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## FOOD CROP MARKETING IN ATEBUBU DISTRICT, GHANA†

The traditional system of marketing food crops in Ghana, as in much of tropical Africa, has recently been under considerable stress. Much maligned, this marketing system has variously been charged with being inefficient, disorganized, unresponsive, and oligopsonistic. At the same time, private wholesale traders have been vilified in the press, often being accused of hoarding and of cheating innocent farmers or powerless consumers.<sup>1</sup> In response to this perceived state of affairs, many governments, including Ghana's, have established parastatal corporations to market foodcrops, sometimes (though not in Ghana) possessing a legal monopoly of this trade.

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<sup>1</sup> In March 1970, Dr. K. Safo-Ado, then Minister of Agriculture of Ghana, spoke to the Parliament with regard to a Task Force for Food Distribution, set up to break alleged monopolies of internal food distribution organized, he suggested, by "some of our citizens who are taking undue advantage of this present grave crisis to amass personal fortunes by hoarding foodstuffs and by creating artificial shortages and violent fluctuations in prices" (Safo-Ado, 1970, p. 667). In 1977 a paper outlining the operations of the government's proposed Special Marketing Unit identified a "trend in the concentration of economic power in the hands of 'market queens' and the Gao traders on the one hand and the multiplicity of food retailers who normally depend upon the powerful intermediaries for loans to finance their low volume operations" (Ghana, no date). Later, Mr. Ato Quarshie, assistant director, said the newly established unit was "determined to eliminate middlemen whose sole aim was to cheat farmers and expressed the hope that farmers would cooperate"

This article reports the results of a microeconomic study of food crop marketing in a major agricultural district in central Ghana.<sup>2</sup> It describes a system that has overcome poor roads, shortage of trucks, shortage of capital, poor communications, and ethnic diversity to provide remarkably good services to a diverse and scattered farm population.

The results of the study are largely at variance with most of the stereotypical notions held by many government officials and other members of the intelligentsia in Ghana and elsewhere in tropical Africa. They are consistent with a small but growing body of evidence demonstrating that many traditional African wholesale marketing systems for food crops are remarkably efficient and competitive in the face of numerous obstacles, often government imposed (Couty, 1977; Gilbert, 1969; Hays, 1975; Jones, 1972; Nicolas, 1964; Onyemelukwe, 1970; Schwimmer, 1976).

The central theme is a search for the existence or absence of significant imperfections—departures from conditions characterizing a competitive market—in the marketing system for food crops in Atebubu District. In the absence of complete data on marketing margins and on rates of return to capital invested in the several marketing functions, an alternative approach is taken to identify inefficiencies in marketing and their consequences. The principal characteristics of marketing in Atebubu are evaluated with respect to the requirements for perfect competition.<sup>3</sup> Price data are then analyzed to determine how closely seasonal price rises correspond with costs of storage and to measure the extent of integration of the principal Ghanaian markets for commodities produced in Atebubu.

An underlying theme is the distinction between efficiency of marketing, which exists if participants compete effectively and therefore provide services at the lowest possible costs under existing circumstances, and capacity of the marketing system to expand and to reduce unit costs. Efficiency means that the

(*Daily Graphic*, 1978, p. 11). When the Ghana Food Distribution Corporation raised prices to farmers in February 1977, this was said to have been done because of "the government's determination to encourage the farmers to produce more maize and to deter the ubiquitous middlemen and smugglers from disrupting the maize trade and frequently holding consumers to ransom" (*Daily Graphic*, 1977, p. 7). Gilbert cites similar newspaper accounts of government warnings to traders in Kano's Sabon-Gari market during a period of high prices in 1966 (1969, pp. 345-47). See also Miracle (1968, pp. 214-19) and Nyanteng and van Apeldoorn (1971).

<sup>2</sup> Southworth spent one year in Ghana, principally in Atebubu District, beginning in November 1976; Jones and Pearson made short visits to Ghana and Atebubu in November 1976 and June 1977; Pearson made an additional trip in October 1977; and Pearson and Southworth returned again in June-July 1978.

<sup>3</sup> Jones summarizes the requirements for a perfect market as follows (Jones, 1980): "that the items of a commodity that is being traded be interchangeable—fungible—and divisible; that each buyer and seller act in an economically rational way; that he behave as if his actions had no influence on price; that each buyer and seller have entry to all activities of the market on the same terms; and that each have perfect knowledge of all forces likely to affect supplies and requirements. Briefly, the conditions are fungibility and divisibility, rational behavior, small (atomistic) firms, equal access, and perfect knowledge.

The conditions set down imply the existence of a place (such as a trading floor) where all offers to buy and sell are made; rapid, almost instantaneous communication of information within and among markets; reliable and economical storage and transportation for traded commodities; and a government that ensures internal peace, the rule of law, and the orderly conduct of business.

marketing system is allocating resources optimally among all uses, given the existing level of technical development. It does not imply that there is no room for improvement in allocation of supplies or in reduction of costs of transport, processing, and storage. Expansion of marketing capacity by lowering costs can improve market performance and reduce unit costs, whether or not marketing was previously inefficient.

## MARKETING ENVIRONMENT

Atebubu District is the easternmost extension of Ghana's Brong-Ahafo Region and lies in the transition belt between forest and savanna. Yeji Town marks an old crossing of the Volta River on the road from Kumasi to the north via Salaga, and Atebubu Town stands at the intersection of that road with the old rubber route from Wenchi and Techiman to the Keta Krachi crossing of the Volta (Dumett, 1971).

### *Population*

In 1970 Atebubu District had a population of 90,233, almost all resident in villages and towns. The distribution of District population as of about 1970 is shown in Map 1, which also indicates the marked tendency to locate along main roads. These roads were opened to serve long distance trade in the early years of the nineteenth century, not the local communities that developed near them later. Soil quality and availability of water also played a part in determining the pattern of settlement and probably explain the considerable population between Kwame Danso and the Sene River. Concentrations in the extreme southeast at Ntoboma and at Kajeji west of Kwadjokrom resulted from resettlement of communities from the Volta Valley. Recent years have witnessed an opening up of the lands north and east of Kwame Danso, but the population in that part of the District remains small.

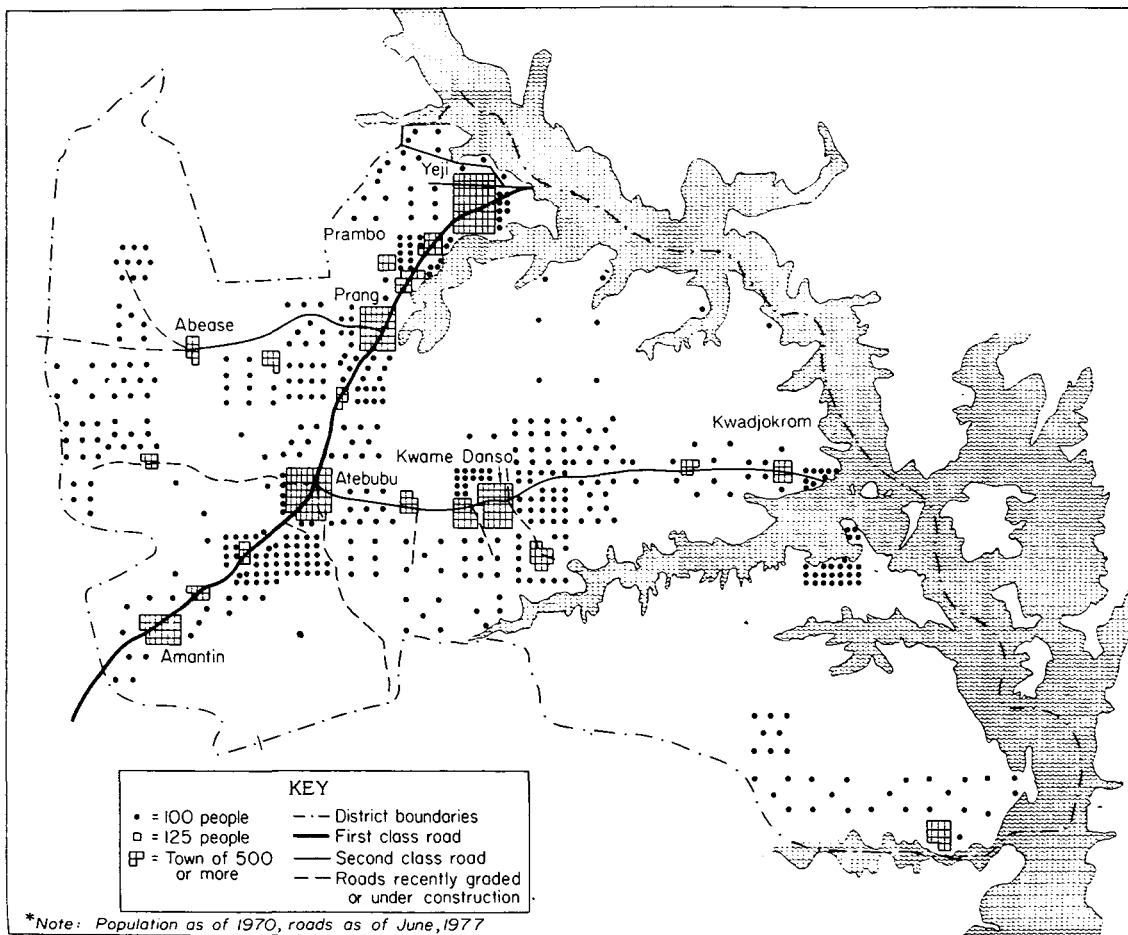
Atebubu Town is the administrative center of the District and a major service center. Its 1970 population of 6,630 was slightly smaller than the conurbation around Yeji, but its economic role is first in the District.

Immigrants from various parts of northern Ghana and more distant have been settling in the District for a hundred years or longer and continue to do so. As a consequence the community is quite mixed in terms of language and culture.<sup>4</sup> Atebubu earlier served as an entrepôt between the products of the forest and of the savanna and between the diverse, partially Islamized, peoples of the north and the Akan-speaking people of the south.

The polyglot nature of the permanent and transient populations brought forth special arrangements to permit trade to go on. Most notable were those deriving from the institution of the commission agent and of the traders' settlement, or zongo. Commission agents included brokers (*dillali* in Hausa) and landlords (Hausa *mai gida*). Both found buyers for sellers and sellers for buyers; the landlord

<sup>4</sup> Southworth conducted a survey of 404 farms in 1977. Of the 401 households that replied to a question about ethnic affiliation, 181 were members of one of 21 tribes of northern origin, 191 identified themselves as Brong, original inhabitants of the area, and 29 belonged to other southern tribes.

MAP 1.—POPULATION AND ROADS OF ATEBUBU DISTRICT\*



also housed and fed visiting merchants, looked after their cattle and their goods, and might stand surety for credit sales. The zongo provided shelter and security for traveling merchants, and its head, the *sarkin zongo*, was arbiter among the people of the zongo and between them and the local authorities, sometimes serving as market master under the local ruler (Arhin, 1971, p. 202n).<sup>5</sup>

Two aspects of Atebubu's earlier history are important today—the accommodation that was worked out between the earlier Akan-speaking occupants of the territory and the immigrant northerners (the people of the zongo, who now outnumber them in many areas), and Atebubu's role as supplier first of caravans and later of truck drivers that traversed the great distances of the western Sudan. Today northerners, with extensive experience of the complexities of trade over long distances, are the principal grain merchants, while the Akan, whose women have been major traders in vegetable crops, are the main yam merchants.

### *Physical Features*

Atebubu District extends 90 miles from east to west and 55 miles from north to south and has a total land area of about 5,000 square miles. Atebubu Town is 100 miles from Kumasi, 260 miles from Accra, and 125 miles from Tamale. Most of the District is a fairly level, undifferentiated plain that is bounded on the north and east by the Volta Lake and deeply penetrated by the Pru and Sene arms of the lake. Parts of the District south of the Sene arm are so remote from the rest that they were not considered in this investigation. The unflooded area is

<sup>5</sup> Peter Garlick says of visiting slave traders in Salaga market (1967, p. 466):

In Salaga, the buyers had to lodge somewhere. It was impossible for an Ashanti, Akim, or Kwahu to live there: there was so much tribal conflict that they were in fact afraid to do so. They lodged with landlords who accommodated and fed them free. The landlord's function was to put them in touch with the sellers, and his reward was a commission on each slave that they bought.

Garlick reports similar arrangements for rubber traders on the coast and in Kumasi in 1959. Hill says (1966, p. 365):

Traditionally, a *mai gida* . . . has three distinct roles: he owns (or rents) a house in which his *bringers* receive free board and lodging during their stay in the market town; he is a *dillali* . . .; and he is a risk-taker who guarantees the credit-worthiness of certain buyers, in the last resort meeting their debts . . . himself.

Of the zongo, Arhin says (1971, p. 209):

Of greater commercial importance than the marketplace was the Zongo, which . . . was the hub of marketing in the market centres of the long-distance trade. It was in the Zongo compounds that bulk exchange in kola and dealings in domestic slaves occurred.

As early as 1897 the Atebubu zongo was a third larger than Atebubu Town (Arhin, 1971, p. 205). In 1977 the *sarkin zongo* of Kwame Danso was Chairman of the Atebubu District Council. In general the *sarkins zongo* gained power at the expense of the traditional rulers. For an account of the evolution of the Atebubu zongo see Arhin (1979, pp. 106-14).

traversed by a few small streams that cannot be crossed after heavy rains, but otherwise it is relatively open to tractor or truck travel.

Vegetation is bushy savanna. Soils tend to be light, with low inherent fertility and poor water retention, and they are rotated with a fairly long fallow. Ground-water supplies are hard to tap, and there is widespread complaint about shortages of household water. Annual rainfall at Atebubu Town averages about 50 inches with a relatively dry period from November through February. Temperatures range from 70°F to 90°F and average about 80°F.

Volta Lake is 7 miles wide at Yeji and the ferry crossing there takes about 40 minutes. But the two ferries stationed at Yeji cannot accommodate the present volume of road traffic, even on the rare occasions when they are both in service. Delays of many hours, sometimes of days, are not uncommon, and north-south traffic is less than it would have been with an easier crossing. A ferry from Kwadjokrom to Keta Krachi crosses twice a day, but is closed frequently for repairs.

### *Transportation Facilities*

The main road, from Amantin to Yeji, is paved and the two secondary roads are kept open throughout the year (Map 1). No other roads are maintained regularly. Farmers themselves, individually or collectively, keep the tracks to their farms and villages open during part of the year.

Fields of about half of the farmers interviewed by Southworth in 1977 were within 2½ miles of the village, but 47 of the 404 said their fields were more than 7 miles from their houses, some up to 22 miles away. All but two of these farmers lived on a motorable road and 22 said that their farms were accessible by truck.

Produce is hauled from the fields in tractor-drawn carts. In many instances tractors haul the crops all the way to the market town. Southworth's survey of 404 District farms in July 1977 found 137 farms to be accessible by truck, 232 by tractor, while 33 could be reached only by foot.<sup>6</sup>

Most roads and tracks can be negotiated from November to May, but heavy summer rains raise streams and often isolate some areas. Farmers adjust their marketings to compensate for this seasonality in transport.

The fleet available to haul more than 17,000 tons of yams, rice, manioc, maize, and peanuts from the field in 1977 consisted of about 65 privately owned tractors, but no more than 50 were in operating condition at any one time. Government agencies owned another 45 tractors in the District, only half of which ran, and they were used occasionally to transport food crops for private traders.

There were also 42 privately owned trucks in the District in 1977. Most were of 3-ton capacity, but there were a few 5-ton and 7-ton vehicles. This small truck fleet probably carried a minor share of the produce moving out of the District, but it was important for local road haulage.

There is some evidence that shortage of long haul transport was more critical than shortage of tractors and trucks for local transportation. At one period during the 1977 harvest, yams accumulated more rapidly at Atebubu market than they could be evacuated to the south, and the flow of yams from farms to Atebubu had

<sup>6</sup> For two farms there is no information.

to be slowed down until the southern transporters could catch up. The difficulty probably resulted from congestion in Kumasi and Accra wholesale markets, as well as from shortages of vehicles.

The most serious problem facing the owners of trucks and tractors is maintenance and repair. The useful life of vehicles is short, and down-time is long. Spare parts are chronically in short supply throughout the country. Many tractor and truck importers use up to 50 percent of their import licenses for spare parts, but the scarcity persists. The shortage is made more critical by the numerous different makes of trucks and tractors that are imported. Mechanics, too, are scarce (cf. Schreckenber, 1976, p. 8).

The Volta Lake is a barrier to road transport, but it is beginning to serve in a limited way as a water route for farm-to-market transport. Forty-eight open boats of 4-ton to 5-ton capacity and powered by 20 horsepower outboard motors ply the shores of the lake out of Yeji on regular schedules. Their principal cargo is fish caught from smaller sailing boats of the lakeside villages, but manioc products (kokonte and gari) and yams are also carried. Produce comes from both sides of the lake and much of it moves north from Yeji.

#### *Market Facilities*

Market facilities in the District are modest. Markets meet weekly at Abease, Amantin, Atebubu, Kwame Danso, Prambo, Prang, and Yeji (see Map 1). All marketplaces have some covered stalls and three have locked stalls. None of the marketplaces is paved and all become unpleasantly muddy during the rains. Atebubu market, the largest, covers less than two acres. It has 120 retail stalls, 38 with locked storerooms. Three new locked storerooms have been reserved for grain wholesalers. Attendance during peak hours is from 3,000 to 4,000 buyers and sellers. The front of the market serves as parking lot and as assembly area for yams bound out of the District.

Atebubu, Amantin, and Prang have wholesale markets specializing in sale to buyers from outside the District, but there is no clearly defined wholesale marketplace. In Atebubu, which is by far the largest wholesale market, most trade in cereals and kokonte centers around the locked storerooms at the front of the market, although some wholesalers assemble supplies in their houses and may negotiate sales there. Yam traders are most likely to be found in the tree-shaded yam assembly area in front of the market area.

Telephone and telegraph are available in Atebubu and Yeji, as are banking services and facilities for minor repair of vehicles. Atebubu has three electricians, two mechanics, one welder, and one tire repair shop in addition to craftsmen in government employment. Motor fuel is normally available in all market towns but Abease.

### PRODUCTION AND MARKETING

Atebubu, Amantin, and Prang have wholesale markets specializing in Ghana's cities and for the cocoa farmers and loggers of the forest belt. The principal marketed crops are yams, rice, manioc (cassava), and maize, but there is also substantial commercial production of peanuts, market vegetables, and tobacco.



The only census of agriculture in Ghana is the Sample Census conducted by the Ministry of Agriculture in 1970-71. Sixty-three locations were sampled in Brong-Ahafo, stratified into three subregions. One stratum comprised Kintampo and Atebubu Districts.<sup>7</sup> Published estimates of planted acreage for Kintampo and Atebubu Districts in 1970 are given in the following tabulation (Ghana, 1972, p. 109):

<i>Crop</i>	<i>Acres</i>	<i>Percent of national acreage</i>
Maize, main season	78,000	8.6
Maize, second season	48,000	22.0
Rice	11,000 <sup>a</sup>	8.1
Manioc, main season	63,000	7.8
Yams	85,000	20.0

<sup>a</sup> Includes Wenchi District.

Atebubu is best known for its production of yams, but it is far from having a lion's share of national production.<sup>8</sup>

The area planted to crops in Atebubu District and, therefore, the output have probably increased over the last decade. The population increase of 24,000 or 37 percent from 1960 to 1970 and ratios of males to females of 1.24 and 1.19 in those census years can only be explained by large recent immigration. Work on farms for wages and the sale of farm crops are overwhelmingly the principal sources of income for the people of the District, and the principal employment of the immigrants must have been farming. Aerial photographs of the area north of the Kwame Danso road show many farms in a large area without villages, consistent with recent development. Lakeside populations as reported by the Census and as seen on aerial photographs are so small that not many of the immigrants could have been employed in fishing. The expansion of farming would surely be accompanied by increased marketings.

In a year-long Produce Movement Census in 1957/58, lorries were checked at Yeji, Buipe, and Bamboi ferries north of Kumasi and again at Asankare and Prasu to the south.<sup>9</sup> Poleman has estimated that annual net shipments out of the area enclosed by these checkpoints and centered on Kumasi totalled 11,000 metric tons of maize and a little over 4,000 metric tons of yams (1961, p. 165). Most

<sup>7</sup> Schedules that would permit the derivation of estimates for Atebubu District alone are no longer available.

<sup>8</sup> The Census acreage figures would indicate a production for all Brong-Ahafo in 1970 of 105,000 tons, if Bray's conservative estimate of one ton per acre is correct (1958, p. 30). Most farmers in Southworth's survey estimated one yam per mound. At 1,000 mounds per acre this would give 1,000 yams, from which, according to Bray and his associates, one should deduct 60 percent for smallness, immaturity, and losses in harvesting, leaving 400 saleable yams or about 1.5 tons per acre. At 1.5 tons per acre, Brong-Ahafo's production in 1970 would have been about 150,000 tons. The Census itself estimates yam yields for all Brong-Ahafo of 2.2 to 2.9 tons per acre on the basis of biological yields from randomly selected small plots. For a variety of reasons set forth by Bray this procedure is likely to lead to overestimates.

<sup>9</sup> Unfortunately there was no checkpoint on the Tarkwa road.

must have come from the savanna areas of Brong-Ahafo. Gould used the same data to estimate a gross annual outflow of yams from Atebubu District of about 5,000 tons but an inflow at Yeji of 2,000 (1960, p. 119). These figures are much below apparent sales of yams in recent years. A 1962 study estimated that 45,000 tons of yams were grown and 9,000 tons were sold in the Sene and Obosum River basins, which included Atebubu District south of the Kwame Danso Road.<sup>10</sup>

In an effort to obtain more reliable and detailed estimates of movement of produce out of the District, Southworth established checkpoints at Yeji and just south of Amantin in March 1977 and collected commodity flow data for 12 months through February 1978. A summary of these data is presented in Table 1.<sup>11</sup>

The checkpoint data are consistent with the hypothesis that District shipments, particularly of rice, are growing. Reports from the farm survey indicate a greater concentration on rice production in the eastern part of the District where 88 percent of all farmers grew the crop and in the area north and south of Prang where 68 percent grew it. These areas are relatively thinly populated and newly settled. In older, more densely populated areas around Amantin and Atebubu, slightly more than half of the farmers interviewed grew rice.

Yam shipments recorded at the checkpoints are also high compared with past estimates. Total shipments for the 12 months, March 1977 to February 1978, were over 10,000 tons.

The evidence that bears on trends in production and marketing of food crops in Atebubu District is sparse. But it points rather clearly to the conclusion that the trend is upward, not downward as Nyanteng and van Apeldoorn reported in their survey of foodcrop marketing in 1971, and strongly so for rice (1971, p. 145).

### THE MARKETING SYSTEM

The marketing task is to assemble commercial lots of food crops from small quantities offered by farmers over a considerable area that is poorly served by roads and other forms of communication. The median total sale of yams per Atebubu farm surveyed was about five tons; median total sale of paddy (unhulled rice) was less than two tons; and median total sale of maize was about one ton. Furthermore, farmers did not sell all of their commercial stocks at once, but spread their sales out though the crop year (see below, Charts 1 and 2). These commodities were shipped by truck to markets that were 100 to 300 miles to the south.

The percentage of production by farmers in Southworth's survey that moves into commercial channels (Table 2) is undoubtedly higher than for the District as a whole.<sup>12</sup> The proportion of the yam crop that is said to have been sold is

<sup>10</sup> See Smith (1962). These figures were based on a "Pilot Census in Agriculture: East Brong-Ahafo," published by the Economics Division of the Ministry of Agriculture.

<sup>11</sup> Virtually all produce leaving the District was carried on the main road either south through Amantin or north through Yeji. Very little was evacuated by water across the Volta Lake or through Kwadjokrom. Nevertheless, the figures in Table 1 are underestimates. An unknown number of trucks traveling at night was missed in the early months, and when a 24-hour watch was instituted the checker sometimes dozed on his job.

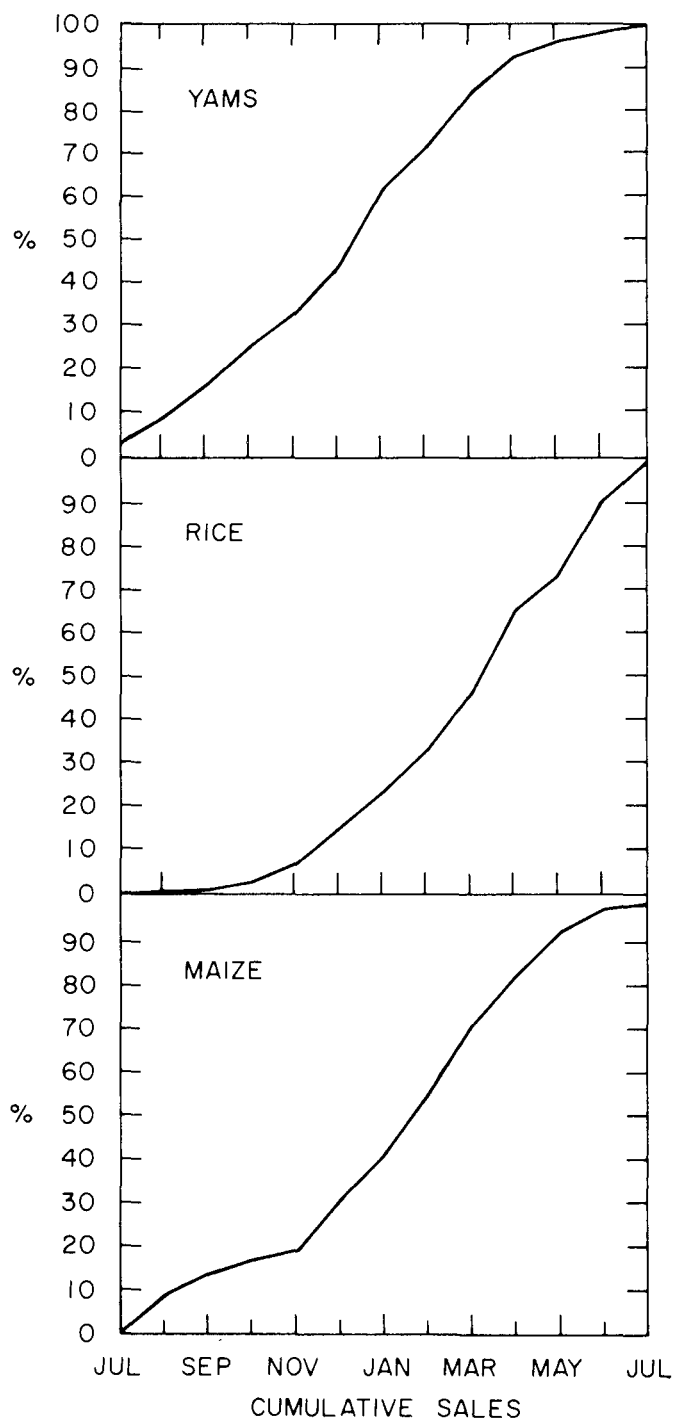
<sup>12</sup> Farmers often arrived at their estimates of production by summing their estimates of sales. It is also likely that the sample contained a disproportionately large number of the more prosperous

TABLE 1.—PRODUCE MOVING OUT OF ATEBUBU DISTRICT, MARCH 1977 THROUGH FEBRUARY 1978\*  
(Tons)

Commodity	Produce moving south at Amantin			Produce moving north at Yeji		
	Loaded in the District	Loaded elsewhere	Total	Loaded in the District	Loaded elsewhere	Total
Yams	10,514	12,052	22,566	134	1	123
Maize	1,128	170	1,298	200	4,831	5,031
Paddy rice	1,784	49	1,893	16	0	16
Milled rice	781	1,244	2,025	—	84	84
Kokonte	1,987	368	2,353	236	71	307
Peanuts	338	936	1,274	2	7	8
Gari	54	27	81	226	6	40
Pepper	123	17	140	33	7	40
Total	16,709	14,863	31,570	847	5,015	5,850

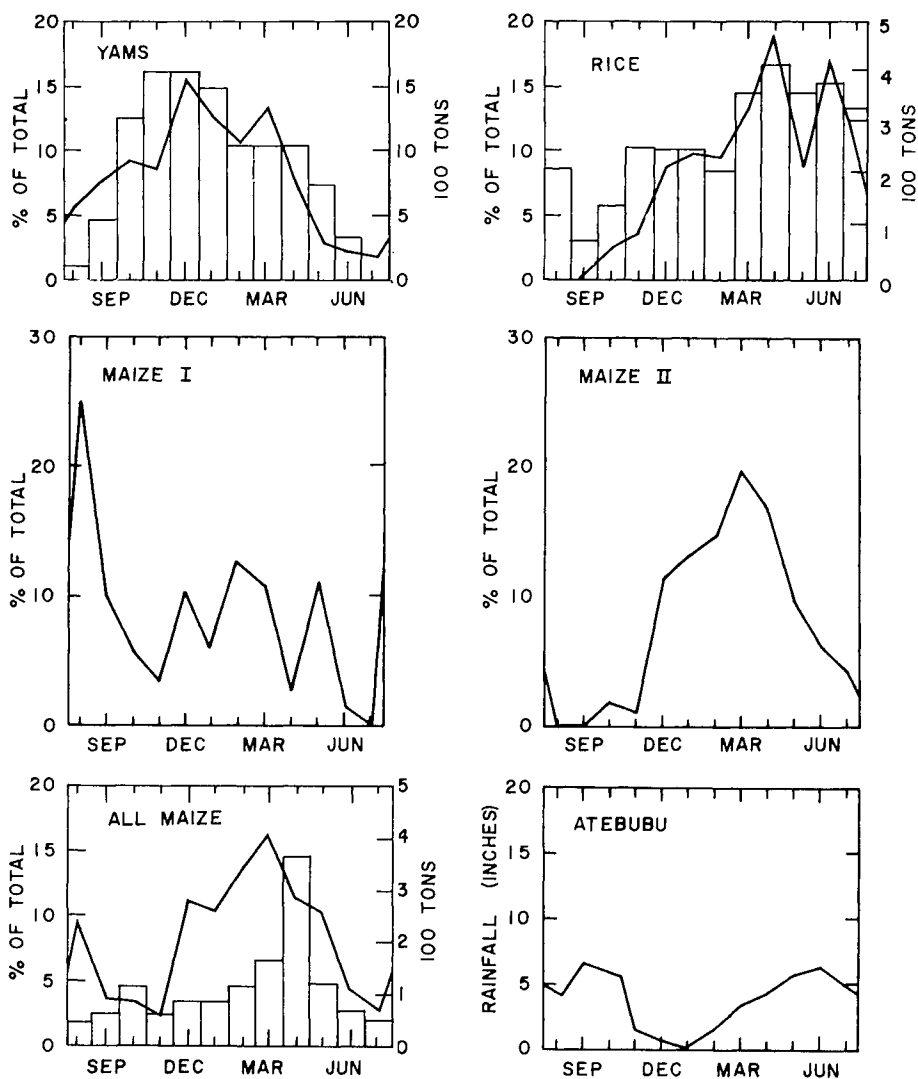
\*Source: See text.

CHART 1.—MONTHLY SALES BY 404 ATEBUBU DISTRICT FARMERS, 1976/77\*  
(Percent of total sales from 1976 crop)



\*Source: See text.

CHART 2.—MONTHLY SALES OF 404 ATEBUBU FARMERS, 1976/77,  
MONTHLY SHIPMENTS OUT OF THE DISTRICT,  
MARCH THROUGH NOVEMBER 1977,  
AND AVERAGE MONTHLY RAINFALL, ATEBUBU\*



\*Source: See text. Solid lines show percent of total sales from 1976 crop. Bars represent total tonnage passing through Yeji and Amantin and are from checkpoint count. Rainfall is from Ghana Meteorological Service. Milled rice is converted to paddy equivalent at a milling ratio of .6.

consistent with this crop's position as the preferred starchy staple of the area.<sup>13</sup> Rice and maize, on the other hand, are more peculiarly cash crops, although a significant amount of these staples, too, even in the biased sample, appears to be eaten by those who grow them.

### *First Point of Sale*

Farmers sell most of their yams, rice, and maize in the village or field and the buyer takes delivery there. Purchasers are Atebubu or Amantin assemblers and "foreign" wholesalers, occasionally retailers, from outside the District. Farmers' sales of yams, rice, and maize in the marketplace are small and are mostly to traders. Farmers are more apt to sell lesser commodities like kokonte and peanuts in the marketplace, although the degree to which this is so varies with distance from a major market.

Many Kumasi yam traders buy directly from farmers, particularly in the area around Kwame Danso, thus competing directly with local assemblers. Nearly all rice and maize, on the other hand, is bought by local assemblers. This difference in marketing is apparent in Table 3 which shows where trucks passing through the Amantin checkpoint were loaded. The large tonnages of yams coming from

TABLE 2.—HARVEST AND SALES OF MAJOR CROPS REPORTED BY  
404 ATEBUBU FARMERS FOR THE PERIOD JANUARY 1976 TO JUNE 1977\*  
(Tons)

Commodity	Harvest <sup>a</sup>	Sales as a percentage	
		Sales	of harvest
Yams	4,291	2,238 <sup>b</sup>	52
Rice	665	587	88
Maize	548	476	87
Kokonte	—	23	—
Peanuts	96	80	83

\*Source: See text. Average weight of yams, 8 lbs., bag of rice, 180 lbs., bag of maize, 240 lbs., bag of kokonte, 130 lbs., bag of peanuts, 180 lbs.

<sup>a</sup>Harvest figures are much less reliable than sales because of the considerable amount held for own consumption.

<sup>b</sup>Assuming 110 tubers per hundred.

farmers. Selection of villages was random within strata, but for selection of farmers within villages it was necessary to rely on local leaders, and they inevitably thought of the more prosperous farmers first.

<sup>13</sup> The proportion of yam production sold by the 404 sample farmers is much higher than that implied by the 1970 Sample Census of Agriculture and by Bray's yield estimate. If yam acreage in Kintampo and Atebubu Districts was in proportion to their populations, Atebubu District had 48,000 acres of yams; if it was in proportion to the number of households, there were 55,000 acres in the District. At one ton per acre—Bray's conservative estimate—production was from 48,000 to 55,000 tons, or about 5 times the measured shipments out of the District in 1977-78.

TABLE 3.—ORIGIN WITHIN ATEBUBU DISTRICT OF PRODUCE PASSING THROUGH AMANTIN CHECKPOINT,  
MARCH 1977 THROUGH FEBRUARY 1978  
(Tons)

Truck loaded at	Yams	Paddy rice	Milled rice	Maize	Kokonte	Peanuts	Total
Amantin	1,568	377	107	433	581	206	3,282
Atebubu	4,906	1,031	161	524	1,027	103	7,752
Kwame Danso	2,109	160	79	19	63	6	2,436
Prambo	474	1	23	20	59	2	579
Prang	293	200	389	62	50	3	997
Yeji	141	2	16	11	158	16	344
Other	1,023	13	6	49	49	2	1,142
Total	10,514	1,784	781	1,128	1,987	338	16,532

\*Source: See text.

Kwame Danso were purchased at the farm and hauled by tractor to Kwame Danso to make up loads for shipment to the south. Rice marketings in the Kwame Danso area are more important than is indicated in Table 3, because much rice is hauled directly to Atebubu for shipment out of the District.

### *Market Chains*

Market chains within the District are fairly short, and they probably are so in the areas that receive District produce. Diagrammatically the chains are:

1. Farmer → consumer
2. Farmer → retailer → consumer
3. Farmer → resident assembler → retailer → consumer
4. Farmer → resident assembler → foreign wholesaler → The South
5. Farmer → foreign wholesaler → The South
6. Farmer → foreign retailers → The South

Chains 4 and 5 are most important. Local demand, indicated by chains 1, 2, and 3, plays a small part, accounting for no more than 15 to 20 percent of the marketed production.

Declared destinations of trucks leaving the District are shown in Table 4. The importance of Kumasi is marked, but much of the rice milled in Ejura ends up in Accra, and much of the produce destined first for Effiduase, Ehiawoeno, Konongo, Ntonso, and even Mampong may be sold there to Accra buyers. It is not clear how much produce reported as destined for Kumasi is resold there to more southerly markets.

### *Wholesale Trade*

The wholesale trade in Atebubu District is characterized by commodity and ethnic specialization. Northerners, mostly Dagomba, Hausa, and Gonja, dominate the grain and kokonte trade, and Akan-speaking southerners dominate the yam trade. Women outnumber men in the wholesale trade, but the larger traders in grain and kokonte are most often men. A few Akan and northern men trade in yams.

*Traders' organizations.*—Each yam seller typically trades on her own account, although two or three may go together to hire a truck. The yam sellers association in Atebubu has 87 members and the one in Amantin has 20. The associations' most important roles are to regulate disputes among their members and to represent the yam sellers before the local authorities. They provide some storage and protection from theft to their members, and they occasionally intervene to balance the flow of produce to the availability of transport. Associations are also used to assist members who face financial difficulties that threaten to wipe out their working capital.

Most large grain traders and almost all brokers in Atebubu are members of one of three "companies." The largest company has three senior partners who each contributed £6,000 (*cedis*) to working capital.<sup>14</sup> Three junior partners who have

<sup>14</sup> The official exchange rate in 1977 was £1.15 per U.S. dollar.



TABLE 4.—DESTINATIONS OF ATEBUBU DISTRICT PRODUCE MOVING SOUTH THROUGH AMANTIN CHECKPOINT,  
MARCH 1977 THROUGH FEBRUARY 1978\*  
(Tons)

Town	Yams	Paddy rice	Milled rice	Maize	Kokonte	Peanuts	Total
Accra	768	28	16	286	879	5	1,982
Effiduase	329	40	16	11	15	36	447
Ehiawoenu	25	339	18	14	—	21	417
Ejura	472	661	64	16	50	115	1,478
Koforidua	719	2	0	18	19	1	759
Konongo	110	1	1	6	2	4	124
Kumasi	7,074	651	660	663	901	111	10,060
Mampong	261	20	5	1	17	17	321
Ntonso	63	18	1	4	10	6	102
Other	693	24	0	9	94	22	842
Total	10,514	1,784	781	1,128	1,987	338	16,532

\*Source: See text.

not contributed to working capital are in charge of the storeroom and assist in buying and selling. Four other men are employed as carriers and grain handlers and are paid by the task. The company assembles commodities from farmers and buys from other assemblers for sale in the Atebubu market. Its members act as commission selling agents for both assemblers and farmers. Profits are shared among the partners, the senior partners taking about two-thirds and the junior partners one-third. About 40 percent of each market day's profits, including commissions, is distributed among the partners at the end of the day. The remaining 60 percent is accumulated for distribution at the end of the Muslim year.

The second company consists of three Hausa men whose principal business is commission selling and an Akan man who is an assembler and rents a locked storeroom. The Akan assembler entered into formal partnership with the three Hausa commission agents when he was allocated one of the new storerooms at the front of the market. He pays the rent and receives a share of the profits from commission sales. When the Hausa dillali trade on their own account, profits are not shared with the storekeeper.

The third group handles a smaller volume of grain than the other two and does not sell on commission. The head of the company supplies all the working capital, while four partners help in buying and selling. Profits are shared among the partners after each market meeting, with the head taking 40 percent and the others 15 percent each.

*Buying practices.*—Sales made in the village may originate with either the farmer or the trader. When the farmer is ready to sell he calls on or sends word to an assembler, usually someone he has dealt with before, but sometimes to a trader who has been recommended by a friend. Occasionally, a buyer traveling from village to village in search of supplies makes the initial contact with a farmer on the basis of information from his other suppliers or from buying agents. Visual inspection is required whenever title is transferred because there are no generally recognized quality standards or units of sale.

Yams vary greatly in size and quality, so that there is wide latitude for bargaining. They are stacked customarily into piles of 110 similar sized tubers of one variety for inspection by the buyer. The farmer begins negotiations by stating his asking price. The negotiation is essentially private, although it may be observed by other farmers. Important factors entering into the negotiation include size and quality of the yams and transportation costs. If agreement is reached, the trader travels back to the nearest market to arrange for transport from the farm.

Prices of grains are less variable because the bag supplied by the trader provides a fairly standard unit of measure, although bags are often overfilled. In many instances the extra amount represents the traders' margin because the same price may be paid for the overfilled bag at the farm as for a sealed bag in the market.

When purchase agreements have been completed, the buyer arranges to haul the commodity to market. Typical tractor transport charges for yams from villages in the District to Atebubu vary with condition of the roads and distance, ranging in 1977 from £1.52 to £5.10 per ton-mile.

*Brokers.*—The services of brokers are utilized all along the marketing chain.

Brokers often are employed to locate supplies and establish initial contact with potential sellers, occasionally to complete the purchase. They are paid about ₵0.40 to ₵.60 per bag for grains and from ₵1 to ₵2 per 100 for yams. Brokers are also present in the wholesale markets on each market day where they sell commodities for assemblers and farmers alike. Regular market attendance gives the brokers an advantage in assessing market information and dealing with potential buyers (Jones, 1972, pp. 252-57). Brokers often facilitate credit transactions by guaranteeing credit sales and stand witness to the terms of a transaction. Furthermore, most brokers trade on their own account. Grain traders smooth price fluctuations and the flow of produce by holding stocks for a short time during slack periods and selling them later for a small profit, an option not open to yam traders because yams deteriorate rapidly unless they are held in proper storage.

*Volumes handled.*—The volume handled by assemblers can be substantial. The largest grain assembler interviewed claimed to have ₵20,000 available for grain purchases, or enough to buy about 16 tons (160 bags). Mean weekly volume handled by 57 assemblers of grain and kokonte was 26 bags. Capital available to these assemblers averaged ₵2,800 (based on 35 interviews). The average weekly volume for 47 yam assemblers was about 1,100 tubers (4 tons) and average capital availability was approximately ₵1,935.

Rice processors, mostly northern women, handled about 40 percent of the District's marketed rice crop in 1977-78. They buy paddy from farmers and from assemblers, parboil it, and pay to have it hulled at one of the small mills. They sell to resident retailers and to foreign retailers and wholesalers. A few engage dillalis to sell for them in the Kumasi market. Weekly turnover typically does not exceed five bags.

Assemblers and processors earn their living from rapid turnover of their capital. During peak buying periods most assemblers attempt to turn over their stocks weekly. Few store speculatively, although they sometimes hold stocks when sudden price drops face them with a loss. However, most do not view storage as part of their business or as a means to earn profits.

### *Entry into Trade*

Most assemblers and processors enter the trade as apprentices to a relative or close acquaintance. Female traders commonly serve as apprentices to their mothers, although they can be apprenticed to a sister or husband, introduced to trading by friends, or put in the case of a merchant who teaches them to trade. About 70 percent of the assemblers who were interviewed served as apprentices. Apprenticeship was most common among the Kumasi yam assemblers.

The apprenticeship period usually lasts from one to two years, during which the apprentice is taught fundamental trading skills and is put in contact with a number of farmers who eventually become her suppliers. A child apprentice later becomes a partner of her master or mistress, assuming control of the business when the older partner can no longer trade. A number of male assemblers said they began trading as an outgrowth of their own farming operations, first marketing their own produce and later buying crops from acquaintances. Several

assemblers still farm on a part-time basis although they earn most of their income from trading.

Traders often receive part or all of their initial capital from relatives—mothers, husbands, aunts, and uncles. Some contributions are loans to be paid back during the first few years of trading, but most are outright gifts. Most traders who did not receive financial help from relatives said they used their own savings. A few relied heavily on credit purchases to build their working capital.

The average age of Kumasi yam assemblers interviewed was 34, of local yam assemblers 40, and grain assemblers 45. The oldest grain assembler interviewed was in her seventies. The average number of years of experience ranged from nine for the Kumasi yam assemblers to 17 for grain assemblers. Several traders claimed to have careers spanning 25 years or more.

### *Credit*

Trade at all levels of the marketing chain is facilitated by credit. Careful use of credit permits a trader to establish a network of friendly suppliers in several villages who also put him or her in touch with other farmers.

On occasion farmers extend credit to traders, receiving payment after the commodities are sold. Assemblers sell on credit to their regular wholesale customers and sometimes are advanced money by them. Wholesalers also extend credit to retailers in the terminal markets. Completing the chain, retailers sell on credit to regular customers.

These routine credit relations expand traders' ability to take advantage of commercial opportunities that their otherwise limited working capital could not cover. They also involve an element of risk sharing. If the borrower finds that she cannot resell her produce without facing a loss, she can sometimes arrange with the supplier to reduce the original purchase price. In times of price uncertainty credit can be a means by which the risk of loss is shared along the marketing chain. This sharing can also extend back to the farmer if he has given his crop to an assembler for later payment. Sharing of risk through renegotiating purchase prices also occurs in credit sales. Prices in cash sales are final.

As a percentage of total volume, the quantity of farm purchases directly secured through extending credit to producers is typically low. The capacity of traders to lend to farmers is limited. Most can make only seven to ten loans totaling ₵1,400 to ₵2,000. More would cause shortages of working capital.

Of the 404 farmers interviewed, 238 (59 percent) borrowed from banks, friends, relatives, traders, or money lenders. Sixty farmers borrowed from more than one source. The numbers of farmers who customarily borrow from each source are shown below:

<i>Source</i>	<i>Number of farmers</i>
Agricultural Development Bank	110
Traders	112
Friends and relatives	78
Money lenders	6
Other	1
Total loans from all sources	307

The group credit scheme of the Agricultural Development Bank (ADB) has increased credit availability to producers, but there is no evidence that ADB loans have decreased loans by traders.<sup>15</sup> In fact, the survey shows that 32 percent of those borrowing from the ADB also borrowed from traders.

Detailed information was recorded about 133 loans made by traders to 112 farmers (Table 5). Fifty-eight of the loans were for yams, 49 for rice, and 16 for maize. The remaining 10 were for manioc, peanuts, or combinations of crops. Traders secure the right to buy the commodities for which the loan is made, but the terms are typically negotiated at time of purchase. The farmer is expected to inform the trader when he is ready to sell. The price is then negotiated, and the amount of the loan is deducted from the total amount to be paid.

The median loan is less than £200, although loans of up to £4,000 were reported (Table 5). Duration of loans is typically for the crop season. While most farmers pay off their loans in cash, some pay partly or entirely in kind. Less common forms of repayment include a predetermined amount of commodity to be given in return for a loan or a repayment partially in cash and partially in kind. These arrangements are usually for grain because of the difficulty of establishing a predetermined quantity of yams to repay.

Of the 133 loans, 20 were repaid in kind, 10 in cash and kind, and 103 in cash. Interest was not large. No explicit interest was charged on 78 of the 103 cash repayments, although implicit interest may be built in by custom.

### *Bargaining Position of Farmers*

In their study of Atebubu and Mampong Districts in 1971, Nyanteng and van Apeldoorn concluded that many farmers were at a bargaining disadvantage because of the poor transportation system (1971, p. 110). Southworth tested this conclusion in his farm survey of 1977. Farmers were asked directly whether they had difficulty finding buyers when they wanted to sell produce, whether at the end of the crop year they ever bought back food crops that they had sold earlier and why they did so, whether they sold crops before harvest, and how they knew what prices were when they decided to sell. A summary of the answers to these questions is given in Table 6.<sup>16</sup>

Of the 404 farmers who were interviewed, only 16 said that buyers were not usually available when they wanted to sell. These results do not confirm the hypothesis that poor roads and shortages of vehicles have reduced farmers' bargaining advantage and sales opportunities. A companion question about prices found only 90 farmers willing to say that they knew what prices were at the time they were interviewed. (July when few had anything to sell.) The next question about sources of price information is more informative. It sketches a

<sup>15</sup> The ADB branch in Atebubu began lending to traders in 1976. Loans are made to individuals or to groups. Total loans to groups (yam traders and fish traders only) in 1977 amounted to £101,600. Loans totaling £110,600 were also made to 38 individuals in that year. The largest, £30,000, was to a food contractor, and two others amounted to £20,000 and £10,000. The rest were in the range of £1,000 to £1,500. Two-thirds were to yam traders.

<sup>16</sup> Some questions were open ended and the coded tabulation conceals nuances.

TABLE 5.—SIZE OF LOANS MADE TO FARMERS  
BY TRADERS, 1976/77

Amount (cedis)	Number of loans	Percent of loans	Amount loaned (cedis)	Percent of otal amount loaned
Less than 100	32	24.1	2,425	4.3
101-200	40	30.8	7,240	12.7
201-300	8	6.0	2,360	4.1
301-400	19	13.5	7,480	13.1
401-600	11	8.3	6,150	10.8
601-800	4	3.0	3,200	5.6
801-1,000	10	7.5	9,640	16.9
1,001-1,500	3	2.3	4,100	7.2
1,501-4,000	6	4.5	14,400	25.3
Total	133	100.0	56,995	100.0

\*Source: See text

picture of farmers who are at ease in commercial transactions, who know how to find what prices are when such information will be of use, and of a few who think they can influence prices so as to cover their "production costs." Only 58 out of 394 farmers who answered this question named traders as a source of price information.

Another frequent criticism of the farm marketing system alleges that farmers must buy back at high prices late in the season those same foodstuffs they sold early in the year to pay their creditors. When asked this question directly, 23 Atebubu District farmers out of the 393 who replied (5.9 percent) said that they did in fact sometimes buy produce late in the season like that they hold sold earlier. The reasons given by all but one, however, suggest that they were simply letting someone else pay the cost of the storage. They were able to do so because they lived on year-round roads or in market towns and could easily buy what they needed.

### PRICE ANALYSIS

Effectiveness of the system for marketing food crops grown in Atebubu District can be tested further by analysis of arbitrage over time and space, specifically of the extent to which seasonal price increases approximate the cost of storage. Efficiency is reduced to the extent that traders have sufficient monopoly power to depress prices at harvesttime and to hold them artificially high at the end of the season. Analysis of intermarket price correlation and examination of trading practices, especially of farmers, provide further bases for evaluating the marketing system.

TABLE 6.—SALES PRACTICES AND OPPORTUNITIES OF 404  
ATEBUBU DISTRICT FARMERS INTERVIEWED IN JULY 1977\*

<i>When you were ready to sell, were buyers always available?</i>	
Yes	387
No	16
No response	1
<i>After you sell the crop you grew, do you ever have to buy the same crop for yourself at a later date?</i>	
Yes	23
No	370
No response	11
<i>If yes, why?</i>	
Not enough storage capacity.	22
Poor harvest.	1
<i>Do you ever sell your crops before harvest?</i>	
Yes	9
No	395
<i>If yes, why?</i>	
No time to harvest myself.	5
Sell to gari maker.	1
Need money before harvest.	2
Other	1
<i>Do you sell to the same people each year?</i>	
Yes	119
No	282
No response	3
<i>If yes, why?</i>	
Buyer gives financial aid.	116
Buyer gives physical assistance in farming.	3
<i>Do you know what prices are currently being paid in the market for the crops you grow?</i>	
Yes	90
No	314
<i>When you sell your crops, how do you learn what price to charge?</i>	
Other farmers tell me.	128
I check in the market.	160
Relations or friends tell me.	8
I set the price so as to give me more than the crop cost to grow.	40
From buyers.	58
No response.	10

\*Source: See text.

*Seasonality and Storage*

Chart 1 shows the cumulative sales of yams, rice, and maize as reported by farmers, and Chart 2 compares reported monthly sales with movements of these commodities through Amantin and Yeji checkpoints. There is considerable difference in the timing of sales of each commodity.

Farmers in Atebubu District produce several varieties of yams with differing planting dates, time to maturity, and storability. Harvest extends from September (puna yams) to January (water yams), and marketing is at a fairly high rate from September to May. Yams are stored only by farmers. Hence, records of monthly farm sales, so far as they are accurate, also depict monthly supplies moving into retail positions, with a lag of 3 or 4 weeks. Yams are available in Ghanaian markets throughout the year, but the flow to market slackens as the crop year goes on.

The monthly pattern of maize marketing is more complex. The so-called major crop (Maize I) is harvested in June and the minor crop (Maize II) in September and October (Chart 2). Maize II is more important than Maize I in Atebubu District, and important quantities are sold from December through May. More than half of the crop is sold in the first three months, more than three-fourths in five months. Sales of Maize I as reported by farmers were quite different. One-fourth of the crop was sold in the first month, but it required four more months to sell half of the crop and almost eight months to sell three-fourths.

There is only one rice harvest, and farmers release their supplies at a fairly steady rate over the following nine months.

Manioc can be harvested in every month of the year, and kokonte probably has a shelf life of little more than a month. Seasonality and storage between harvests, therefore, are not significant problems, although seasonal availability of labor might affect supplies.

It is well established that the timing of farm marketing is affected by a complex of forces and that a major reason for holding stocks is farmers' expectations that prices will rise as the crop year progresses (Jones, 1972, pp. 102-03). This finding is confirmed by the farmers who were interviewed in Atebubu District as shown below.<sup>17</sup>

	<i>Number</i>
<i>Reasons for storing</i>	
Waiting for the price to rise	212
Holding until cash is needed	53
Waiting for transportation	7
Cannot sell after harvest because road is flooded	33 <sup>a</sup>
<i>Reasons for not storing</i>	
Need the money	39
No storage facilities	21
Afraid of theft	1
No report	43 <sup>b</sup>

<sup>a</sup>Reported from half of the villages, but from only 4 on primary or secondary roads.

<sup>b</sup>Of which 9 were in Atebubu.

<sup>17</sup> In a period of rapid inflation there is also a preference to hold financial reserves in the form of a commodity rather than as cash or in bank deposits.



TABLE 7.—INDEX OF MONTHLY WHOLESALE PRICES OF YAMS,  
PADDY, MAIZE, AND KOKONTE IN ATEBUBU MARKET,  
1965-74\*

	J	F	M	A	M	J	J	A	S	O	N	D	Range
Yams, mean	104	111	109	126	135	139	90	67	66	67	91	95	73
Standard deviation	11	20	10	19	17	20	28	15	16	15	16	22	
Paddy, mean <sup>a</sup>	91	93	96	105	111	110	109	109	110	99	85	82	29
Standard deviation	10	15	5	12	8	11	16	30	13	6	9	11	
Maize, mean <sup>b</sup>	97	99	104	125	141	136	102	74	66	78	92	90	75
Standard deviation	9	8	7	18	14	26	15	10	6	10	11	6	
Kokonte, mean	101	103	83	83	97	102	103	120	126	103	95	83	43
Standard deviation	42	40	13	13	14	18	15	54	51	26	23	12	

\*Based on data from Ghana, Ministry of Agriculture, *Monthly Food Situation Report* (title varies), July 1965 to March 1974. Index is average monthly percentage of twelve-month moving average.

<sup>a</sup>January 1969 to July 1974.

<sup>b</sup>January 1968 to March 1974.

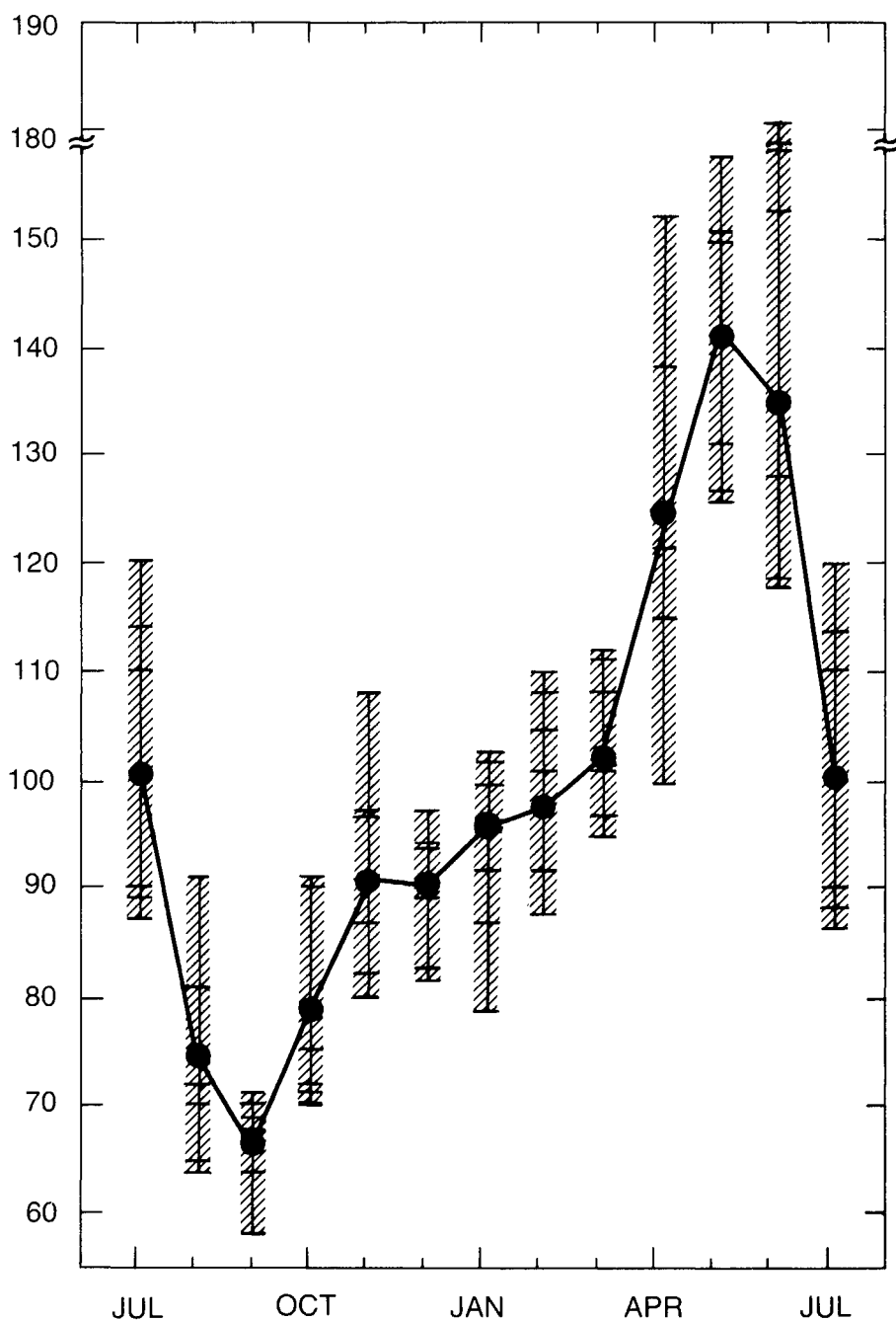
The importance of speculative storage in expectation of a price rise can be seen by comparing the timing of farm marketings as reported in the farm survey with the seasonal behavior of wholesale prices at Atebubu during the period for which prices were available. Seasonal indexes of the wholesale prices of yams, paddy (unhulled rice), maize, and kokonte at Atebubu from June 1965 to March 1974 are shown in Table 7. They show a doubling of prices from harvest to pre-harvest for yams and maize, and increases of 35 percent for paddy and 50 percent for kokonte. But the standard deviations of these indexes are also large, reflecting the fact that the price series from which they are calculated are short and cover disturbed times.

In examining the impact of seasonal price changes on Atebubu farmers, therefore, it is helpful to consider year-to-year variations in the departure from trend. Their magnitude is implied, of course, by the standard deviation. But the farmers' views of seasonal price variations are more likely to be in terms of price relationships in individual years. This phenomenon is illustrated for maize in Chart 3, where short horizontal bars show price as a percentage of trend in each year and large dots show the mean monthly value for the nine years. The year-to-year variation is large. In July the wholesale price of maize might be 13 percent below the year's average or as much as 20 percent above it. In August the value ranged from 23 percent above to 14 percent below. The price of maize in some years could easily have been higher relative to trend in August than in the preceding month, and, if the trend is ignored, August prices could often be above July prices, especially in a period of inflation. If farmers have some general awareness of the persistent rise in prices between harvests, as they almost certainly must, then the information that they have to work with is probably something like that shown in Chart 3. As displayed there, August, September, and October price expectations would not differ much among themselves, but they clearly would differ from expectations about prices in April, May, and June. At the same time, expected price in July must be quite uncertain.

Reports of monthly marketings of the two maize crops, as depicted in Chart 2, give some confirmation of this notion about farmers' price perceptions. Pressure for money induces farmers to sell about one-fourth of their Maize I crop at once, even though prices then can be expected to be low. Thereafter, stocks are held as long into the summer months as money requirements permit, with the consequence that slightly more than one-fourth of the crop is sold from March through June. Consideration of the prices when the second maize crop is marketed suggests that its peculiar popularity with Atebubu District farmers, who grow more maize in the "minor" season than in the "major" season, stems at least in part from differences in price expectations. Maize II is harvested in September and October. More than half of the maize crop marketings occur in the period March through July, although this timing of sales requires holding stocks for up to nine months.

Similar behavior may be observed in yam marketing. One-fourth of the crop is held in expectation of higher prices until March or later. Because it costs less to store rice and because rice is probably less important than yams and maize in local diets, two-thirds of rice marketings can be postponed until the period of higher

CHART 3.—MONTHLY WHOLESALE OF MAIZE IN ATEBUBU, 1965 to 1974\*  
(As percent of trend)



\*Source: Ghana, Ministry of Agriculture, *Monthly Food Situation Report*, various issues. Horizontal bars show prices in individual years, large dots show monthly averages for the period.

prices in March through July, from four to six months after harvest. That stocks of maize, rice, and yams are not held even longer into the period of expected high prices is undoubtedly due to the increasing difficulties of transportation in the rainy season. All in all, Atebubu District farmers seem well able to adjust their sales so as to take good advantage of anticipated price rises.

It is frequently asserted that merchants exploit farmers through their ability to promote great seasonal variation in prices. Seasonal rises in District prices are in fact large. For yams, though, they are quite consistent with the cost of storage. Yams require storage conditions—protection from excessively high temperatures and provision of adequate ventilation—that can be met much more easily on the farm, and virtually all of the crop is stored there. Even under these conditions, “very serious losses in weight occur” and may be from 30 to 50 percent after six months (Coursey, 1967, p. 180). Despite the extended harvest, therefore, prices tend to rise a great deal in the course of the crop year.

Seasonal increases of maize prices are very high, and rice prices, too, rise considerably for a food grain. But there is no evidence that stocks of either of these crops are being accumulated by traders so that they can manipulate prices and obtain a return much greater than the cost of storage. On the contrary, as Charts 1 and 2 show, stocks are mostly held by farmers and released at a fairly constant rate. It is difficult to see how farmers could collude to exaggerate the seasonal price rise, although ignorance of the true size of a short crop could produce this effect. It seems hard to escape the conclusion that the cost of storing maize and rice is high in Ghana because of poor storage conditions.

### *Market Integration*

An impression of how well the national marketing system for domestically produced food crops performs and of how well Atebubu District is integrated into the national system can be obtained by examining the extent to which prices in various market towns are related. The analysis presented in this section depends on wholesale prices reported from June 1965 to September 1974 for the 16 market towns with the most complete records (Map 2).<sup>18</sup>

*Spatial arbitrage.*—As a test of spatial arbitrage, the correlation over time of wholesale prices in pairs of markets was calculated for each of four commodities—yams, rice, maize, and kokonte. A large number of high correlation coefficients between pairs of markets is indicative of a high level of market integration, although there is no statistical test of significance of these results. More important may be the information about how the marketing system is organized and the principal financial connections between supplying and receiving markets that is provided by mapping at high levels of correlation (Chart 4).

Table 8 shows the distribution of correlation coefficients so calculated. Their general level proved to be markedly higher than had been obtained in a similar study in Nigeria based on retail prices from 1952 to 1967 (Jones, 1972, p. 141). This result arises partly from the fact that the present study examines prices only

<sup>18</sup> The Ministry of Agriculture has published records of wholesale prices since 1954, with an interruption in the early 1960s. Publication of market prices stopped again in 1974, but prices are still being collected by the Ministry. Retail food prices have been reported for a shorter period and for fewer towns.

CHART 4a.—INTERMARKET CORRELATION OF WHOLESALE PRICES: MAIZE\*

MAIZE CORRELATIONS  
 $\geq 0.90$ 

• TAMALE

BIMBILA •

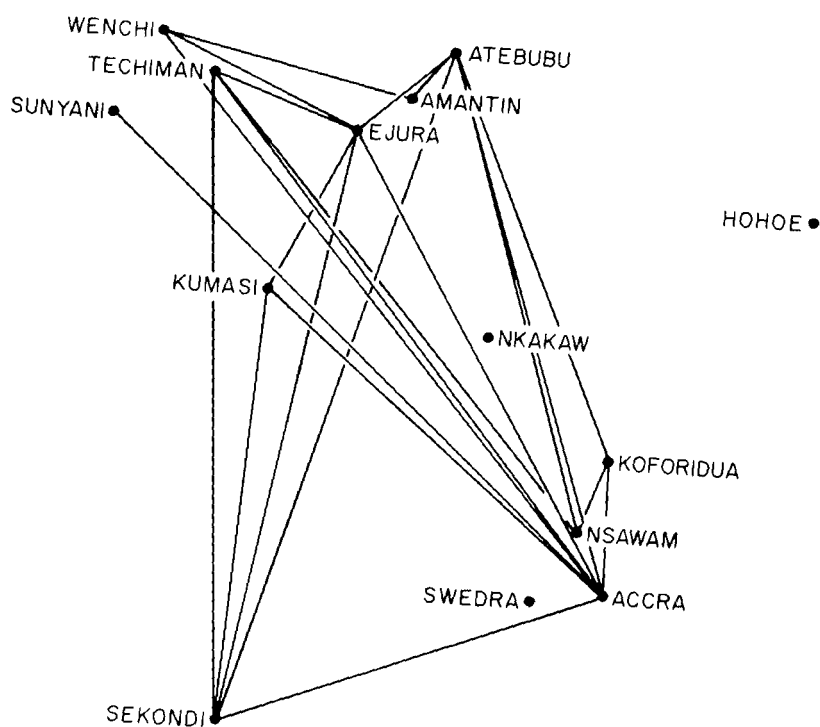
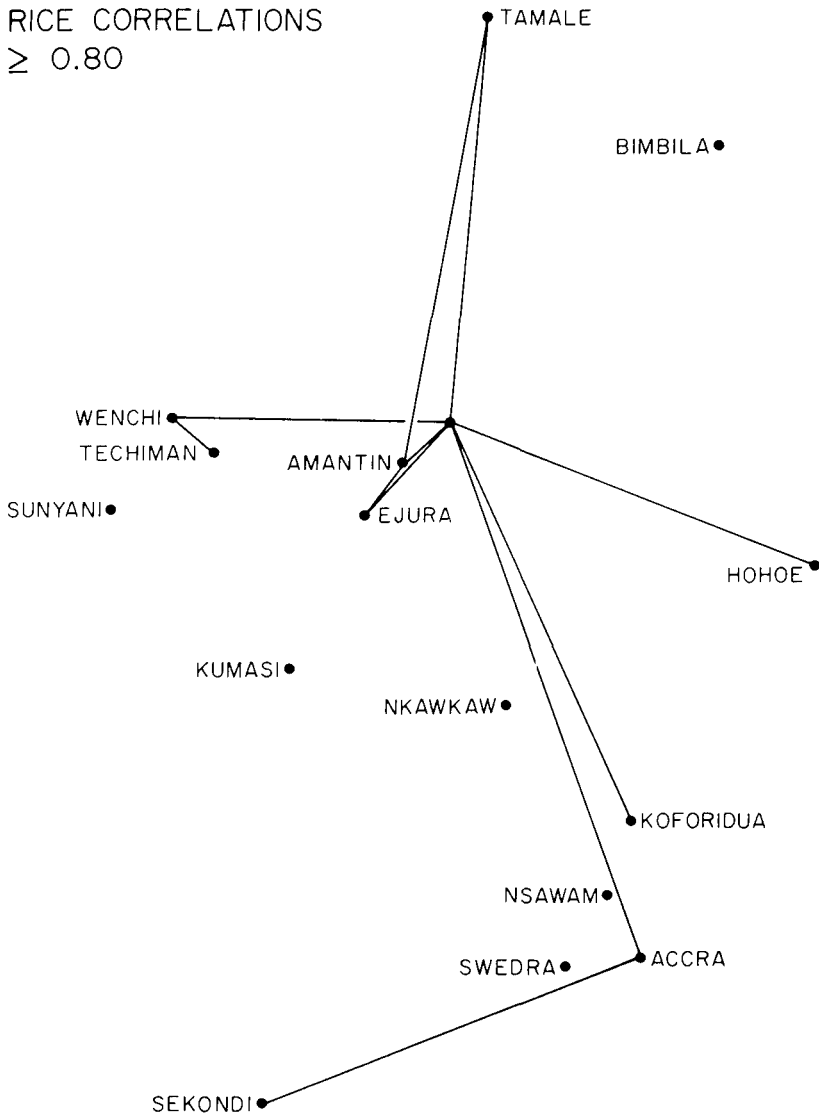
\*Source: Ghana, Ministry of Agriculture, *Monthly Food Situation Report*, various issues.

CHART 4b.—INTERMARKET COERELATION OF WHOLESALE PRICES: RICE

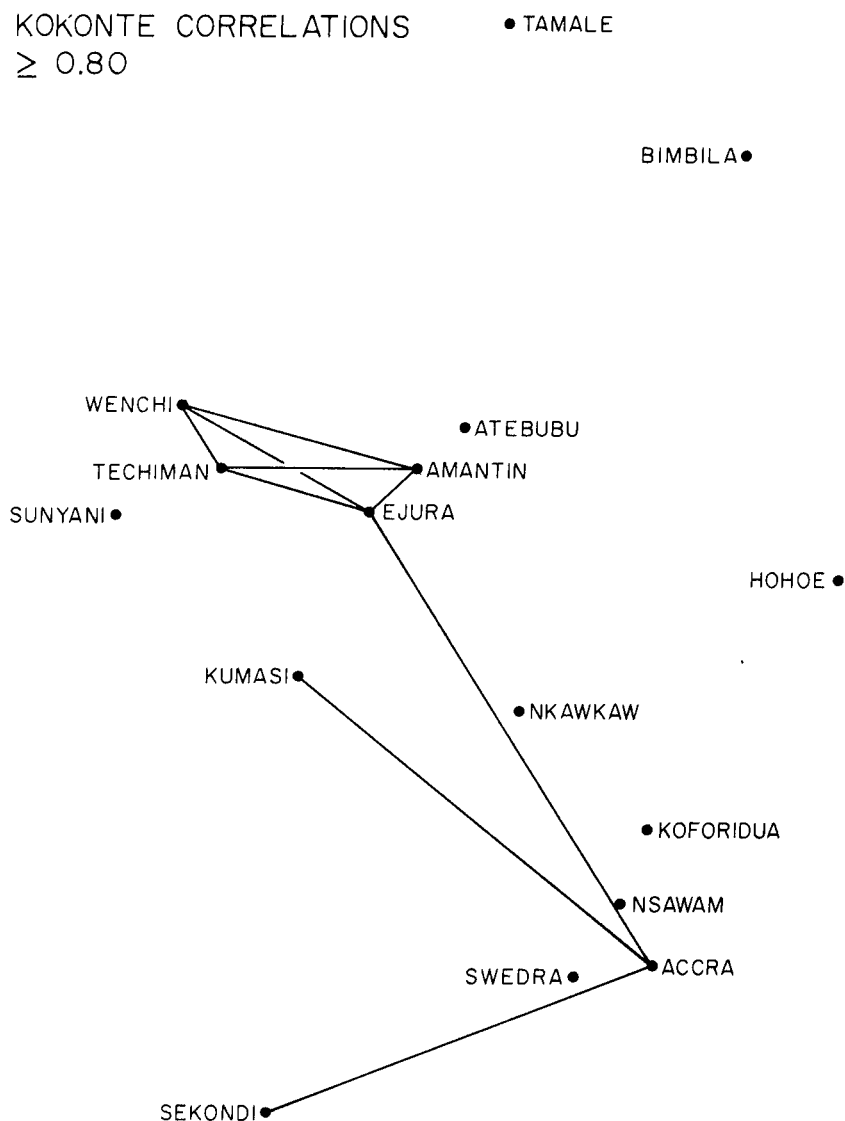
RICE CORRELATIONS  
 $\geq 0.80$



\*Source: Ghana, Ministry of Agriculture, *Monthly Food Situation Report*, various issues.

CHART 4c.—INTERMARKET CORRELATION OF WHOLESALE PRICES:  
KOKONTE\*

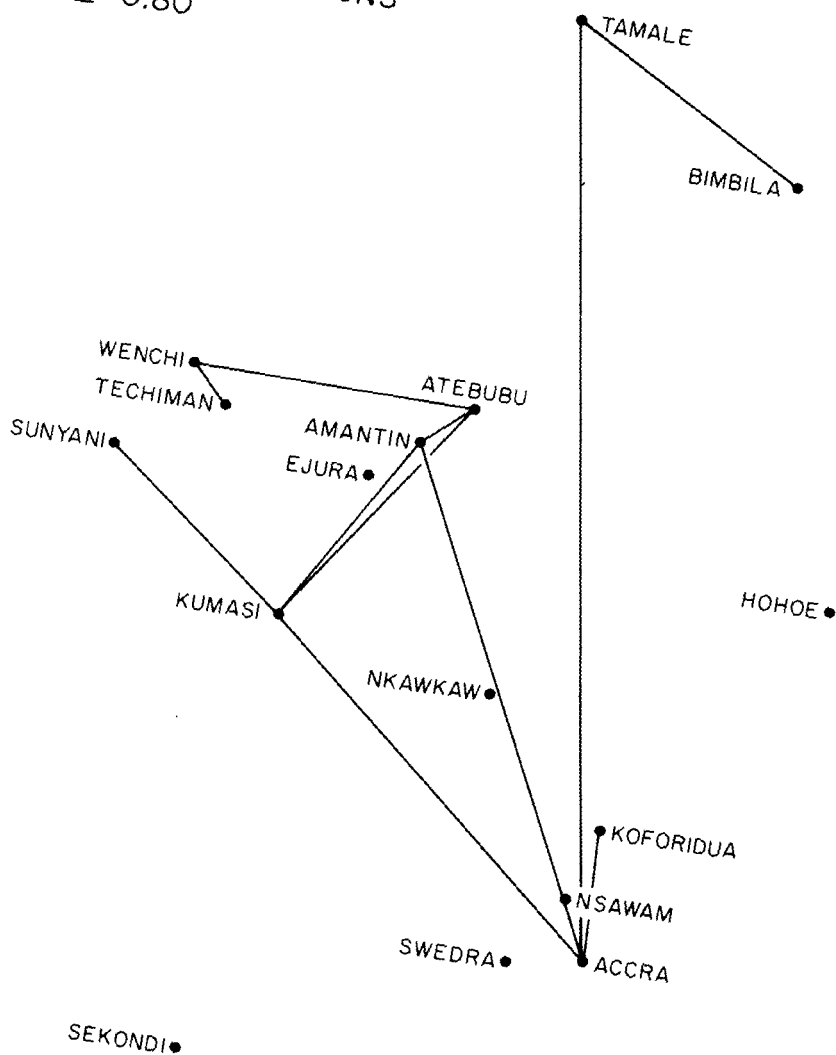
KOKONTE CORRELATIONS  
 $\geq 0.80$



\*Source: Ghana, Ministry of Agriculture, *Monthly Food Situation Report*, various issues.

CHART 4d.—INTERMARKET CORRELATION OF WHOLESALE PRICES: YAMS\*

YAM CORRELATIONS  
 $\geq 0.80$



\*Source: Ghana, Ministry of Agriculture, *Monthly Food Situation Report*, various issues.



MAP 2.—MARKETS INCLUDED IN PRICE ANALYSIS

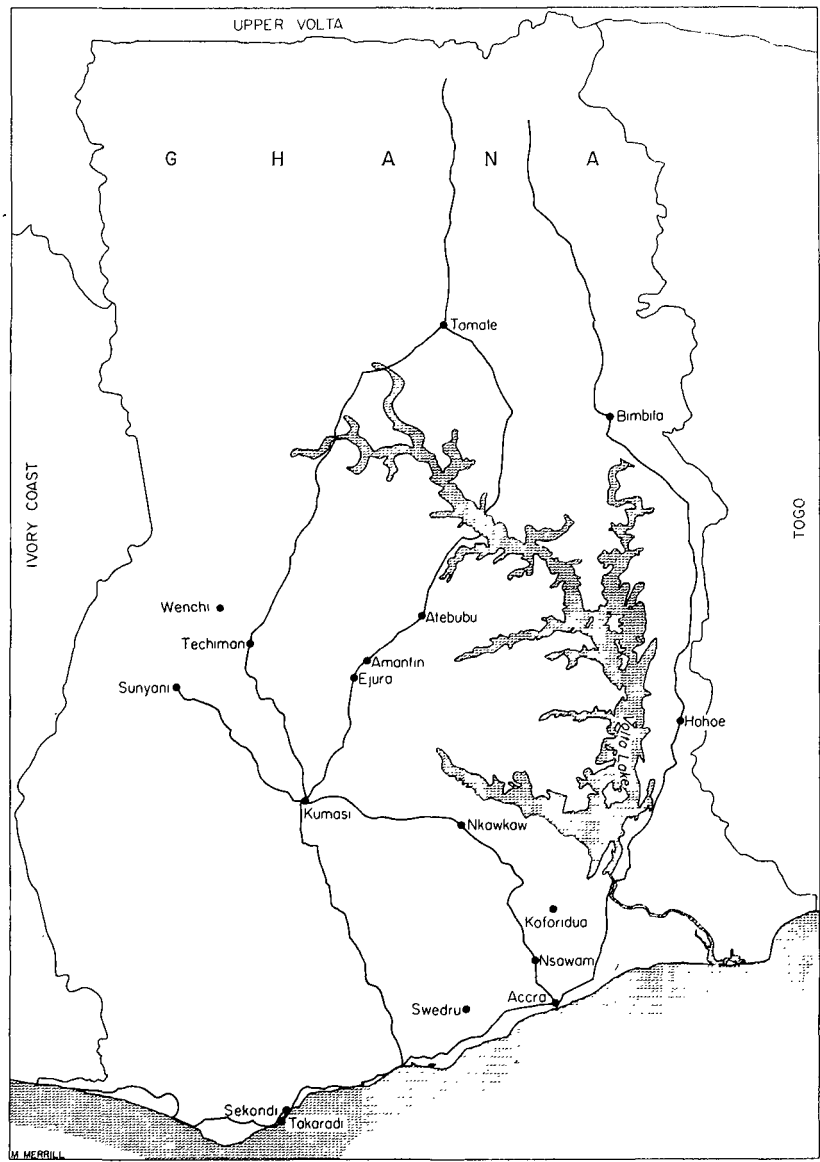


TABLE 8.—CORRELATION OF WHOLESALE PRICES,  
AMONG PAIRS OF MARKETS, GHANA, 1965-72\*  
(Proportion of total coefficients by commodities)

<i>r</i>	Yams	Rice	Maize	Kokonte
.95+	.02	.04	.02	0
.90-.94	0	.03	.20	.01
.85-.89	.02	.03	.43	.03
.80-.84	.06	.08	.17	.03
.75-.79	.11	.13	.06	.08
.70-.74	.07	.17	.01	.08
.65-.69	.11	.13	0	.17
.60-.64	.13	.09	.03	.09
.55-.59	.07	.07	.03	.13
.50-.54	.11	.03	.04	.10
0-.49	.30	.18	.02	.23
<0	0	.03	0	.06
Total	1.00	1.00	1.00	1.00
Number of markets	16	16	16	16
Number of pairs	120	120	120	120
First quartile	.70-.74	.75-.79	.85-.89	.65-.69
Second quartile	.60-.64	.65-.69	.85-.89	.55-.59

\*Source: Ghana, Ministry of Agriculture, *Monthly Food Situation Report* (title varies), various issues.

for towns with relatively good records, whereas in Nigeria all towns for which there was any sort of price record were included. Nevertheless, the absolute number of pairs at higher levels is also conspicuously larger for yams, rice, and maize in Ghana as shown below.<sup>19</sup>

Commodity and country\*

	Yams		Rice		Maize	
	Ghana	Nigeria	Ghana	Nigeria	Ghana	Nigeria
Number of markets	16	36	15 <sup>a</sup>	59	16	35
Number of pairs	120	630	105 <sup>a</sup>	1,596	120	595
Number of correlation coefficients						
≥ .90	1	0	1	0	25	0
≥ .85	4	0	3	1	73	0
≥ .80	11	0	11	4	93	4

\*Nigeria data are from Jones (1972, p. 141).

<sup>a</sup>Excludes Nkawkaw; too few observations.

<sup>19</sup> Correlations tend to be increased by the long-term upward movement of farm prices in Ghana. But this change was irregular prior to 1973, and prices after December 1972 were not used in calculation of the intermarket correlations.

TABLE 9.—WHOLESALE PRICE DIFFERENCES BETWEEN ACCRA AND SELECTED CITIES OF YAMS, RICE, MAIZE, AND KOKONTE, 1965 TO 1974\*  
(Amount less than Accra in cedis per ton)

City	Yams	Rice	Maize	Kokonte
Amantin	9.66	4.65	4.26	2.95
Atebubu	8.31	5.04	4.14	2.79
Bimbila	17.86	4.07	3.19	3.71
Ejura	14.63	3.85	3.95	3.06
Hohoe	-2.14	"	0.94	"
Koforidua	-6.96	-0.70	"	0.60
Kumasi	8.57	-0.14	2.46	1.77
Nkawkaw	-5.94	"	0.52	1.16
Nsawam	-1.92	"	"	0.77
Sekondi	-13.83	-0.68	-0.30	0.40
Sunyani	2.97	1.54	4.52	2.04
Swedru	-4.61	"	-0.12	"
Tamale	11.87	5.35	2.09	1.62
Techiman	11.35	4.67	4.25	2.94
Wenchi	9.12	3.28	4.94	3.10

\*Based on data from Ghana, Ministry of Agriculture, *Monthly Food Situation Report*, various issues.

"Too few observations to calculate.

Intermarket arbitrage, therefore, was apparently better in Ghana in the 1960s and 1970s than it was in Nigeria ten years earlier.

Correlations of prices among markets might, of course, be masked by inaccurate price knowledge within the wholesale markets themselves. Accurate knowledge of prices and supplies at various points in the system and the ability to respond to market opportunities thus revealed are essential for strong relationships of price movements among markets, and relatively low correlations are caused in part by traders' inadequacies of information and resources.

The difficulties encountered in moving produce from one market to another also affect intermarket relationships. This problem can be expected to be greater for bulky and delicate commodities like yams than it is for kokonte, rice, and maize. In 1977 it cost about ₵50 per ton to haul produce from Atebubu to Kumasi and about ₵85 per ton from Atebubu to Accra. Yams at the height of the season in August through November sold for ₵180 to ₵330 per ton in Atebubu, paddy in November and December when its prices are usually lowest sold for about ₵800 per ton, and maize in August to October for about ₵500 per ton.<sup>20</sup> The relatively higher cost of moving yams might be expected to result in poorer spatial integration of yam markets than of those for maize and rice (Jones, 1976,

<sup>20</sup> These figures are based on wholesale prices reported by the Ministry of Agriculture. The paddy price is derived from the milled rice price. The Kumasi price is used for maize because of gaps in Atebubu data.

pp. 319-21). Maize does in fact show more correlations of .80 or greater than do yams, and the chart of maize correlations (Chart 4a) shows a tightly integrated system with all towns except Bimbila, Swedru, and Tamale included at  $r = .90$ . (Tamale and Swedru are correlated with most other towns at  $r = .80$ ). Atebubu prices are correlated at  $r = .90$  or higher with six other markets and at  $r = .85$  with all markets except Bimbila.

Other networks, even when plotted at  $r = .80$  or more, show patterns that are much less complete. Atebubu figures prominently in the correlation map for rice, consistent with the growing importance of the crop in the District, but Kumasi is not included in the rice system at all (Chart 4b). The kokonte map suggests a concentration of production for market in the area between Amantin-Ejura and Techiman-Wenchi (Chart 4c). Atebubu is only loosely connected with this system by a correlation of  $r = .74$  between its prices and prices in Amantin, despite the fact that checkpoint data show Atebubu to have shipped nearly twice as much kokonte as Amantin. The yam map confirms the marketing relationships between Atebubu District, Kumasi, and Accra (Chart 4d).

*Intermarket price spreads.*—The estimates of intermarket price spreads between Accra and the other 15 market towns for the period 1965 to 1974, shown in Table 9, should be treated with caution because transport costs, even for yams, are likely to make up a small enough part of wholesale price to be swamped by errors in the original data, whatever their cause. In a general sense, however, the price differences are consistent with other information about these systems. Prices of all four foodstuffs tend to be highest in Accra and Sekondi-Takoradi, with few exceptions. Prices in most of the producing zones are considerably lower than those in the consuming centers. Nevertheless, there are a few puzzles.

Yam prices in Kumasi and Atebubu markets averaged  $\text{C}\$8.57$  and  $\text{C}\$8.31$  per hundred less than in Accra throughout this period, when the average price of yams in Accra was about  $\text{C}\$45$  per hundred. This is a larger spread relative to commodity value than is suggested by comparison of transport costs and wholesale prices in 1977, although not out of line with Atebubu-Accra market spreads and values in the 1960s and early 1970s for rice,  $\text{C}\$5$  and  $\text{C}\$30$ , and for maize,  $\text{C}\$4$  and  $\text{C}\$14$ . But it does seem strange that average prices of yams over the period were almost exactly the same in Atebubu as they were in Kumasi, despite the fact that information from the Amantin checkpoint shows Kumasi to be the first destination for more than two-thirds of yams leaving the District.

How could traders make money by hauling yams from Amantin and Atebubu to Kumasi under these circumstances? The answer begins to appear when monthly price differences are considered rather than average differences over nine years. In 57 of the 115 months for which prices were examined yams cost more at wholesale in Atebubu than they did in Kumasi; in 58 they cost more in Kumasi. These relationships were distributed fairly uniformly through the year. The average annual price was higher in Kumasi, though not by much, during the first half of the period, and lower from 1970 to 1973.<sup>21</sup>

A possible explanation of this paradox is that the Kumasi wholesale market for yams is often quite congested (it could only accommodate 20 trucks a day in 1977). Buyers from Accra can shorten their trip time if they go directly to

<sup>21</sup> Data for 1974 were incomplete when the analysis was done.

Atebubu market, bypassing Kumasi market and Kumasi town entirely. They do this by leaving the main road at Konongo and joining the Atebubu road at Ntonso or Mampong.<sup>22</sup>

Higher yam prices in Atebubu than Kumasi could occur if buyers from Accra found the cost of time lost in Kumasi town and Kumasi wholesale market greater than the increased price they had to pay in Atebubu. At such a time, the only yams going from the District to Kumasi would be those that were purchased directly from farmers, rather than through resident assemblers. When prices assumed a more customary relationship, Kumasi traders would also buy from Atebubu assemblers. This hypothesis cannot be confirmed, but it seems plausible.<sup>23</sup>

The rice prices also present anomalies. Kumasi prices average the same as Accra prices, and Tamale, in the heart of major rice production, occasionally reports higher prices than several markets farther south, particularly Atebubu and Amantin. A likely explanation lies in the impact rice imports have on prices of domestic rice.<sup>24</sup> Imported rice is unloaded at Tema and its effect on domestic prices weakens with the distance of markets from the coast, so that prices in Brong-Ahafo tend to be appreciably lower than prices in the major rice areas farther north. This spatial difference also helps to explain difficulties sometimes reported in bringing rice down from the Northern Region.

Maize price spreads, too, have a special pattern reflecting the very widespread production of this crop. Prices averaged about the same in Atebubu, Amantin, Ejura, Techiman, Wenchi, and Sunyani, and they tended to be highest in Accra and nearby Nsawan, presumably reflecting the large effective demand in the metropolitan area of the capital city. In addition, the kokonte price differences add Atebubu to the cluster around Techiman and Ejura that the correlation map indicated might be a center of distribution.

In summary, information about intermarket correlations of prices and inter-market price spreads confirms that a national marketing system exists and functions moderately well. Atebubu is well integrated into this national system. There is, however, a strong implication that although the general levels of wholesale prices move more or less together among Ghanaian markets, these interrelationships are handicapped by deficiencies of financial resources and market facilities. Measures that would assist in the development of better organized rural assembly markets and urban terminal or redistributive markets could not help but reduce the costs of food crop marketing.

<sup>22</sup> Evidence that yam buyers do use this route is provided by the appearance of Konongo, Effiduase, and Ntonso among the destinations of yams passing through Amantin checkpoint.

<sup>23</sup> Atebubu may in fact be on the imperfectly established boundary between the market of a "frontier city" (Accra) and that of a city (Kumasi) whose market area is in process of becoming "impacted." Cf. P.R. Jones (1978).

<sup>24</sup> When imported rice arrived in Ghana in August 1977, two months before the Atebubu rice harvest, prices of paddy at Atebubu fell from £160 to £80 per bag, and domestic rice disappeared from the markets except for small distressed stocks in the hands of local assemblers.

## SUMMARY AND CONCLUSION

Atebubu has a reasonably efficient marketing system, but investments to expand its capacity could make it better. The system is complex, as it must be if it is to achieve distributive efficiency and at the same time protect the independence of small farmers and preserve the freedom of choice of consumers. The preceding pages have provided glimpses of the complexity of the Atebubu system and of how farmers and traders, by constant attention to changing circumstances and diligent pursuit of economic opportunities, make the system perform its primary task. That task is to assemble produce from thousands of small farmers in lots of 3 tons or less and to make them available eventually by the piece or the cup to consumers in retail markets as far as 100 to 300 miles away. Furthermore, the system must see to it that these staple foods are available all year round at prices consumers can pay, so that people no longer need to go through the annual fear of a "hungry gap" while waiting for a new crop. These tasks must all be performed at a cost low enough so that prices offered to farmers will induce them to grow crops for market and prices asked of consumers will induce them to buy what is grown.

Complexity is inherent because of the large numbers at each end of the chain whose abilities to supply and whose desires to consume must be brought into balance. It is little wonder that uninformed outsiders describe the markets of West Africa as disorganized. They are in fact anything but that, yet the organization is so complex as not to be perceived easily, and it is the result of decisions by multitudes of participants who themselves have no clear vision of the overall structure.

The marketing system for food crops in Atebubu District is not perfect, but it is sufficiently competitive to prevent traders from reaping excess margins. A large number of buyers and sellers participate, and none is able to corner large supplies. Knowledge of prices and requirements on the parts of all participants is adequate to obviate collusion, although information flows could certainly be improved upon. Entry is free, and despite the hopes of some District traders' associations, traders from outside Atebubu are very active. Seasonal price rises of maize and yams are high, as they must be to cover large costs of storage, but there is no evidence that traders are able to manipulate prices. Atebubu markets are integrated with the national system, which works moderately well, and their efficiency is enhanced by intermarket movements of traders and information.

Atebubu merchants and farmers perform their roles in the economic order remarkably effectively in the face of numerous obstacles which limit the capacity of the system. Barriers to expansion include shortages and irregularity in the availability of transport for hauling crops to market, inadequacies in financial resources needed to assure farmers of a market and to smooth out price fluctuations, meager wholesale market facilities and frequent congestion, risk of intervention by state trading organizations, and general mistrust and suspicion of traders by the public.

Atebubu farmers and traders do an efficient job of providing food for the people

of Ghana under existing circumstances, but it is clear that they could perform their services at lower cost if these obstacles to the flow of foodstuffs from farmers to consumers were removed or their impact reduced. A helpful program of government interventions might include completion of long-delayed rural road projects and better maintenance of the entire road system in the District, improvements of the wholesale market facilities in Atebubu and Amantin, and expansion of credit to traders from the Agricultural Development Bank.

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