen only after careful and detailed preliminary survey work. A proven and improved land use system must be available and the absolute support of the participating farmers must be ensured. If the scheme is to succeed, technical and extension assistance must continue after consolidation to prevent any relapse to the previous inefficient farming methods.

The technical problems of consolidation are mainly related to pre and post-consolidation

survey. There must be an accurate and detailed survey of all fragmented holdings and a similar survey of the consolidated blocks. Each new holding should have access to road and water and they should be so designed as to be capable of incorporating a more intensive farming system.

One of the greatest difficulties following consolidation is to ensure that there is no reversion to fragmentation through the subdivision of the consolidated farms. This cannot be solved simply by legislative action, as private arrangements may be made between joint heirs to farm their inheritance separately although making no legal agreement to do so. Thus discrepancies can arise between land records and the actual situation in the field.

The problem is possibly best tackled through extension and education and in the first generation through the obvious example of the favourable effects of consolidation. This example is lost, however, to the next generation, and to overcome this Sweden makes a distinction between holdings which are legally sub-divided and those sub-divided by private agreement. The latter can be mortgaged only with difficulty and are excluded from Government grants for purchase and improvement purposes. (Jacoby 1959.)

It must be emphasised that at all stages of consolidation competent technicians must be available but "technical competence alone is not enough, as consolidation demands at least three parts of psychology and diplomacy for one part of technique." (Jacoby 1959.)

Land Consolidation and Farm Planning in Kenya.

In Kenya over 1,200,000 acres of peasant land in the Central Province alone, has been consolidated into individual holdings. The process has differed from tribe to tribe depending on land tenure customs. That adopted in the case of the Kikuyu, who farmed land owned under a form of individual ownership, was as follows:—(Kolbe and Fouche 1959.)

1. The people of a clan were persuaded by various propaganda means to adopt consolidation voluntarily.
2. A survey of all the clan-land in the particular sub-location was made. Within

this area the boundaries of all individual fragments were measured and recorded.

3. A committee of clan elders, and all district representatives of departments met to determine what areas should be set aside for public purposes (i.e., roads, churches, schools, hospitals, townships, etc.) These recommendations were then put to the clan elders for their approval. The area so approved was then calculated as a percentage of the total area and all members of the clan were required to contribute an equal percentage of the total area of their holdings for public purposes.
4. A committee of elders of the clan was set up to hear and settle disputes or complaints arising from the preliminary survey. Thirty days were allowed for such appeals.
5. The land remaining after that set aside for public purposes was re-allocated in consolidated holdings to farmers according to the size of their previous holdings. These new holdings were sited according to size—those which were defined as "sub-economic" (in this case less than four acres) were sited close to the village area, whilst larger holdings were sited, if possible, so as to incorporate any perennial crops previously planted by the farmer. Each new holding had an access road and access to water. In the case of farms incorporating tree crops planted by someone other than the new owner, then arrangements to the mutual satisfaction of both parties were made by private treaty.
6. The boundaries of the newly demarcated holdings were trenched by paid labour gangs preliminary to more permanent fences or hedges being established.
7. Any further disputes arising were settled and the holdings were then registered by the Government (a charge of 10s. per acre being made) and owners were given a registration certificate.

In the case of the neighbouring Embu and Meru people who owned land on a communal basis, the process was similar but disputes as to land ownership were settled at sub-clan level and the size of holdings allotted to individuals was determined by the sub-clan elders after consultation with the people.

The people of other tribes—especially the Kipsigis, Nandi, and Elgeyo—are primarily pastoral people but since the war they have become more interested in agriculture. These people have, of their own volition, enclosed much of their former communal lands into individual holdings. (Huxley 1960.)

Once individual ownership was established it became relatively simple to improve the standard of farming through more intensive planning, with the aim of supplying the farmer's subsistence needs and a minimum cash profit of £100 per annum. (Brown 1957.) With security of tenure smallholders were able to offer security for developmental loans.

Farm planning is most advanced in the Nyeri-Embu area and has been along the following lines:—(Brown 1957.)

1. The farm is laid out to provide five basic necessities.
 - (a) Homestead area;
 - (b) An area of permanent or semi-permanent cash crops and famine crops;
 - (c) An area of arable land adequate for the family's needs and some surplus to set aside against poor years;
 - (d) An area of temporary and permanent grass equal to or greater than the arable, which provides for keeping stock and for alternate husbandry; and
 - (e) A tree plot.
2. The layout of the farm is designed to suit possible future mechanical cultivation and to provide for soil conservation measures. Arable areas are divided into fields of equal size to enable a satisfactory cropping rotation to be practised. The decision as to the proportion of land to be apportioned to cash cropping is made by the farmer, but this is usually between one fifth and one quarter of the total farm area. Monoculture is discouraged because it is considered to be a dangerous practice on a small farm. (Kolbe and Fouche 1959.)
3. The outer perimeter of the farm is planted with a hedge and internal boundaries are planted with thatching grass or a hedge or are wired.

4. Once the farm is fully fenced into fields and all necessary soil erosion measures have been taken, provision is made for rotating the grass and cultivated areas and all the farmer's stock is kept on the holding.

5. When the farmer becomes self-sufficient in food and is using improved methods of cropping (e.g., application of manure, better spacing, etc.) then he becomes eligible for a loan for a specific purpose such as permanent fencing, dairy-shed, etc.
6. A cash crop is not introduced until the farmer has shown that he can farm his land and that his family is self-supporting. The cash crop—usually coffee but possibly tea or pyrethrum—is planted under carefully supervised conditions.
7. The farmer is encouraged to repay his loan as soon as possible out of the farm income. The maximum time for repayment is five years, and it is paid in yearly instalments plus interest.

The coffee produced by the planned farms has been of high quality, 60 per cent. being in the top three classes in 1959-60. (Clayton 1961.) This is no doubt due to the strict control kept by the pulpery management committees (all African) which refuse to accept coffee from poorly managed blocks. Yields have been 8-12 cwt./acre with some to 15 cwt. Farmers are receiving a return of 8s. to 10s. stg. per tree per year (i.e., a minimum of £200 stg. per acre of coffee per year) and all farms in the coffee and tea areas should be able to produce a net profit of £35 to £50 stg. per acre of their farm per annum. (Kolbe and Fouche 1959.) Individual farmers are receiving a net income of £600 to £1,000 stg. per annum.

In 1960 difficulty was being encountered in the enforcement of loan repayment despite the obvious ability of farmers to repay. This was due to the prevailing political confusion at the time. There was a considerable lack of understanding of the meaning of the anticipated

"independence" of Kenya which many farmers thought would be accompanied by a revocation of all outstanding debts. Difficulty in obtaining repayment emphasises the cost of loan finance—it is estimated that there are 600,000 farms in Central Province which could readily and beneficially use a loan of £200. (Swynnerton n.d.) The initial injection of capital required to start off satisfactory development is considered by Kolbe and Fouche (1959) to be a minimum of £10 stg. per acre.

The productivity of the native breeds of livestock has been unsatisfactory and better stock are required. Improved Zebu types are being introduced below 5,000 ft. and selected local breeds to Jersey through artificial insemination above that altitude. Unless the productivity of livestock is improved they become a burden upon the farm which would be far more productive if planted entirely to crops.

There is no assurance that the consolidated holdings will not be re-fragmented. Legally it is impossible to subdivide holdings of less than eight acres but as yet this has not been tested. The enforcement of this law will lead to an increase in the present landless class.

This problem was first faced after the initial consolidation when a landless class—previously not known to exist—emerged. These people had been tenants on other people's land. They were settled on large re-settlement schemes designed especially for them. However, such schemes cannot be continually established and it will become necessary to educate Kenyas to change their traditional belief that without land a man is nothing, and to realise that in a cash economy there is room for a landless class which need be neither poor nor depressed. Consolidation has been followed by an intensification of agriculture, and most farms, especially those of more than 6 acres, require additional labour. (Clayton 1960, Brown 1957.) Thus there is developing a considerable need for paid agricultural labour, which should increase with increasing intensification of land use.

Land re-allocation in Southern Rhodesia.

In Southern Rhodesia until 1962 the land was apportioned so that natives farmed approximately 40 per cent. of the total land.

Native land was subdivided into Native Purchase Areas where farmers could purchase farm land, and Native Reserves where farming was carried out under traditional land tenure systems. Land in the reserves has become badly eroded as a result of overstocking and poor cultural techniques and with the population increasing at about two per cent. per annum the position is deteriorating annually. Following the success of farm planning of European farms from aerial photographs the technique has been introduced to native areas.

The procedure is as follows:—

1. Aerial photographs are obtained of the area and from these the land is divided into eight classes. (Classes I-IV being arable, V arable but wet, and the remainder suitable for grazing only.)
2. Within the reserves the land is re-allocated to individuals. This re-allotment is on the basis of available land rather than previously farmed portions, and arable and non-arable rights are given. The arable rights may be units of 8 to 12 acres, depending on the available clan land. Chiefs receive three units whilst other people receive one. The arable blocks are laid out along the contour and delimited by stone cairns.

The re-allocation of African owned land has not led to an increase in productivity, but it has slowed down, and possibly halted, deterioration through overgrazing. It has shown that simple re-organization of land tenure cannot, in itself, lead to economic development. To attain a real improvement in the African agriculture it will be necessary to devise better systems of agriculture. This should not be difficult, as alongside the African owned land there are European farmers obtaining 24 bags of maize per acre compared to the African's two to six bags. The secret is higher plant densities (15,000 plants per acre instead of 2,000) and the application of fertilizer (100 lb. N. per acre.) (Rowland 1959.) The poverty of the Africans prevents them from adopting such simple measures—to be able to do so they require credit facilities.

SETTLEMENT SCHEMES.

Settlement schemes may be used for several purposes:

1. to develop previously unused areas.
2. To introduce a more intensive agricultural system into an area.
3. To re-settle people from an over-populated area in an area of relatively low population density.
4. To enable progressive farmers to break free from the conservative influences of their traditional society.

If a settlement scheme is to be a success there must first be available accurate information regarding the various factors determining its agricultural potential. Thus a preliminary survey is required to determine the soil fertility and the carrying capacity of the land. A land use system capable of maintaining fertility and providing a satisfactory return to the farmer must be available. The projected individual holdings must be of a size capable of supplying food, and an acceptable, and improving, standard of living for the average farmer. There should also be provision for progressive farmers to expand their holdings and so reserves should be set aside for future allocation.

No full scale settlement scheme should ever be attempted without a successful pilot scheme.

Settlers should be carefully selected and should receive training in the new techniques of agriculture involved in the farming of their holdings. They should be required to live within the settlement from the earliest possible stage of development. They may require financial assistance until their crops are harvested. In addition both long term and short term credit should be available. Settlers should be expected to pay for all direct services they receive and if they cannot do so over a period then the scheme can be considered a failure.

Security of tenure is essential for any satisfactory agricultural development and after serving a probationary period settlers should be given long term leases at economic rentals. Adequate safeguards should be incorporated in the leases to ensure that a satisfactory standard of husbandry is maintained.

Farm Settlements in Western Nigeria.

The Western Nigerian Government has embarked upon an ambitious programme of Farm Settlements. These are located in each district of the Region and are so designed that each settler should be able to receive a net cash income of up to £600 stg. per annum (i.e., considerably more than a Government clerk with eight years schooling). The twin aims of these settlements are to demonstrate that scientific farming, supported by capital investment offers a return at least equal to that of city employment, and to increase the production of Western Nigeria (both on the settlements and through example to other farmers).

The lay-out varies according to the crops. Each settlement is planned to cater for 150 farmers to be settled over a five year period.

ESA-OKA Farm Settlement.

Each individual farm is planned to consist of—

- 15 acres cocoa;
- 5 acres Robusta coffee; and
- 5 acres arable.

The aim is to establish ten acres of cocoa before the farmer takes over the land. Each block will have a well-built house and the farmer will be supplied with the necessary tools and planting materials by the Ministry of Agriculture.

ORIN Farm Settlement.

This is similar to Esa-Oka but instead of Robusta coffee the secondary crop is citrus.

MBIRI Farm Settlement.

This is located in the wetter Benin Delta Area (rainfall 70in.-80in.) and is based on rubber and oil palm. Each farm consists of—

- 20 acres oil palm;
- 10 acres rubber; and
- 1 acre food garden in the settlement village.

The Settlement is so planted that each farm has rubber and oil palm blocks adjacent within the farm and contiguous with those in

the neighbouring farms. Cattle will be owned communally and will graze between the oil palms.

This settlement requires labour in addition to the farmer-owners and this labour will be located in planned villages in the settlement.

Ogbsomosho and Ilora Settlements.

These two settlements are based on maize cultivation and are in the savannah country north of Ibadan where the 70 inch rainfall is divided into two seasons. Each settler will have a holding of 70 acres and this will be cultivated so that 35 acres is under maize at any one time. (The rotation will be maize/maize continuously for three years and then fallow.) The aim is to mechanize the cultivation as much as possible, using contract equipment, and to control weeds with chemicals. Yields are expected to be ten cwt./acre. It is not planned to sell the maize direct but rather to feed it to poultry and pigs which will be farmed in intensive units in decentralised villages on the settlements (four villages/settlement). By doing this it is hoped to maintain a steady £20 per ton for the maize—if it were sold on the open market in Western Nigeria the price would slump to £10 or less per ton.

The cost of each settlement scheme is calculated to be about £1,500 stg. per farm unit (i.e., up to the stage when the unit has permanent housing and is self-supporting). Naturally clearing costs per acre vary with the crops. The maize farms were cleared and contoured, either by hand or heavy equipment, at a cost of £11 per acre whilst the cost of clearing the Mbirri farms was £45 per acre.

The planned programme of establishment of the Farm Settlements was:—

1960.—First batches of settlers were to go straight to the Settlement sites to obtain "on site" practical training and also to work as paid labour. The second and third batches of settlers were to enter one of the five Farm Training Institutes and there receive instruction in all the crops that are to be handled on the settlements (i.e., rubber, cocoa, coffee, oil

palm, vegetables, subsistence crops). There is a strong emphasis on the practical side at the Training Institutes.

1961.—The first batch of settlers were by then to have taken up their own blocks which at this stage were to be self-supporting. The second batch of settlers after one year at the institute were to take up their blocks after assisting in their establishment.

1962-4.—The third and subsequent batches of settlers, after two years at the Farm Institute, were to take up their blocks after assisting in their establishment.

The following are standard requirements for the settlements:—

1. The potential settlers are selected young men from the 18-22 age group who have received education to sixth standard and who have shown a desire and an aptitude for farm work and who live within a 30 mile radius of the settlement.
2. All labour in the developmental stages is paid for—i.e., there is no "voluntary" forced labour.
3. The settlers enter into an agreement with the Ministry of Agriculture to farm their blocks according to direction from its approved agent. Settlers failing to maintain a satisfactory standard of husbandry are to be dispossessed. A probationary period must be undergone before the settler can receive a long term lease.
4. The settler receives a long-term mortgage on the farm and this is to be re-paid in annual instalments.
5. The blocks may be inherited but not sub-divided.

The Farm Institutes, although established primarily for the Settlement scheme, are to be a permanent feature of the Region's Agricultural Education Policy.

It is too early to give an appraisal of the scheme but the farms based on the tree crops appear sound and should be successful. The prospects for the maize farms, however, appear dim. They were established for political reasons and without any prior experience in the large scale cropping of

maize and thus without knowledge of the agronomic problems, such as the build up of insect pests, which will occur. The produce is to be marketed in a roundabout way, which may appear theoretically possible, but will probably be beset with practical difficulties.

Makueni Farm Scheme, Kenya.

The Makueni area is waterless and tsetse infected and has an unreliable rainfall of 20-30 inches. It was in this area that families from the neighbouring crowded Mackakos area were settled. Settlement was under a "crash programme" during the Mau Mau Emergency.

The plan was to settle families onto holdings of 22 to 30 acres with five acres under crop. The Government provided dams and roads and eliminated tsetse by discriminatory clearing of bush. The holdings were prepared for the reception of settlers by clearing and ploughing five acres of land and all necessary soil conservation measures were taken.

Settlers were carefully selected and were rationed during their first year. Holdings were registered and security of tenure ensured, provided that the settler maintained a satisfactory standard of husbandry. No subdivision of blocks was permitted. Strict rules regarding stocking rates were laid down. Settlers were to clear one acre of bush per year and to put one acre of cultivated land out to grass. It was thus intended to clear the blocks completely over a 20-25 year period.

The rules laid down for the bush clearance and cropping programmes could not be enforced and bush encroachment became an extremely costly problem which remains unsolved. By 1958 more than 2,000 families had been settled on the scheme at a cost of more than £200,000 stg. but few of these remained for long. In 1960 the scheme was virtually abandoned pending the introduction of a satisfactory farming system.

Although strict husbandry and sound land tenure rules were made the scheme has been an apparent failure. This was caused by the lack of any proven farming scheme for the area. There was no previous experience of farming the area and no pilot scheme was attempted.

CO-OPERATIVE AND PARTNERSHIP SCHEMES.

These schemes are a modified form of group tenure and aim at the combination of the incentive of ownership with the technical advantages to be gained by large scale agricultural methods. The communal farms of the Communist countries are a particular form of this type of ownership. They are liable to inefficiencies if the incentive for individual enterprise is decreased too greatly.

There is a large variety of this type of scheme combining in differing degrees the principles of individual and joint ownership. In some, ownership and cultivation remain individual, and machinery only is hired or used on a co-operative basis. In others land ownership is merged to a degree and most farm operations are conducted jointly. The communal farms of Eastern Europe are so organized that the members are organized into work "brigades" which are assigned to special tasks. The net proceeds from co-operative farms are divided amongst the members on different principles depending upon the organization of the farm. Generally there is a limit upon the amount of rent paid and most of the proceeds are divided according to the quality and quantity of produce produced by each member.

Partnership schemes are a specialized form of co-operative in which the Government or some other authority provides the capital, technical skills and supervision, and the farmers provide labour and sometimes land. To be successful, partnership schemes require certain pre-requisites.

1. Considerable knowledge as to the proposed land use must be available before the scheme commences full scale operation.
2. The topography of the area chosen must facilitate large scale cultivation and intensive supervision.
3. There must be a low capital development cost per productive area.
4. There must be an active external demand for the crop produced and its marketing should be so controlled by the management that it is able to recoup all its costs, and especially advances made to farmers.
5. Farmers should have security of tenure provided they work efficiently.

The difficulty of obtaining such pre-requisites limits the application of partnership principles but a realisation of their need will assist in planning development projects.

The Gezira Scheme of the Sudan.

Possibly the best known of all partnership schemes is that of the Gezira. (Gaitskell 1959.) There are 1,750,000 acres under cultivation (including 800,000 in the New Managil extension) and the scheme directly supports over 600,000 people as well as being the economic backbone of the Sudan.

Originally the vast Gezira plain between the Blue and White Niles south of Khartoum was farmed by Arab peasants who were semi pastoral. They planted their staple crop of sorghum in fields surrounded by low earth banks which prevented rain-water from running off. When the crop was harvested they left their villages to seek grazing further south. Land was owned by large landlords as well as small farmers. It was inherited under Moslem Law, and this results in the repeated sub-division of land so that the stage is often reached where land owners have so little land that they are unable to support a family on it (Tothill 1948.)

From 1906 to 1910 all native owned land in the Gezira was registered, and rigid land sale laws were enforced to prevent land speculation by foreign interests.

The first cotton grown under irrigation in the Sudan was harvested in 1906 at Zeidab on the main Nile north of Khartoum. This was grown by an English company which was later asked to manage the small experimental irrigated cotton project which the Government established at Tayiba in the Gezira in 1911. This project at first consisted of 600 acres of land rented from the native owners and sub-divided into 30 acre blocks. These were leased to tenants who cultivated the blocks under the supervision of the company's staff. The Tayiba project proved more successful than the Zeidab one and it was expanded, and in 1913 an agreement drawn up to distribute profits in the following proportions:

- 35 per cent. to the Government;
- 25 per cent. to the company (Sudan Plantations Syndicate Ltd.); and
- 40 per cent. to the tenant.

The Government realised that if the scheme were to be expanded it would be necessary to re-organise land tenure in the Gezira. Under the Gezira Land Ordinance of 1921 it leased all land in the area at 2s. per acre per year. (This was the highest ruling rental of unirrigated land at the time.) The land was then to be sub-divided into economic units let by the State to tenants.

In 1919 negotiations were commenced for a new agreement which was eventually finalized in 1926. Under this agreement the profits from the sale of the cotton were divided in the following proportions:—

- Government 40 per cent.;
- Syndicate 20 per cent.; and
- Tenants 40 per cent.

In 1927 a sister company of the Syndicate, the Kassala Cotton Company, was granted a concession of 45,000 acres in the western Gezira. This company received a slightly larger share of the profits than did the Syndicate.

The responsibilities of the parties to the agreement were:—(Tothill 1948.)

Government:—Provision of the land; construction, maintenance, and operation of the Sennar Dam, the Main Canal, and the main canalization; payment of rents for the land.

Concession Companies:—The construction and maintenance of subsidiary canalization; the clearing and levelling of land; the provision and working of ginning factories; the provision and maintenance of buildings, machinery, stores and supplies required to enable the companies to carry out their functions; the general management and supervision of letting of land, the cultivating by the tenants; the collection, storing, and marketing of the cotton crop (including seed); the making of loans to tenants.

Tenant-Cultivators:—The growing of crops under supervision of the Companies, and the provision of the necessary labour.

The original 30 acre tenancies were later expanded to 40 acres. (The new Managil extension has 15 acre tenancies and a slightly different rotation system to the original Gezira.)

After June, 1950, the Syndicate ceased operating and was replaced by the Sudan Gezira Board which continued its activities.

After the formation of the Gezira Board in 1950 the allocation became:—

- Government 42 per cent.;
- Tenants 42 per cent.;
- Gezira Board 10 per cent.;
- Tenants' Reserve Fund 2 per cent.;
- Local Govt. Councils 2 per cent.; and
- Gezira Social Development acc. 2 per cent.

Tenancies are of one year's duration but are renewable provided that the tenant maintains satisfactory cultivation standards.

Original allotments were made to :—

1. Right Holders;
2. Nominees; and
3. Preferential Tenants.

Right Holders were those who originally held 40 acres or more and these had the final claim. The right holder could either cultivate himself or appoint nominees to farm the land; he normally could cultivate only one holding himself, unless the Syndicate representative agreed to more. Sons of right holders were included in this category.

Nominees were pre-scheme cultivators or relatives of the class above. Where there were several claimants to a 40 acre holding, they selected one of their number who thus became a right holder. Right holders and legal nominees were given tenancies unless they had bad cultivation records; in such cases they were persuaded to nominate someone else. In the case of nominees other than heirs, the Syndicate was not compelled to accept those with bad records.

Preferential tenants were those who owned between 20 and 40 acres, and therefore did not qualify as right holders. This class was allotted tenancies in preference to landless men.

After the claims of these three groups had been satisfied further allocations were made to those considered suitable after consultation with the native authorities concerned.

All proceeds realised from the sale of cotton products, lint and seed are credited to the "Joint Cotton Account." From this account are

deducted all costs incurred after delivery of the cotton crop to the collecting stations until its ultimate disposal. These include, amongst others, the costs of ginning, sacks and baling materials, transport, insurance, freight and marketing expenses. All fertilizer and pesticide costs are also deducted from this account. The balance is then divided according to the above formula.

Individual accounts are kept for each tenant and against these are debited any advances made for clearing, cultivation and picking. Payments are made to tenants in two stages:—

1. Initial payments are made on the basis of the quantity and quality of the tenant's cotton.
2. Later payments are made on a flat rate irrespective of grade and paid out when the tenant's needs for cash are most acute.

The Tenants' Reserve Fund has a statutory maximum of £3 million stg. which is financed from the profit distribution and from the "spillover" of the Board receipts (i.e., the excess of receipt over calculated requirements of the Board). If the statutory maximum is present in the Reserve Fund the "spillover" is shared amongst the tenants.

Besides providing a livelihood for the families of its 40,000 tenants the scheme requires about 200,000 pickers from outside the area. (Sudan Gezira Board 1959.) This large seasonal labour requirement is one of the weaknesses of the Gezira scheme and it was in an effort to reduce the dependence of the tenants on outside labour that the Managil Extension was subdivided into tenancies of 15 acres rather than 40 acres. The aim of the smaller holding is to employ fully the tenant's family and at the same time to require little outside labour. It is hoped that this will also increase the productivity per acre.

There have been many efforts to emulate the Gezira scheme but few have been successful, and some have been notable (and costly) failures. (For one see Baldwin 1957.)

Kongwa Farm Settlement Scheme, Tanganyika.

This is a partnership scheme in which tenant farmers and the Tanganyika Agricultural Corporation combine to produce ground nuts and beef at Kongwa, one of the sites of the unsuccessful East African Groundnut Scheme.

In 1960 the scheme involved 110 farms of ten acres under crop and one acre under food and communal grazing sufficient for 20 head of cattle per farmer.

The farms are laid out on suitable soils as compactly as possible and on the contour. Farmers receive an annual leasehold which is renewable provided that satisfactory standards of cultivation are maintained by the farmer.

The following rules apply to all tenants:—

1. The tenant is not permitted to transfer in any way his right to the farm to any other person.
2. The farmer must personally occupy and cultivate the farm.
3. All cultivation must be diligently carried out according to the directions of the Corporation's Manager.
4. The farmer is not permitted to sell or let any grazing on his farm.
5. The farmer must pay for all goods and services rendered to him by the Corporation annually when his crops have been sold. If a farmer is unable to pay his debts to the Corporation from his receipts from the sale of his crops then the Corporation sells sufficient of his cattle to cover its charges.
6. The farmer is not permitted to pledge his crops to persons other than the Corporation.

The Corporation provides the following services:—

1. All services considered necessary to assist the farmer to cultivate and manage the farm efficiently.
2. All mechanical cultivation.
3. Water supplies for stock and domestic purposes.
4. Necessary credit facilities for the farmer's crops. The farmer receives a net return equal to the gross amount received by the Corporation for the farmer's crops, less all charges incurred by or due from the farmer to the Corporation and all amounts due from him in respect of goods and services supplied to him or loans made to him by the Corporation.

In addition to the above regulations which apply to the arable area the farmer must abide by special Animal Husbandry Regulation. These require the routine dipping of cattle and castration of all male calves. (Bulls are provided by the Corporation). No male cattle may be sold to persons other than the Corporation but females may be sold to the farmer's choice of buyer. The Corporation hires to farmers in-calf cows and the calves become the property of the farmer. There is a limit on the number of cattle that a farmer may graze. Cattle are grazed communally in accordance with Corporation requirements to ensure the best possible pasture management.

This scheme has evolved from an earlier one where the emphasis had been on crop production and the holdings were of 20 acres incorporating two different soil types. Heavy fertiliser applications were required but the tenants were not prepared to pay for the fertiliser. The average return on the holdings was £27 per annum plus food. Tenants did not stay long and many were unable to repay their debt to the Corporation. Since the re-organisation of the scheme to give more emphasis on grazing there has been an improvement in the income of the tenants, and the Corporation has been able to ensure that all its loans are repaid. Cattle are the main source of income on the new scheme and the nearby Tanganyika Agricultural Corporation's Cattle ranch provides a ready market for all surplus stock.

CONCLUSION.

From the foregoing it is obvious that for any rationalization of peasant agriculture to be successful it is essential that certain prerequisites be met. These are:—

1. A proven farm system must be available for the area. This system must be more productive than that prevailing under the traditional land usage—i.e., there must be a changeover from extensive to intensive farming.
2. Farmers must be given security of tenure of their holdings. This may be in the form of freehold or leasehold. There should be provision made for forfeit if a satisfactory standard of husbandry is not employed.

3. Financial assistance must be available to farmers so that their standard of farming may be raised.
4. Safeguards must be incorporated in the title to ensure against fragmentation, through inheritance or for other reasons, to sub-economic holdings.

The necessity for pilot programmes and for their slow development emphasises the need to commence such programmes in Papua and New Guinea. Already there are small settlement schemes in the Gazelle Peninsula, Northern and Central Districts, and valuable experience is being gained through these. It is doubtful, however, whether settlement schemes will ever be the main means of rationalizing the agriculture of this country. They are expensive [Hasluck 1962 estimates £5,000 for the development of each block, which may be excessive, but is probably of the right order when all auxiliary services are charged for], and there will be great difficulty in providing the large areas necessary for them from existing areas of Crown Land. The present attitude of most native landowners is that they will not dispose of land to the Crown and this attitude is unlikely to change. It therefore seems necessary to introduce additional schemes and consolidation appears the most suitable. Settlement schemes should probably be reserved for those people who have no land suitable for agriculture but who wish to develop agricultural blocks.

Any pilot consolidation programme should be carefully sited as it will prove to be the key to success or failure of later schemes. It should be located in an area which has all the factors necessary for success.

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