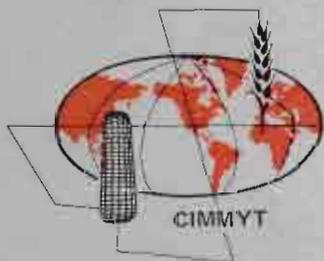


MAIZE MARKETING AND DISTRIBUTION
IN SOUTHERN ZAIRE

Mbuki Mwamufiya and James B. Fitch



CENTRO INTERNACIONAL DE MEJORAMIENTO DE MAIZ Y TRIGO

INTERNATIONAL MAIZE AND WHEAT IMPROVEMENT CENTER

México

MAIZE MARKETING AND DISTRIBUTION
IN SOUTHERN ZAIRE

Mbuki Mwamufiya and James B. Fitch

1976

Dr. Mwamufiya recently received the Ph.D. from Oregon State University, and Dr. Fitch is Assistant Professor in the Department of Agricultural and Resource Economics at Oregon State University.

Support for this research was received from CIMMYT, the U.S. Agency for International Development, and the Oregon Agricultural Experiment Station. The authors are particularly indebted to Don Winkelmann for his continued support and comments. Frank Conklin and Carl O'Connor also made useful comments on an early draft of the manuscript. Naturally, responsibility for any flaws in the final product remains solely with the authors.

Recent dramatic increases and shifts in Zaire's population have had significant influences upon both the supply and the demand for basic foods, with profound effects being registered on maize in urban Shaba and in the Kasai regions. Urban demand for food, such as maize, increased rapidly (Table 1), not only as a result of population increases, but also due to investment and income distribution policies which favored urban areas [12, pp. 2-6]. These factors present a problem of developing an expanded production system, together with a distribution system capable of delivering more food to the growing urban market. This paper focuses on the marketing of maize and is directed to improving the understanding of factors which influence the nature and effectiveness of the marketing process.

Information presented here is based on a study of the production and marketing of maize in the districts of Tshilenge, Gandajika, Mwene-Ditu, and Kaniama, in south-central Zaire. This included a 1974-75 survey of 299 producers interviewed in their villages, a separate survey of 93 producers who were selling their maize in rural and urban markets of the Kasai Oriental region, and the analysis of the retail price shares received by various marketing agents in each of three different types of rural-urban market channels. These results are more fully discussed in an Oregon State University Ph.D. thesis by one of the authors [12].

The Uses of Maize

In the four districts where surveys were conducted, farmers were found to allocate the maize harvested among consumption needs, seed for future plantings, gifts, payment to outside labor used for harvest, bartering, and sale. Table 2 shows that home consumption was found to be a universal use, and that setting maize aside for seed was nearly so. On the other hand, very few farmers used maize for animal feed, to pay hired harvest labor, or as a gift to the village chief. In all districts, except Kaniama, producers reported using maize for bartering more frequently than for sale. Over all four of the districts surveyed, 65 percent of the producers did report selling maize. The survey also showed that for those producers who do sell maize, sales average 29 percent of total production.

Table 1. Production, Import, Export, and the Urban Demand of Maize in Zaire (1950-1974)

Year	Tons				Urban demand
	Produced	Traded	Export	Import	
1950.....	336,635	68,000	17,748	*	50,252
1951.....	313,289	69,000	23,938	*	45,062
1952.....	305,640	55,000	207	*	54,793
1953.....	327,100	76,000	4,577	*	71,423
1954.....	321,670	80,000	20,443	*	59,557
1955.....	325,419	81,000	8,443	*	72,557
1956.....	315,245	103,000	2,984	*	100,015
1957.....	330,350	119,357	14,204	*	105,153
1958.....	320,222	115,751	15,119	718	101,350
1959.....	332,690	97,961	8,863	8,002	97,100
1960.....	*	*	*	*	*
1961.....	250,000 ^{1/}	*	*	*	*
1962.....	226,000 ^{1/}	*	0	38,837	*
1963.....	252,000 ^{1/}	*	0	81,888	*
1964.....	237,000 ^{1/}	*	0	73,356	*
1965.....	232,000 ^{1/}	*	0	45,144	*
1966.....	270,000 ^{1/}	*	0	74,355	*
1967.....	297,000 ^{1/}	*	0	68,632	*
1968.....	250,000 ^{1/}	103,000	0	57,677	160,677
1969.....	350,000 ^{1/}	100,000	0	69,600	169,600
1970.....	375,000 ^{1/}	90,000	0	87,500	177,500
1971.....	306,000 ^{1/}	130,000	0	106,962	236,962
1972.....	433,000 ^{1/}	135,000	0	108,450	243,450
1973.....	477,000 ^{1/}	114,480 ^{2/}	0	146,378 ^{2/}	260,858 ^{2/}
1974.....	524,000 ^{1/}	125,760 ^{2/}	0	170,000 ^{2/}	295,760 ^{2/}

SOURCES: [1-6; 9, p. 58; 14, p. 55].

* Information not available.

^{1/} FAO estimate.

^{2/} Authors' estimate.

Table 2. Uses of the Maize Harvest

Type of use	District			
	Kaniama	Mwene-Ditu	Gandajika	Tshilenge
	-----percent of producers reporting use-----			
Consumption.....	100.0	100.00	100.0	100.0
Save for seed.....	99.1	100.0	97.1	96.2
Barter or sell.....	80.6	86.6	86.8	78.6
Barter.....	47.2	83.3	79.4	77.4
Sell.....	70.8	66.7	72.1	50.9
Barter but do not sell..	9.8	19.9	14.7	27.7
Sell but do not barter..	33.4	3.3	7.4	1.2
Gift to village chief...	20.8	4.5	4.5	1.9
Pay hired harvesters....	17.0	7.6	11.8	15.1
Feed animals.....	9.4	0.0	7.4	9.4

SOURCE: [12, p. 323].

In consumption, maize and cassava flour are mixed with boiling water in the cooking of a thick paste called "fufu", "bidia", or "nshima", which serves as the basic food in the survey districts. Maize is also used in the preparation of "tshibuku", "tchorst", and "cinq cent", which are three alcoholic beverages produced by villagers. Tshibuku and tchorst are cheaper than beer and many use it because of its unique taste, or as a substitute to the more expensive beer.

All farmers interviewed in the study districts acknowledged using maize in the preparation of fufu. Of those interviewed, 87 percent said they used maize throughout the year. Some 81 percent reported eating fufu twice a day. Most households of the study area mix maize flour and cassava flour in the preparation of fufu, but the proportion of maize flour actually used varies depending upon availability. Where the average area planted in maize is larger, such as was the case of farmers in Kaniama and Gandajika districts, farmers tend to use more maize flour in the preparation of fufu than farmers in districts where the average maize area is smaller, such as was the case of the districts of Mwene-Ditu and Tshilenge. Nevertheless, the survey also showed that regional preferences for maize flour in fufu do not coincide exactly with patterns of availability [12, pp. 159-161].

The strength of preference for using maize flour in the fufu mix is important in determining whether or not a producer will sell maize, but the following analysis shows that several other factors also influence the decision to sell.

Factors Influencing the Decision to Sell Maize

Discriminant analysis was used as a means of isolating those factors which distinguish between producers who sell maize and those who do not sell. Discriminant analysis is a special technique of multivariate statistics which is similar to multiple regression analysis [13, pp. 434-467]. In this case, it was used to determine whether or not there was a significant statistical relationship between certain variables which were hypothesized to influence a farmer's propensity to sell maize and a special "dummy" variable which was coded one for farmers who sold maize and zero for non-sellers:^{1/}

Results of the discriminant analysis are summarized in Table 3. All explanatory variables which were retained in the analysis after the preliminary variable selection procedures are shown in the table. Average values for the variables are shown for both maize sellers and for non-sellers. Table 3 then lists the standardized weights for each variable in the final discriminant function. Those variables which are statistically significant at the ten percent level, based on a partial F-statistic, are marked with an asterisk (*) in the table.

Three variables had a significant and positive association with the group of farmers who sold maize: (i) ownership of a bicycle or radio, (ii) length of participation in a government supervised production scheme, and (iii) total area planted to crops. The ownership variable was taken as a sign of modernity, although a radio might serve as a source of improved information^{2/} and a bicycle might also be representative of the improved transportation from which the owner benefits. Participation in one of the government-sponsored production schemes, CAKO or TABAZAIRE, signifies access to government extension workers,

^{1/} Sale of maize was chosen as a means of identifying those farmers who participate in the marketing process. It might be argued that maize which is bartered also ends up in market distribution channels. The decision to use sale and not bartering in this analysis is admittedly somewhat arbitrary.

^{2/} Nevertheless, there are few, if any, regularly scheduled agricultural or marketing news programs for the areas surveyed. None of the farmers interviewed listed the radio as a primary source of information.

Table 3. Means for the Discriminating Variables and Their Weight in the Discriminant Function

Variables/Size	Mean value for variable		Standardized coefficient in final discriminant function
	Group 1 (sell)	Group 2 (not sell)	
Family size (members).....	4.71	9.38	-0.304
Age of the respondents.....	45.91	42.84	0.106
Ownership of bicycle or radio...	0.52	0.38	0.326*
Number of years under a supervised government production scheme <u>a</u> /.....	1.14	0.85	0.236*
Years of formal education.....	2.52	3.06	-0.288*
Total area planted (1/100 Ha)...	170.41	131.27	0.296*
Size of the village (people)....	931.83	1295.78	-0.533*
Distance to market (km).....	9.71	10.21	-0.311*
Area planted with maize (1/100 Ha).....	75.60	57.45	0.247
Proportion of maize flour in fufu mix <u>b</u> /.....	1.88	2.08	-0.322*

SOURCE: [12, p. 167].

a/ Such schemes included CAKO and TABAZAIRE.

b/ Farmers surveyed were asked how many handfulls of maize flour they would prefer to put in a batch of fufu requiring five handfulls of flour.

* Indicates significance at the 10 percent level, based on a partial F-test.

as well as a certain amount of assistance from government-owned machinery.^{3/} The positive influence of total area planted to crops is taken to mean that the larger an area a farmer is able to crop, the more likely he will be to have surplus left over for sale. The fact that total area planted to maize was not significant in distinguishing among maize sellers and non-sellers is perplexing. In view of the high correlation between total crop area and the total area in maize variables ($r = 0.55$), however, this is probably just a case of the former masking the significance of the latter.

Four variables had a significant negative association with the group of farmers who sold maize: (i) years of formal education, (ii) size of the village, (iii) distance to market, and (iv) relative degree of maize flour used in fufu mix. Contrary to the results of the analysis, the prior expectation was that education would have a positive effect on the decision to sell maize. The negative loading for education may be a reflection of the fact that the more highly educated are both younger and (consequently) have larger family size. We speculate that it is the combined effects of these factors, rather than education per se, which mitigate against the decision to sell maize. The effect of village size was also contrary to expectation. It is known that producers in larger villages plant more total maize than those in small villages [12, Table 4.13]. Results of the discriminant analysis nevertheless suggest that farmers from large villages fall less frequently into the maize seller category.^{4/}

The negative effect of distance to market on the decision to sell maize was expected, as was that of the relative degree of maize used in fufu mix. The latter variable was included as a proxy to indicate the preference for maize in consumption. Thus, a stronger preference for consuming maize weakens the propensity to sell maize.

^{3/} This assistance comes in the form of tractorized plowing for either tobacco (TABAZAIRE) or cotton (CAKO). There is not direct mechanized support for maize per se. Nevertheless, improved tillage for cotton or tobacco may have a residual effect on maize production in subsequent rotations.

^{4/} A different result might have been obtained, however, had both barter and sale been used as the indicator of marketing. See footnote 1 above. Of the four districts surveyed, Tsilenge has the highest population density and the highest average village size [12, pp. 63-64]. Yet, Table 2 shows that Tsilenge relies more on bartering alone (i.e., farmers who barter but do not sell maize) than do the other districts. On the other hand, Kaniama, which ranks lowest in terms of population density and village size, ranks highest in terms of farmers who sell but do not barter.

Government Regulation of Maize Markets

Government efforts to regulate the marketing of maize are focused primarily in price policies which affect the market for maize flour as well as that for maize grain. In addition to these price policies, which are imposed by the national government, many regional and local (municipal) governments have established regulations on the purchase of maize by licensed traders operating within their jurisdictions [12, pp. 203-204].

Potentially of most direct effect on farmers is a floor price which is to apply to the purchase of maize grain at the farm level. However, great confusion exists on the concept and application of floor prices. While top officials know what the floor price is supposed to be,^{5/} this understanding does not seem to be shared by the many local and regional officials who would normally be expected to enforce it. Many of these officials in fact call it "the official price", "the government price", and even "the official maximum price" [12, p. 255], a clear indication of the degree of misunderstanding. This confusion undoubtedly contributes to an almost universal lack of awareness of the floor price policy on the part of farmers. Of the 299 farmers interviewed in four different districts in 1974-75, only six percent knew of the existence of such a government policy, and less than two percent could state the actual floor price in effect at the time [12, p. 256].

A second set of maize price policies is aimed at the milling process. On one hand, a ceiling price is set for the delivery of maize grain to flour mills, whereas, on the other, a ceiling is set on the wholesale price of flour produced by the mills [12, pp. 250-253]. These ceiling prices tend to reduce the incentive for traders to collect maize from the more outlying villages -- those lying 30 to 40 or more kilometers from the main roads and railroad tracks. Thus, one result of the ceilings policy is a decreased incentive for farmers -- especially those who are more distant from market -- to produce maize [12, pp. 257-263].

^{5/}The official floor price was four Makuta per kilogram during the study period in 1974-75. There are 100 Makuta per Zaire, the basic monetary unit, and the official exchange rate was U.S. \$2.00 per Zaire.

Because of the price ceilings and due also to slow response in changing these ceilings as conditions of national supply and demand for maize change, there tends to be a large differential between the delivery price of locally produced maize and the price which flour mills must pay for maize imports (Table 4). The existence of this differential suggests that substantial reduction in imports (Table 1) and savings in foreign exchange might be obtained merely by permitting the domestic mill delivery price to rise, thus stimulating the local production and supply of maize.

Table 4. Delivery Prices of One Ton of Maize and the Price of Maize Imported by the Kakontive Flour Mill in Likasi, Fob at Zambian Border

	Price in Zaire's Per Ton								
	1967	1968	1969	1970	1971	1972	1973	1974	1975
Imported maize.....	35	38	42	42	42	40	68.8	a/	78
Domestic maize.....	25	32	32	32	34	37	63	63	63

SOURCE: [11].

a/ Import price not available for 1974.

Local and regional officials frequently intervene in the maize market in a more direct fashion. These actions often have the effect of restricting trade between towns and regions. These interventions are usually motivated by seasonal shortages in local markets. In Shaba, a regional ordinance banned the export of maize beyond the regional boundary, and in 1975, the Kasai Oriental government was considering a similar edict as a form of retaliation. Licensing of traders, as required by local and regional governments in Kasai Oriental, Kasai Occidental, and Shaba, may also be designed to restrict trade. In the latter two regions, in 1975, the issuing of such licenses was contingent on the trader indicating which districts maize would be bought from, as well as on his agreement to sell to a designated flour mill. While such moves are evidently intended to secure local supplies in the short run, they tend to limit the number of maize traders, and thus to limit competition in maize trade. Furthermore, by promoting disparities in maize prices among regions, these policies are likely to lead to an inefficient allocation of resources in the production of maize. A pattern whereby some districts produce "too much" maize, while others produce "too little", will thereby be perpetuated.

Marketing Channels

Farmers in the study districts sell maize in bulk, typically still on the cob, and in small loads which are measured out in a variety of unstandardized

containers. Many farmers sell their maize at home in their villages, while others take it to rural and urban markets where they sell to assemblers who collect for later sale to other intermediaries or to consumers. The discriminant analysis demonstrated that farmers who are located closer to organized markets show a greater propensity to sell maize.

There are a number of different types of maize buyers who work in the various rural and urban markets and directly in the production areas. Small scale buyers who operate in isolated villages and in rural markets are referred to here as local assemblers. Buyers operating between rural and urban markets are called rural and urban assemblers. Truck-owner-licensed-traders operate all the way from remote rural markets to the centrally located urban markets. Data from the various study districts, shown in Table 5, indicate that from 29 to 52 percent of the farmers sell most of their maize to local assemblers and local consumers. From 20 to 64 percent sell to rural and urban assemblers, and 7 to 21 percent sell directly to licensed traders.

Table 5. Proportion of Producers Selling Maize to Different Categories of Buyers

Type of buyer	District			
	Kaniama	Mwene-Ditu	Gandajika	Tshilenge
	percent			
Local consumers and local assemblers.....	50	37	29	36
Rural and urban assemblers.....	20	44	64	39
Licensed traders.....	19	12	7	21
Others (not specified)..	11	7	0	4

SOURCE: [12, p. 182].

Table 6 lists sales according to their location. In most districts, farmers tend to sell at home in their village. But in more densely populated districts, such as Tshilenge, Gandajika, and Mwene-Ditu, there is a tendency for farmers to take their maize directly to rural and/or urban markets. Many direct sales by producers were also observed in the town of Mbuji-Mayi.

Table 6. Proportion of Producers Selling Most of Their Maize in Designated Locations

Location of sale	District			
	Kaniama	Mwene-Ditu	Gandajika	Tshilenge
	-----percent-----			
Village (at home).....	67	64	33	57
Along main road.....	1	5	5	0
Rural market.....	27	11	17	14
Urban market.....	0	20	43	29
Other answers.....	5	0	2	0

SOURCE: [12, p. 182].

In the more densely populated districts, numerous buyers are active in rural markets, particularly during the first two to three months after maize harvest. Because of bad roads and limited transportation services, most of the maize bought by these small-scale rural assemblers has to be carried in head loads to shipping points or other markets. This means that the activities of most rural assemblers are restricted to areas within short distances of main roads and some secondary roads.

Truck-owner-licensed-traders who buy maize are unspecialized seasonal buyers who deal mainly in the buying and selling of consumer manufactured goods. These traders can devote larger sums of money to maize purchase and can reach more remote markets and villages. Nevertheless, their activities are also limited by the poor road network. Thus, the number of traders and assemblers who reach the more remote villages is limited; and this appears to limit the competition for the purchase of maize in such areas.

The marketing chain nearer to the large consumption centers involves numerous intermediaries. During the survey, this was especially evident in the Mbuji-Mayi-Gandajika interurban link. The high price of maize in consumption centers, the prospect of positive retail margins, and high rates of urban unemployment in these cities have induced many to enter the maize retailing business. Because of limited working capital, these retailers run very small-scale operations. Thus, as maize travels in from the countryside, it is frequently split into smaller loads and handled by numerous retailers.

The degree of competition among maize suppliers in rural and urban markets depends upon the seasonal variation in supply. In the three to four months following harvest, many producers and assemblers are active in both rural and urban markets, and this results in a competitive environment which undoubtedly helps to keep prices down. As the period after harvest lengthens, however, wholesale supplies become dominated by urban and rural assemblers as well as truck-owner-licensed-traders, and the degree of competition in the maize market decreases gradually, particularly at the wholesale and semi-wholesale levels.

Analysis of a subsystem of the marketing chain in the Mbuji-Mayi and Gandajika areas indicates that most maize producers do not store maize for speculative purposes, to gain from seasonal price variations; rather, most producers sell maize to assemblers and traders, and it is this group who often store for future sales. The same analysis also indicates that as producers become rare in the market, competition among sellers is gradually affected [12, p. 220], and by July or August, the wholesale supply of maize grain is dominated by few truck-owner-licensed-traders who, in some cases, run an integrated operation from the wholesale to the retail level. This pattern of supply may be responsible for some of the price increases noticed in the last months of the marketing season [12, p. 223].

Price Equilibrium in Rural and Urban Markets

Three rural markets and two urban markets were selected for the purpose of investigating price formation, seasonal price variations, and intermarket price relationships [12, pp. 190-191]. The three rural markets surround Gandajika City, which has a population of 60,000. Nsona lies 10 kilometers west of the city, Kamanda 21 kilometers south, and Kaseki 18 kilometers east. The urban markets of Mbuji-Mayi, a town of about 342,000 people located 85 kilometers northwest of Gandajika City, and markets in Gandajika City itself, were also examined. Maize producers in the Kamada, Kaseki, and Nsona production areas can sell their maize in their respective rural markets, or take it to the Gandajika market where maize is sold either to consumers or assemblers. Some of the maize which reaches the Gandajika urban market is subsequently shipped to the Mbuji-Mayi metropolitan urban market. During the period of

high shortages of maize grain, some maize can also move from the Mbuji-Mayi metropolitan urban market to the Gandajika regional urban market, as was observed in October through December 1974. Seasonal price variations for the period of December 1974 to December 1975 are listed in Table 8 for rural and urban markets.

Price figures in Table 7 indicate that the price of maize grain declines in all markets up to February, as many producers and assemblers literally invade rural and urban markets following the first maize harvest. The price of maize then rises until April, then declines in May and June, with the coming of the second harvest of maize. The price of maize subsequently rises to a peak high in October or November, then declines in December, with the forthcoming maize harvest in late December and in January^{6/}. The simultaneity of seasonal price changes in all markets suggests that there exists a relatively good flow of information on supply and demand between the markets studied here. Presumably, price changes in the metropolitan market in Mbuji-Mayi are transmitted to the regional urban markets in Gandajika, then onto the non-isolated rural markets at Kamanda, Kaseki, and Nsona.

Under perfect competition and perfect information in the spatially located rural and urban markets studied, maize prices would tend to move toward equilibrium. Equilibrium prices for Gandajika and any trading rural markets, as well as equilibrium prices for Mbuji-Mayi and Gandajika, would differ by the cost of transferring maize between trading markets. A price differential above the transfer cost of shipping maize from one market to another trading market would indicate that marketing agents could benefit from shipping more maize from their own markets to other trading markets. The following section investigates the performance of the urban rural link.

Performance of the Rural Urban Link

The concept of parity price and price spreads [7-10; 12, p. 227] is used to investigate the effectiveness of the rural urban link for rural

^{6/} Discussions with various marketing agents indicated that the pattern observed in 1974-75 was similar to that of other years in the markets studied here.

markets located in geographic areas accessible from urban consumer centers. By definition, the parity price, P_{ik} , of maize in the i^{th} relative to the k^{th} market is the retail price of maize in the i^{th} market, P_i , less the cost of shipping it from the k^{th} to the i^{th} market, T_{ki} . The price spread of maize between the i^{th} and the k^{th} markets is then defined as the parity price P_{ik} , less the retail price of maize in the k^{th} market, P_k . In theory, a substantially positive price spread would provide a potential opportunity for assemblers or producers to make more than normal profits while a negative spread would be a disincentive and would serve to reduce the volume of trade between the k^{th} and the i^{th} markets.

The price figures used in this analysis are those in Table 7 for Gandajika, Kaseki, Kamanda, and Nsona. Transportation costs were based on information provided by lorry transporters operating between Kaseki and Gandajika, and between Kamanda and Gandajika. For Nsona, where no lorry transporters were operating, transfer cost was estimated by placing a value on the time required to walk from Nsona to Gandajika. Figures 1 through 3 present retail prices of maize for the three rural markets and the parity price (P_{ik}) between these markets and Gandajika.

Figures 1 through 3 indicate that shortly after the first maize harvest in February and March, and in the period following the second maize harvest in May and June, there is a positive price spread, indicating that producers could benefit from selling maize directly in the Gandajika urban market. Producers and assemblers could benefit by an even greater amount from selling directly in Gandajika market during the period of July or August to October or November.

An observation of market attendance in February and March 1975 indicates that producers did respond to price differentials taking their maize directly to the Gandajika or the Mbuji-Mayi urban market [12, p. 191-202]. The figures indicate that response was nearly sufficient to eliminate the positive price spread. Evidently the response was weaker during September and October, when general scarcity and high prices were experienced. During this period, the price spread became quite large in all three markets.

Table 7. Retail price of maize in six markets of southern Kasai Oriental.^{a/}

Month	Urban			Rural			
	Mbuji-Mayi		Gandajika	Kaseki	Kamanda	Nsona	
	Zaire	Bakwadianga					
	Maize flour	Maize	Maize	Maize	Maize	Maize	
1974 December	-	-	-	6.7	7.5	6.5	5.9
1975 January	13.3	13.8	12.2	5.3	4.4	4.8	3.9
February	12.6	8.5	8.1	4.7	3.6	2.9	3.0
March	14.8	8.7	7.8	5.5	5.3	4.8	5.1
April	14.7	11.0	11.8	8.8	7.3	8.1	6.7
May	11.7	7.3	7.2	7.5	7.2	4.9	7.9
June	14.8	8.9	8.6	7.2	6.7	5.9	6.7
July	14.4	10.7	9.9	9.4	9.2	8.5	7.7
August	24.6	24.5	19.3	18.5	14.6	13.3	9.4
September	-	-	-	20.1	16.1	16.7	11.1
October	38.4	26.1	28.4	25.8	27.6	31.7	26.2
November	34.6	29.3	31.6	28.4	29.8	29.9	31.1
December	30.0	28.6	27.0	20.1	20.3	26.1	-

^{a/} Makuta per kg.

SOURCE: [16, p. 222].

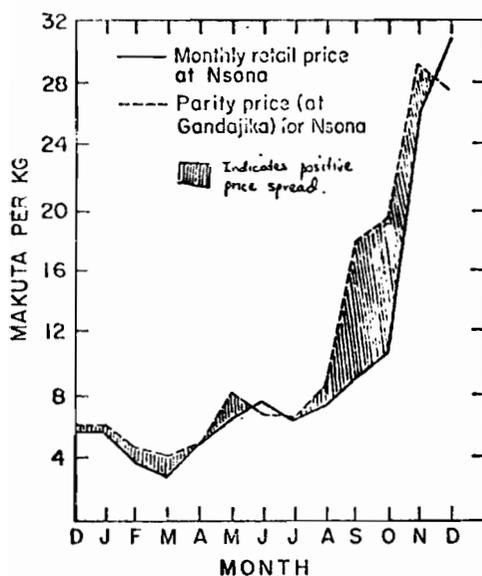


Fig. 1. Price spread for maize between Nsona and Gandajika markets, December 1974-December 1975. Source: 16, p. 228 .

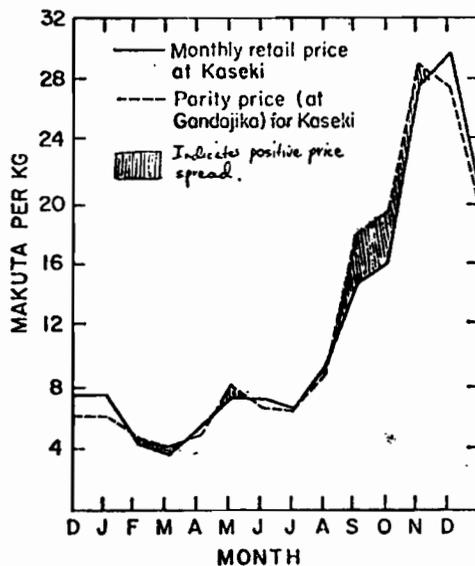


Fig. 2. Price spread for maize between Kaseki and Gandajika markets, December 1974-December 1975. Source: 16, p. 229 .

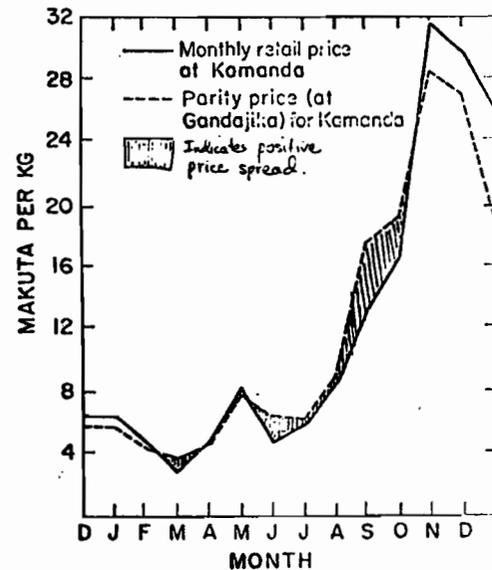


Fig. 3. Price spread for maize between Kamanda and Gandajika markets, December 1974-December 1975. Source: 16, p. 230 .

The high price of maize in the last two trimesters of the year and the positive price spreads during the period of August to October suggest that farmers could benefit from storing their maize and spreading their sales over the second semester of the year. A related analysis of storage and maize protection practices in the districts of Tshilenge, Gandajika, and Mwene-Ditu and Kaniama shows difficulties with molding and sprouting and substantial transfer of weevils from the field to the grainery [12, pp. 105-106]. Thus, a better system of maize storage and protection could help farmers to successfully spread their sales over the maize season. The extreme seasonal variation in price observed during 1974-75 suggests that storage may be profitable, although final determination on that must be subject to further investigation. If successful, storage facilities could serve to stimulate the production and selling of more maize.

Seasonal Price Variations and Producers' Share

The share of the retail price received by maize producers depends on the degree of competition in the maize market and the cost of transferring maize from the production site to the retail market. Over time, the share of the seasonal price variations received by producers depends on when these producers get their maize in the market. An analysis of the components which make up retail price indicates that, in the rural-urban link between the Gandajika urban market and the Kamanda rural market, producers received 47.5 percent of the retail price in February-March, 1975 (Table 8).

Table 8. The Share (%) of the Retail Price Each Marketing Agent Received Per 60 kg Sack of Maize Shipped from the Kamanda Producing Area to the Gandajika Urban Market, February-March, 1975 ^{a/}

Marketing agent	Percent
Retailer.....	14.8
Urban assembler.....	2.2
Transporter.....	27.3
Rural assembler.....	3.3
Village assembler.....	4.9
Producer.....	47.5

SOURCE: [12, p. 232].

^{a/} Based on wholesale or bulk sales prices in the Kamanda area, and retail prices in the Gandajika market. These data are not directly comparable to Figure 3, which is based on retail prices in both markets.

The analysis also indicates that producers who were able to get their maize to the Gandajika market and convey it to Mbuji-Mayi were able to capture a larger share of the retail or wholesale price [12, pp. 239-243] (Table 9).

Table 9. The Share of the Retail Price Received by a Producer or Rural Assembler for Taking His Maize to Mbuji-Mayi and Selling It as a Retailer

Cost items and return to capital	Retail		Wholesale	
	Bakwadianga	Zaire	Zaire	Bakwadianga
	-----percent-----			
Cost of maize.....	54.5	50.4	54.5	58.4
Transporter.....	16.3	15.1	16.3	17.5
Storage.....	1.4	1.3	1.4	1.5
Food.....	13.4	12.4	13.4	14.3
Return to management & capital...	14.4	20.9	14.4	8.3

SOURCE: [12, p. 243].

The single factor which most affected the producers' share was the cost of transporting maize, particularly between rural markets and urban markets. The lower share of transportation in transactions involving urban markets may in part result from greater competition among transporters between urban markets. The high share of transportation in the study area contrasts with the situation in Northern Nigeria, for example, where Hays and McCoy found that transportation accounted only for 5.4 percent of the retail price for sorghum and 6.5 percent of the retail price of millet, and where the producer's share accounted for 69.8 percent of the retail price of sorghum and 68.2 percent of the retail price of millet [7, p. 17].

Because of limited capital and because of the high cost of transportation, many producers located in the neighborhood of the Gandajika market carry their maize in headloads directly to the urban market. In so doing, many producers take weekly trips to markets. However, some crops have planting or weeding periods which coincide with the selling period for maize. Farmers who plant such crops simply may not have time available to perform their own marketing [12, p. 238-239].

The proportion of the seasonal price variations which is captured by producers is a function of how producers spread their sales over the maize season. Survey data indicate that 44.9 percent of the farmers in the district of Gandajika, 60.5 percent in Kanama, 67.9 percent in Mwene-Ditu, and 76.9 percent of the producers in Tshilenge sell most of their maize within six months after harvest (Table 10) and, thus, do not benefit from price rises during the September to December period. Observation of marketing practices in the Gandajika, Tshilenge, and Mwene-Ditu districts also indicates that it is not the producer, but the rural and urban assemblers, and the licensed traders who collect and store maize for sale during the period of shortages.

Table 10. Number of Months After Harvest Within Which Producers in Designated Districts Sell Most of Their Maize (%)

Number of months after harvest	District			
	Kaniama	Mwene-Ditu	Gandajika	Tshilenge
less than one.....	26.3	19.2	28.6	42.3
1-3.....	23.7	29.5	4.1	26.9
3-6.....	10.5	19.2	12.2	7.7
6-9.....	10.5	13.6	24.5	15.4
Spread over the year.....	27.6	15.9	24.5	3.8
Other answers.....	1.3	2.5	6.1	3.9

SOURCE: [12, p. 326].

Summary and Conclusions

This study on the marketing and the uses of maize in rural Zaire was aimed at analyzing factors which affect the supply of domestic maize to urban areas. The analysis of maize suppliers in four districts of Kasai Oriental and Shaba indicates that just under two-thirds of the surveyed producers sell maize, and that these producers sell less than 30 percent of their maize.

A variety of factors were shown to influence the decision to sell maize. On the one hand, factors which are difficult to control, such as the size of family, size of village, the preference for maize in fufu, and prior exposure to the "modern" or monetized economy affect the propensity to sell.

Other factors, such as distance to market and exposure to government-supervised production schemes, also influence the decision to sell, and these factors are subject to influence by government policies and programs.

Distance to market, in particular, is affected by the condition and extent of the transportation network. The transportation system in the study area is rudimentary at best. Study of the marketing cost structure indicates that transportation costs account for between 15 and 27 percent of the final retail price. High transportation costs serve to reduce the price incentive to the producer and are especially detrimental to marketing opportunities in more remote and isolated areas.

The high degree of seasonal price variability, together with the fact that most farmers sell their maize within six months of harvest, when the price is relatively low, suggest that improved storage facilities may be a key to improving the incentive structure for farmers to sell maize. While the economics of storage require further investigation, it appears that improved storage could be useful in permitting producers to hold their maize until later in the marketing year, when scarcity begins to occur and prices rise. This could provide an added incentive for farmers to produce and sell more maize.

A number of government policies were singled out as having possible detrimental impacts on maize sales and marketing. While the floor price is intended to serve as a stimulus to production, there is widespread confusion among government officials as to what it means. In fact, few farmers are even aware that such a policy exists, so it is difficult to argue that it could be serving as a production incentive. On the other hand, the official price ceiling on maize delivered to flour mills serves as a disincentive for farmers to produce and sell maize. There is a distinct price differential between this ceiling price on domestic maize deliveries and the price which the same mills pay for import. The existence of such a differential suggests that reductions in imports and savings in foreign exchange could be attained by permitting the mill delivery price to rise to the import price level. This would simultaneously serve to stimulate local production and supply of maize.

BIBLIOGRAPHY

- [1] Coursier, C. J. 1974. Programme Engrais, AGRI/FAO. Rapport Technique, Compagne Agricole 1972 et 1973. Technical paper.
- [2] Food and Agricultural Organization of the United Nations (FAO). 1962. Production Yearbook. Vol. 16. Rome.
- [3] Food and Agricultural Organization of the United Nations (FAO). 1963. Production Yearbook. Vol. 17. Rome.
- [4] Food and Agricultural Organization of the United Nations (FAO). 1966. Production Yearbook. Vol. 20. Rome.
- [5] Food and Agricultural Organization of the United Nations (FAO). 1968. Production Yearbook. Vol. 22. Rome.
- [6] Food and Agricultural Organization of the United Nations (FAO). 1973. Production Yearbook. Vol. 26. Rome.
- [7] Hays, H. M. Jr., and J. H. McCoy. 1973. Performance of the Staple Food Grain Marketing System in Northern Nigeria. Contribution 545. Department of Agricultural Economics, Kansas State University, Manhattan, Kansas.
- [8] International Bank for Reconstruction and Development (IBRD). 1972. Agricultural Survey: Republic of Zaire. Report No. PA-118a.
- [9] Kamwanga Mulumba, K. B. 1973. Le Mais au Zaire. A thesis presented for the degree of Ingenieur Agronome. Universite de Kinshasa.
- [10] Kotler, P. 1971. Marketing Decision, A Model Building Approach, New York. Holt, Rinehart, and Winston.
- [11] Minoterie de Kakontwe (GECAMINES, MINOKA). 1975. Calcul de prix de maïs graine, Janvier.
- [12] Mwamufiya, Mbuki. 1976. Maize Production and Marketing in Four Districts of Zaire: An Introductory Economic Analysis. Corvallis, Oregon. A dissertation submitted to Oregon State University for the degree of Doctor of Philosophy in Agricultural and Resource Economics.
- [13] Nie, N. H., et. al. 1975. Statistical Package for Social Sciences, SPSS. Second ed. New York. McGraw Hill.
- [14] Republique du Zaire, Ministere de l'Economie Nationale. 1974. Conjoncture Economique. Vol. 14. Kinshasa. Decembre.

