Introduction

Although classification of farming systems has been an important theme in the fields of agricultural geography and agricultural economics, there appear to have been no agreed criteria upon which a typology should be made (Grigg, 1969). The problem seems quite intractable as far as most of the developing countries of the tropics are concerned, because lack of statistical data on agriculture has made it impossible for the quantifiable criteria used by agricultural geographers in the advanced countries to be applied. It is therefore not surprising that 'the notion that shifting cultivation is simple and varies little from area to area and continent to continent' runs through much of the literature on tropical agriculture. This oversimplified picture of traditional agriculture in the tropics was drawn by earlier writers (Gourou, 1965) who established the framework for a regional differentiation of agriculture. It disregards the changes which have been taking place as a result of increased population pressure on available land, the introduction of cash crops, and the impact of agricultural innovations.

While the use of the same criteria by research workers for world-wide classification would facilitate comparisons of farming systems in different parts of the globe, and perhaps remove the element of subjectivity in classifications (Johnson, 1968), it is arguable whether a meaningful and useful global classification is possible in view of the great differences which exist between agriculture in the developed and the developing parts of the world and even within parts of the same country. It must also be emphasized that a classification of any kind is designed to serve a specific purpose and the selection of criteria may be largely influenced by the objective sought. In the developing countries where the main aim is to improve agriculture to feed the rapidly growing population, a classification based on how the different farming systems function in their physical and socio-economic milieu may be of more practical value than a classification based on the inherent properties of agriculture. The former approach may provide clues for changing inefficient systems while the latter may end up with static pictures of agriculture at particular points of time.

Towards a Classification of Small-Scale Agriculture in Ghana

In this paper, an attempt is made, based on the results of intensive case studies by the author, to classify small-scale farming systems in Ghana and to show how each system functions. Each farming system is regarded in the words of Moszczenski as an 'ensemble of means and practices aimed at the achievement of agricultural produc-

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1 This paper is an elaboration of a lecture given by the author at the Geographical Research Institute, Hungarian Academy of Sciences, Budapest, on 6 December 1971.

2 Quoted in Floyd, 1969.

3 For the two different approaches to the classification of agriculture, see Kostrowicki, 1970, and Olmstead, 1970.
tion and at maintaining soil fertility. It is a product of the appraisal by individual farmers of the biological and economic resources at their disposal and the decisions taken by them on what to produce and the techniques of production to adopt in the light of their assessments. Thus as new decisions are arrived at in response to a re-appraisal of these resources, the methods of cultivation may change. A farming system is therefore not static but dynamic.

While in the technologically advanced countries, the decisions of a farmer may not be unduly influenced by the physical attributes of land, the ecological factor is a dominant factor in pre-scientific societies. The method of maintaining soil fertility which depends largely on the ecological conditions of an area and the level of technology is therefore a useful criterion upon which a classification of small-scale farming systems in Ghana can be made. Much more, it indirectly determines such characteristics of farming systems as land use patterns, capital inputs, yields, intensity of cultivation and the permanence and impermanence of rights in cultivated land.

Two broad systems of small-scale farming may be distinguished in Ghana based on the above criterion. These are the bush fallow system and permanent tillage. The latter may be based on the application of compost, manure, and fertilizers to restore soil fertility or on tree cropping. The two systems are subdivided on the basis of land tenure which largely determines field patterns and the intensity of cultivation in terms of capital inputs. In parts of northern Ghana each farming unit combines permanent tillage of the area immediately around its compound house with bush fallowing at some distance from the settlement in much the same way as the well known infield–outfield system. There is thus the need for a third category—combined farming system (Uhlig, 1971:113).

Method of Case Study

Since the primary objective for undertaking the case studies was to compare the different functions of the farming systems and not to delimit agricultural regions of Ghana, villages where the different systems of farming are practised were carefully chosen. Depending on both the size of the village lands and the intensity of cultivation either part or the whole of the farming community was selected as the unit of study. Thus in the case of the survey on market gardening, the holding of one family was selected for an intensive study in the village of Dornorgbor and this was only 2.5 acres in size whereas, the survey on strip farming systems involved the total population of the selected village and an area of about 700 acres.

The same method of survey has as far as possible been used for all the case studies. Factual information on the area selected for study was first gathered from maps, air photographs, published statistics, reports and papers in libraries and the National Archives. This formed the background data on the area. Preliminary contacts were then made during which the author explained the purpose of the survey to the chief and people of the village and questions raised by the farmers were answered. The initial contacts in some cases took several weeks before the consent of farmers was obtained. This was mainly due to the suspicion which farmers have in a survey which involves their showing their farm boundaries.

1 Quoted in Kostrowicki, op. cit. 19.
In the case of a survey embracing the whole village, land use and cadastral maps covering the village lands were prepared with chain and prismatic compass. Each farmer or his representative was asked to point out the boundaries of his land or field of cultivation. When only a part of the village lands was surveyed, easily identifiable boundaries such as rivers, roads, and paths were used to delimit the area for intensive study.

**Table I**

*Classification of small-scale farming systems in Ghana*

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Every farmer whose land had been surveyed was then interviewed on a number of topics including his perception of the physical environment, methods of cultivation, implements used, organization of farming, orientation of farming, capital inputs, marketing of produce, the history of ownership of the plot being cultivated by him and the rights he enjoys in the land. With slight modifications to cater for the special conditions in the different areas of the country, the same questionnaire has been used in all the case studies. The locations of the villages selected for the surveys are shown in Fig. 1. Each initial period of survey was between three and six months, periodic visits to the villages were made later to seek additional information. Three of the initial surveys were done between 1962 and 1963 with the help of the field survey teams of the Cocoa Division of the Ministry of Agriculture and the others between 1967 and 1970 as part of the Field Research projects sponsored by the African Studies Centre of Northwestern University and the Institute of African Studies of the University of Ghana.

Attempts have been made to find out the extent of occurrence of each of these systems through random interviews conducted in local council districts by students of geography of the University of Ghana using the questionnaire for the case studies and by local studies conducted by senior students of the same department on land tenure and land use systems as dissertations for their B.A. degree. Fig. 1 is based on the results of these surveys and on data obtained from published land use maps.

**Bush Fallow System (Mosaic Pattern)**

This is the most widespread system of farming in Ghana. The main characteristics are rotation of fields rather than of crops, easy acquisition of land for cultivation, use of fire for clearing vegetation, dependence on muscle power, use of simple implements—dibble stick, machete, and hoe—for cultivation, mixed cropping,
production of food crops mainly for consumption by the farmer and his family and the restoration of fertility of the soil by fallow vegetation and lack of physical inputs.

The right to cultivate a piece of land is a birthright. It depends on one’s membership of the land-holding group (family, clan, or tribe). A member of the land-holding group who is the first to cultivate a tract of land establishes the right to use that land for himself and his descendants as long as they continue to cultivate it. Since farmers are aware of differences in soil and their suitability for the crops they cultivate, each tries to establish a number of plots at different sites to take advantage of the
available soil types. At any particular site the farms of an individual may be interspersed with those of other farmers. This gives rise to a patchwork quilt or mosaic pattern of land ownership with no characteristic shape of fields.

Under the bush fallow system growing crops tap the accumulated plant food built up by the original or fallow vegetation. Consequently, the yield in the first season of cultivation is usually high but it declines in subsequent seasons when most of the nutrients in the soil are exhausted. After two or three farming seasons, the food plot is abandoned by the farmer for the fallow vegetation to regenerate and for the small capital of plant food to be restored to the soil through the repetition of the nutrient cycle. The burning of cleared vegetation on plots intended for cultivation not only saves time and labour but also improves the soil. Carbonates and phosphates are obtained from the ash on the surface of the soil and are washed into the soil by the first rains. On the other hand, burning of litter exposes the soil to the effects of the sun and torrential rains until the first crop forms an effective protective cover. The danger of soil erosion is, however, considerably reduced by the fact that soil structure is not greatly disturbed by either the use of ploughs or the uprooting of tree stumps. Moreover, since the cleared plots are usually small and fringed by uncleared vegetation there is little danger of serious sheet erosion.

By cultivating different crops on his small food plot, the farmer is able to obtain all the items he needs for preparing his diet. Although the yields of individual crops on the food farm may be low compared with yields of the same crops grown in pure stands, this is offset by the advantages the farmer derives from mixed cropping. Furthermore, since the various crops on the farm mature at different times, harvesting is spread over a longer period.

The system works satisfactorily only if there is enough land to ensure that each abandoned clearing is allowed an adequate period of rest and regeneration. Gourou (1965) considers that a minimum of 25 to 30 years fallow is necessary for the soil to build up its lost fertility. A more practical length of fallow, 6–8 years, has been suggested by recent writers (Morgan and Pugh, 1969). The need to allow the soil adequate rest means that the area of land needed to sustain a population group which depends on the bush fallow system cannot drop below a certain minimum. A number of authorities have suggested critical population densities beyond which the system cannot function properly. According to Boateng (1962) the density possible in the forest region of Ghana under the existing systems of cultivation and transportation is 150 persons per square mile. This figure in his view can be exceeded but that usually means a reduction in the period of fallow to the detriment of the soil.

In the forest region, shortage of land for food farming is also partly due to the keen competition for land between the more profitable cash tree crops and food crops. On the one hand, the long life span of crops like cocoa, rubber, and oil palm precludes land occupied by them from being utilized for growing food crops except in the first few years when cocoyam and plantain are usually cultivated on tree-crop farms to provide shade for the young seedlings. On the other hand since farmers would normally prefer virgin forest land to fallow land for cultivating cocoa, land under fallow or food crops is not often used for cocoa cultivation.

There is increasing evidence that the bush fallow system is becoming an inefficient system of cultivation because it is no longer possible for farmers to leave their land
long enough under fallow for the soils to regain their fertility. The results of a survey conducted by the author in many agriculture districts in the country indicate that in the last ten years the fallow period has been shortened from 6 to 10 years to 2 to 3 years. This has led to decline in yields and a deterioration of cultivated soils.¹

**Bush Fallow (Strip Pattern: Huza)**

Although the methods of cultivation and the implements used are broadly the same as those described above, the *huza* sub-type is a distinctive system because of the peculiar system of land ownership which gives rise to the strip pattern of land use (Field, 1943). Other characteristics which distinguish the system from the mosaic system are its orientation towards a market economy, a lesser degree of scatter of individual holdings and the use of hired labour.

Ownership of farm land is acquired through purchase, the individual farmer thus acquires permanent and absolute interest in a well-defined parcel of land. Individual farmers do not buy land directly from a land-owning group. They organize themselves into small groups for this purpose in order to increase their bargaining power. At the head of the group or company as the organization is often described is an important person in the social hierarchy of the community to which the people belong who is in charge of the negotiations for the purchase of the tract of land. The size of the land to be bought is determined by measuring a base line normally along the course of a river with a special rope known as *kpa* which is normally 12 or 24 arm-spans of a tall man.²

The base line is subdivided amongst the members of the group with the same unit of measurement. The length acquired by an individual depends on the size of his contribution towards the payment of the tract of land. After the share-out *buna* trees, *pycnonoma cornuta*, are planted to mark the limits of each strip on the base line *kpa kato* from which cultivation begins. Each farmer is required to maintain the distance measured for him on the base line as the width of his strip of land as he farms towards the opposite end of the purchased land. In order to ensure that no strip increased in width at the expense of a neighbour’s strip, each farmer is expected to keep pace with the advancing line of cultivation.

In the study of the Dawa Ogome *huza* it was found that the acreages of individual strips of land which started with the same widths on the base line varied a great deal. The acreages of strips with a width of half a rope varied from 9·1 to 20·7 while those with a width of one rope ranged between 11·6 and 28·4. According to informants this occurred when industrious farmers took advantage of their lazy neighbours to increase the widths of their strips (Benneh, 1970b).

The company does not disintegrate after the purchased land is shared. It is transformed into a coherent social unit. The leader of the group is responsible for maintaining peace and harmony among members of the community. Boundary disputes between individuals are settled by him and a council of elders selected amongst the members. Nevertheless, every member of the company has absolute control over his parcel of land.

¹ The problem of changing the bush fallow system is discussed in Benneh, 1971a.
² In recent years the distance between two
Although most of the original *huzas* in the Eastern Region were used for the cultivation of tree crops (oil palm and later cocoa) they are now used for growing food crops for the market following the devastation of cocoa trees by the swollen shoot disease and the demand for foodstuffs in nearby large urban centres such as Accra and Koforidua. The *huz* system is the dominant system of cultivation in the two Krobo traditional states in the Eastern Region.

Hired contract labour is used for clearing the fallow vegetation when fields are being prepared for sowing. The labourer is paid according to the size of the field; this is measured with the rope. At the time of the survey (1962) there were five resident labourers engaged in clearing land. Local farmers were employed as labourers on *Dibimamennibi* (literally eat and let me eat) terms. Under this arrangement the owner of a strip of land divides the field which is cleared in a farming season by a labourer into two, and each cultivates one half during that particular season. The labourer returns his half to the landowner at the end of the harvest.

Since the size of some of the strips of land are small in relation to the number of people who depend on them, renting of land is a common practice on *huzas*. Land may be rented for cultivating either maize, the chief cash crop, or other food crops, mainly cassava and cocoyam. In the case of maize, land is rented for three months, the life span of the crop, and in the latter case for three years. Two crops of maize are raised in a year, and they are grown in pure stands; the other crops are mixed. The main implements are the cutlass and the hoe.

After two or three seasons of cultivation when yields begin to decline, the field is left fallow. The efficiency of the system depends on low population density since this would ensure a longer rest for an exhausted soil. In the past, farmers solved the problem of population pressure on their strips of land by buying more land; there was thus always some land in reserve. With the depletion of virgin forest land in the country as a result of the rapid expansion of cocoa cultivation, it has become difficult for farmers to acquire more land. Because of the pressure of population and the great demand for land, the length of fallow period is now short (2 to 6 years).

**Cash Tree Cropping System**

This system is found mainly in the forest region of Ghana. It is based on the cultivation of tree crops—cocoa, oil palm, rubber, and kola for the market. It is a permanent system in the sense that the land supports the cultivated plants for a long time. The nutrient status of the soil is maintained not through such inputs as manure and chemical fertilizers but largely through the decay and decomposition of vegetable matter which falls on it. It is completely market-oriented, hired labour is employed, cultivated land is individually owned either as a result of membership of the land-holding group or through purchase such as under the *huz* system which has been described above. Cash tree crops may also be cultivated under share cropping systems. The sizes of farms are larger than the sizes of food farms under the bush fallow system.

Cash tree cropping became important in Ghana with the successful introduction of cocoa in 1879. Its rapid expansion in the forest region was partly due to the fact that

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1 The different tenure systems in Ghana are discussed in Benneh, 1970a.
its adoption did not necessitate a complete break with the traditional bush fallow system. The land for tree cultivation is prepared in much the same way as that for food crops under the bush fallow system. Seedlings of the tree crop which are raised on beds at suitable sites are transplanted on the prepared field. Shade for the growing seedlings is provided by a few trees left standing on the cultivated plot and food crops such as bananas, plantains, and cocoyams. Particular types of trees are favoured as shade trees. These include *Ceiba pentandra*, *Chlorophora excelsa*, and *Ficus asperifolia*.

Farmers also select special types of soils for cocoa cultivation. Thus the reddish-brown upland soil *sebene* was preferred by farmers in the village of Samproso, to the grey sandy soil *afonhwea*. A high occurrence of trees like *Cylicodiscus gabunensis* and *Ricino dendron hendolotii* was an indication of the suitability of the soil for cocoa. On the other hand *Hymenostegia afzelli*, *Mallotus oppositifolius* and *Aracia pennata* were associated with poor soils. The search for new sites where suitable soils occur results in scattered fields of members of the land-holding group. In the case study, only ten out of thirty-one farmers whose farms around the village were surveyed possessed a cocoa farm. One of the farmers had eleven others in the locality (Benneh, 1971c).

The degree of dispersion of individual holdings within a locality tends to be smaller in the case of 'stranger' farmers (non-members of the landowning group) who acquire land for cash tree cropping either through purchase or through share-cropping tenancy. These farmers normally obtain a contiguous tract of land about one mile square or more. In some of the pioneer cocoa-growing areas, the scramble for the remaining forest land for cocoa cultivation by members of the land-holding group has also led to farmers claiming large tracts of land by being the first to clear the virgin vegetation. This has not always led to efficient utilization of land since not all the farmers who claim such large tracts of land have the capital to develop them (Benneh, 1965).

A member of the land-holding group who grows cash tree crops has greater control over his piece of land than the person who grows food crops under the bush fallow system; the tree crop ties land down for many years, and as long as the trees grow on a plot of land, no person can claim it from the owner of the crop. This system has therefore strengthened the individual interests in his cultivated land at the expense of the group interest (Benneh, 1970c).

The cash tree farming system is based on the natural fertility of the soil. No fertilizers or manure are applied. Since the cultivated trees create ecological conditions similar to those in the forest, there is no break in the nutrient cycle on which the fertility of the soil is maintained. The soil is able to replenish its nutrient supplies used by the growing plants through the decomposition of the leaves and the twigs which fall on its floor. The nutrient status of the soil supporting the same tree crop is however lower than that under the natural forest vegetation with mixed species of plants (Igbozurike, 1971, p. 114) and in time declines, though not as rapidly as that cultivated under the bush fallow system. The yield of cocoa trees in Ghana declines when they are over 30 years old (Jolly, 1955).

Cash tree cropping depends heavily on employed labour; 26 out of the 31 farmers covered by the Samproso survey had employed *abusa* labourers. The *abusa* labourer is responsible for the picking, fermenting, and drying of cocoa and also for weeding the cocoa plot before harvesting. In return he receives one third share of the value
of the cocoa harvested for his employer. A cocoa farmer, small or large in terms of acreage owned, assumes the role of supervisor of the labour he employs on his farms. As the Colonial Report on the Northern Territories for 1913 pointed out 'The remarkable growth of the cocoa industry in Ashanti is due in a large measure to labour supplied from the Northern Territories. The Ashanti—never an agriculturist—is only too pleased to pay the native of the Northern Territories from 1s. to 1s. 3d. per diem in addition to his food, in exchange for his work on the cocoa farms.' Daily paid labourers are normally employed by farmers to help carry fermented cocoa beans from the farm to the village for drying. At the time of the survey (1962–3 main cocoa season) a labourer received a daily wage of 5s.

The Compound Farming System

The compound farming system, based on permanent cultivation of land immediately surrounding a homestead is found in the northern region of Ghana. The fertility of the soil is maintained with refuse from the compound, the droppings of goats, sheep, poultry, and night soil. In order to increase the area under permanent cultivation, women and children are encouraged to deposit refuse further afield. The crop sequence also involves a deliberate inclusion of legumes like groundnuts and bambara beans in the outer zone to help increase the nutrient status of the soil.

Although the compound fields are normally tilled, small patches of fallow are left for tethering sheep and goats during the growing season. At the time of the Lambussie survey, 5 farming units out of the 26 whose fields were surveyed had left parts of their compound farms under fallow (Benneh, forthcoming (c)), because the soil had declined in fertility. The inner concentric zone is sown to early varieties of guinea corn and maize, which mature within three to four months. Farmers depend on these harvests when preparing their bush farms which are cultivated under the fallow system. The main implements are the hoe and the dibble stick for sowing. The compound unit which may consist of a man, his wives, children, and unmarried brothers and sisters, constitutes the basic production and consumption unit. In large compounds, the different nuclear families farm separately. Each farming unit enjoys the permanent right to cultivate the land around its compound house. A stranger farmer is given free land to build on and to cultivate by the Earth Priest who is the custodian of the village lands. He enjoys the right to live in the village as long as he is of good behaviour.

The size of a compound farm depends largely on the extent to which it has undergone fragmentation due to lack of harmony within the farming unit. While the eldest son normally inherits the property of the deceased father on behalf of his brothers, it is not uncommon for the younger brothers to claim their shares when there is lack of agreement among them. The size of a compound farm may vary from less than half an acre to over 5 acres. On large compound farms only the inner concentric zone is normally manured.

Farmers depend on rainfall and this is concentrated between April and September. There is little to do on the fields for the rest of the year after harvesting crops at the beginning of the dry season. The harvests are kept in common granaries owned by

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1 Report No. 807 Cmd. 7950.  
2 This is normally a component of the combined farming system.
the farming unit. The cereals—millet, maize, and guinea corn—are mainly for consumption while part of the groundnut crop is sold on the market.

Although farmers own livestock, they are kept in kraals at some distance away from the settlements by Fulani herdsmen. No attempt is made to apply cow-dung from the kraals on their farms even though this would no doubt increase productivity. The efficiency of this system depends on there being enough land for each production unit to establish bush farms to supplement produce from the compound farms. With increased population pressure when the bush farms are eliminated, the compound farming system becomes inefficient because yields are not enough to feed the population.

**Mixed Farming**

This system of farming is characterized by a combination of cultivation with the keeping of livestock. The latter provides power and manure on the farm. The system was introduced to north-eastern Ghana by the Colonial Administration in the nineteen-thirties to check the rapid deterioration of soils as a result of population pressure on land and to increase agricultural productivity. The idea of using manure to increase production on their compound farms had been known to the farmers. Thus the main technical innovations associated with the introduction of mixed farming were the use of the bullock plough, planting on ridges, and the deliberate attempt made to produce cow-dung through stall feeding of work animals.

Cow-dung is applied mainly on the compound farms where guinea corn and millet are cultivated. Farmers also use compost of household refuse and kitchen sweepings and the sweepings from the sheep and goat pens. Yield surveys conducted by the Extension Office of the Manga Bawku Agricultural Station on selected farms in the village as early as 1940 showed that the average yield was 419 lbs per acre for early millet growing on fields on which cow-dung had been applied as against 258 lbs for non-manured fields and 867 lbs for guinea corn as against 385 lbs (Smith, n.d., p. 15). Although the staple crops—millet and guinea corn—are grown mainly for consumption, small quantities are sold on the market. The main cash crops are rice grown in the valleys and groundnuts.

The adoption of mixed farming has necessitated a change in the land tenure system. There is now the need for common grazing ground. The area to be set aside is agreed upon at periodic meetings summoned by the chief of the village. The farmers who have to surrender parts of their fields do so readily, since this is done on a reciprocal basis. At the time of the Manga Bawku survey, 39 per cent of the village land was used for grazing; a large part of it was unsuited for cultivation because of the damage done by erosion as a result of the great population pressure.

In spite of the demonstrable advantages it has over the other systems of farming, its adoption depends on how effective the extension services are in persuading farmers to produce feeding stuffs and manure, and the availability of capital to purchase bullocks and ploughs. Thus 7 out of 24 farmers who owned or once possessed bullocks in Manga Bawku had acquired them through loans raised from the Ministry of Agriculture and the Bawku Co-operative Society while the rest had purchased them from their own savings (Benneh, 1972). Mixed farming is also restricted to the areas which are free from tsetse fly.
Specialized Horticulture (Shallots)

This is the most intensive farming system in Ghana. It involves irrigation, manuring, and rotation of crops and permanent cultivation of narrow drainage ditches which run almost parallel to the coastline from Attiteti through Dzita, Whuti, Anloga, Ave to as far as Tegbi in the Anlo area of south-eastern Ghana. The main crop which is grown for the market is shallots, sabala, introduced into the area around the eighteenth century.

The crop is cultivated in a sandy poor soil in an area which receives less than 30 inches of rain. The scanty rainfall is however offset by a high water table which makes it easy for farmers to irrigate their fields with water from shallow wells, 4 to 5 feet deep which they construct on their farms. Due to the poverty of the sandy soil, capital resources are important in the sabala farming system. The most important of these are drumi, bat droppings, nyimi cow-dung, lavi fish manure and yeu-du chemical fertilizers to improve the nutrient status of the soil. All the 17 farmers whose shallot fields were surveyed by the author had purchased these inputs (Benneh, 1971b).

The system is also labour intensive. Although family labour is used, for some of the arduous and time-consuming activities, such as the carting of sand to raise the shallot beds and weeding of shallot beds, hired labour is used. Only 2 of the 17 farmers did not employ labour for weeding their shallot beds at the time of the survey and only 4 did not use hired labour for sowing.

Three crops of shallots can be raised in a year in the shallot belt, the first season known in the Anloga area as Fenu starts from mid April and ends in July. The second Kele begins in September and ends in November; this is followed by the third season Fedomi which starts in January and ends in March. In between the seasons the shallot beds are sown to vegetables, maize, and leguminous plants. At the start of each season these are ploughed into the soil, and the level of some of the beds is sometimes raised by adding sand because of the high water table after the rains. Irrigation channels are then constructed. The beds are prevented from being washed away by a framework of corn stalks and grass. The smallest beds in the area surveyed measured 5 feet by 12 feet and the largest 5 feet by 60 feet. There does not appear to be a standard size of a shallot bed in the Anloga district (Grove, 1966: 394), although farmers regard a measurement of 5 feet by 30 or 35 feet as the smallest economically viable unit to operate.

Two weeks before sowing, cow-dung, bat droppings, or fertilizers are applied to the soil. During the Kele season farmers prefer cow-dung to chemical fertilizers because according to them the latter results in poor harvests. The fields are irrigated twice a day, in the morning and late afternoon, until the seedlings mature. Fish manure is scattered on the beds and dribbled into the soil with a stick 3 weeks after sowing. The crop takes about 8 weeks to mature. After harvesting the larger bulbs are tied in bundles for sale whilst the smaller ones are kept for sowing in the next season. The average price of a bundle is £6 to 8,1 and the yield per bed is between 4 and 6 bundles depending on its size.

Shallot beds are acquired by members of the land-holding group (clan) as a birthright. They may also be received as gifts. A prospective farmer who has bulbs but

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1 At the time of the survey, £1 was equivalent to US $1.
no land can obtain beds for cultivation under the share cropping systems known as dame and fame. Under the dame system unprepared beds are given to a relative or a reliable friend by the owner who through either absence or sickness is unable to cultivate them. The tenant cultivates the plots with his own bulbs and the proceeds are shared equally between the owner and the tenant after defraying the cost of production. If in any farming season a farmer has not sufficient bulbs to sow all his beds, he can invite a farmer who has to cultivate his remaining beds under the fame system. Until about 1960, the tenant sold a portion of the crop to defray his overhead costs and shared the rest equally with the landowner. In recent years, owing to shortage of bulbs as a result of flood damage, their owners take two thirds of the money realized from the sale of the crop after the cost of production has been deducted.

The high productivity which the system ensures has been achieved through the efforts of individual farmers who are largely illiterate. Unlike some of the other systems of farming which operate within the limitations imposed by the physical environment, the system is free from the major environmental controls except floods—which occur quite often. Since the shallot farmer irrigates his land, the rhythm of rainfall distribution does not exercise any influence on his farming calendar. He is able to cultivate the same piece of land for a long time because he does not depend on the innate fertility of the soil but builds up a capital of nutrients in the sandy soils. The number of inputs required has made him dependent on a number of services some emanating from outside his immediate environment. Thus he depends on fishermen for fish, Fulani kraals for manure, and agricultural extension officers for chemical fertilizers. In this network of relationships, the primary concern of the shallot farmer is to ensure that he can sell his produce at a sufficiently high profit in order to remain in business.

Conclusion

Although the normal approach to the problem of improving small-scale agriculture in Ghana has been to draw up a common list of prescriptions for all small-scale farmers, it is evident that problems can be quite different depending on the system of farming being practised. The chances of success of agricultural programmes for the small-scale farmer would be enhanced if an attempt were made to solve the problems presented by the different farming systems. It is in this respect that too much generalization on the nature of small-scale agriculture in Tropical Africa as a whole is inimical to the development of the region’s agriculture.

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Résumé

ESSAI DE CLASSIFICATION DE SYSTÈMES D'EXPLOITATION AGRICOLE AU GHANA

Le problème de la classification des systèmes d'exploitation a retenu l'attention des géographes et des économistes agricoles dans les dernières décennies. Dans de nombreux pays tropicaux en voie de développement, le manque de données statistiques n'a pas permis d'appliquer les critères utilisés pour les classifications des activités agricoles dans les pays développés. La généralisation bien connue, affirmant que tous les fermiers d'Afrique tropicale pratiquent une culture itinérante, persiste même si des changements sont survenus dans certaines régions, résultant de l'introduction de la vente de récoltes sur pied, de la pression démographique et de l'impact des innovations agricoles.

Cet article tente de classer un petit échantillon des systèmes d'exploitation au Ghana en se référant principalement aux méthodes de maintien de la fertilité. On distingue deux types principaux d'exploitation : le système de mise en jachère et le système de culture permanente. Ils se subdivisent selon les modes de tenure foncière qui déterminent en grande partie les types de champs et la densité de l'agriculture en termes de pouvoir du capital. La combinaison d'un système permanent de culture avec la mise en jachère dans certaines parties du Nord du Ghana permet de déterminer une 3ème catégorie, un système combiné d'exploitation. Les résultats des études des différents systèmes d'exploitation agricole menées par l'auteur sont ensuite discutés.