

Somali Democratic Republic
Ministry of Agriculture

Directorate of Planning and Training / Food Security Project

Maize Price Seasonality:
An Analysis of Monthly Retail Maize
Prices in Mogadishu
from January 1979 to December 1986
(With 1987 Maize Forecast Prices)

By
Yassin Jeyte Wehelie

WORKING PAPER No. 1
January 1987

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Working Paper

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MSU-MOA-USAID Food Security Project
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at

TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
1.0 Introduction	1
2.0 The Importance of Maize Prices	2
3.0 Background on Maize and Maize Marketing	3
4.0 Analysis of Maize Price Trends	5
5.0 Seasonality of Maize Prices	8
6.0 Policy Implications of Seasonal Maize Price Patterns	10
7.0 Plans for Further Price Analysis	13
APPENDIX	17

LIST OF TABLES

Table 1	Regional Distribution of Maize Area and Production in Somalia, 1982-1986	4
Table 2	Nominal Retail Prices for Maize in Mogadishu from January 1979 to December 1986	6
Table 3	Real Retail Prices for Maize in Mogadishu from January 1979 to December 1986	8
Table 4	Grand Seasonal Index for Mogadishu Retail Maize Prices	11
Table 5	Comparison of Actual & Predicted 1986 Prices	18
Table 6	1987 Monthly Maize Price Forecast	19

LIST OF FIGURES

Figure 1	Nominal Retail Maize Prices Graph	7
Figure 2	Real Retail Maize Prices Graph	9
Figure 3	Graph of the Grand Seasonal Index for Mogadishu Retail Maize Price from January 1977 to December 1986	12
Figure 4	Comparison of 1986 Actual and Predicted Prices Graph	20

1.0 Introduction

Retail prices of maize in Mogadishu and other towns in Somalia vary within and across years as a result of both supply and demand related factors. Supply factors affecting maize prices are aggregate supply, the seasonality of maize production, and the timing and volume of maize imports. Local production and imports of other cereals which are potential substitutes in consumption, such as wheat and wheat flour, rice and sorghum, also affect maize prices, though somewhat less directly than maize supply factors. Demand factors also play an important role in price formation and variation. Mogadishu and other large towns in Somalia are growing rapidly. Migrants from rural areas bring rural consumption patterns, in which maize and sorghum consumption predominate. These tastes and preferences may change, as bread, pasta and rice are widely available in the larger towns at competitive prices. These cereal products require little or no additional processing and less preparation time than maize and sorghum. Given data limitations, it is difficult to separate out the relative magnitude of supply and demand factors affecting maize prices.

This paper has a more modest objective. It will describe and analyze the behavior of maize retail prices in Mogadishu, the largest urban market. Monthly time-series data are available for retail prices during the period January 1977-December 1986 for Mogadishu. The paper will then discuss the policy implications of maize price seasonality. Practical usefulness of seasonal

price analysis is demonstrated in the Appendix; 1987 maize price forecasts is computed using the GSI index for predicting monthly price levels.

2.0 The Importance of Maize Prices

Policy-makers, traders, farmers, and consumers are all keenly interested in the behavior of maize prices in Somalia. Prices are one obvious and universally understood measure of how well the market for the major staples is performing. Price levels of the commodity during different periods of the year provide valuable information to policy-makers as to whether urban consumers are able to buy adequate supplies of maize at reasonable prices. Major drought in a particular year is generally reflected in the higher price levels of the main staple foods.

Traders are especially interested in the seasonal price variation of maize, as it affects the timing of their purchase and sales decisions. Provided there is seasonal price variability and steady and predictable price increases after the harvest, maize traders have an incentive to buy maize when prices are low and store the commodity until it commands a better price.

The price level of major staples such as maize determines the real income of a large portion of the residents of Mogadishu and other towns in Somalia. Maize consumers, particularly poorer families, respond to changes in the price of the maize and other staples. When maize prices rise, the real income of these

families drops and their maize consumption will fall (assuming all other factors remain constant).

3.0 Background on Maize and Marketing

There are two cropping seasons in Somalia, namely, Gu and Der. The Gu season of the big rains starts in April and continues through June. Most of the maize crop is produced during the Gu and harvested from late August to early September. The Der season of the small rains begins in late September and lasts until late November or early December. The smaller quantity of maize that is produced in the Der is harvested in mid to late January. The maize market year can be said to begin in September and extend through August of every year.

Maize is mostly produced during the Gu season along the Shebelle and Juba rivers under controlled irrigation, flood irrigation and rainfed conditions. The available data on the breakdown of area cropped to maize and maize production by region in Somalia are shown in Table 1. The data show that 67-80% of total maize area cropped and total production in any of the years 1982-85 is concentrated in the Gu season. The Lower and Middle Shebelle Regions have produced 63-79% of the maize in Somalia over this same period. The Lower Shebelle alone harvests half of the maize (48-59%) produced in Somalia in any given year. The most productive districts are Merca, Afgoi, Qoricley and Balcad. Sesame is the main crop during the Der season in the Lower and Middle Shebelle, although some farmers plant maize during this

season as well.

Maize supplies are shipped from the nearby producing areas to Mogadishu by both public and private marketing agents,

Table 1
Regional Distribution of Maize Area
and Production in Somalia, 1982-1986
(area in '000 hectares; production in '000 M.T.)

Region	1982		1983		6u 1984		1985		6u 1986	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Gedo	76	5.4	97	10.9	87	7.4	197.6	33.5	57	9.5
Middle Juba	206	14.8	97	9.1	80	13.5	128	15.6	136	21
Lower Juba	250	17.9	147	21.9	101	19.9	117	16.4	99.5	13.9
Bay	0	0	70	2.1	20	1.4	65	5.2	33	1.8
Bakol	0	0	0	0	1	0.1	11.7	0.8	0	0
Hiran	251	18	205	9.9	54	4	73.9	8.2	31	3.7
Middle Shebelle	301	21.6	479	70.1	239	26.8	457.7	73.8	490	73.5
Lower Shebelle	1006	72.2	945	112.7	665	107.1	1248	224.6	1062	164
North/Central Somalia	0	0	0	0	0	0	44.5	4.1	108	14.2
TOTAL SOMALIA	2090	149.9	2640	236.7	1247	180.2	2343.4	362.2	2016.5	301.6

SOURCE: Food Early Warning System, Ministry of Agriculture

including ADC, private traders, and sometimes farmers. ADC exercised a statutory monopoly in the cereal trade from its creation in 1971 until 1982, at which point the government began liberalizing agricultural marketing. During the 1970s, ADC purchased an average 28% of estimated annual maize production, but this fell precipitously in the 1980s.

Retailers in Mogadishu, as well as other parts of the country, sell maize by volume in local units of measure, such as Suus, Shood, and Madaal. The available retail maize prices from Mogadishu are expressed in Suus, which is equivalent to approximately 2.1 kilograms.

4.0 Analysis of Maize Price Trends

We will begin the analysis by plotting nominal maize prices from 1979 through 1986, which are shown in Table 2 and Figure 1. As seen in figure 1, nominal retail maize prices fluctuated greatly from 1979 through 1982, reaching their highest levels in 1980 and the first half of 1981. Nominal prices began to rise in 1983 and then more than tripled from approximately So. Sh. 28.5/ Suus in Jan. 1984 to So. Sh. 92.5/ Suus in June of the same year. Prices declined at Gu harvest in August 1984, but they did not drop significantly until the Gu harvest of 1985. Since then, nominal prices have remained relatively steady. From the plot of nominal retail prices, the strong price seasonality within years is readily apparent.

Table 2
 NOMINAL RETAIL PRICES FOR
 MAIZE SOLD IN MOGADISHU
 (So. Sh. per Suus)

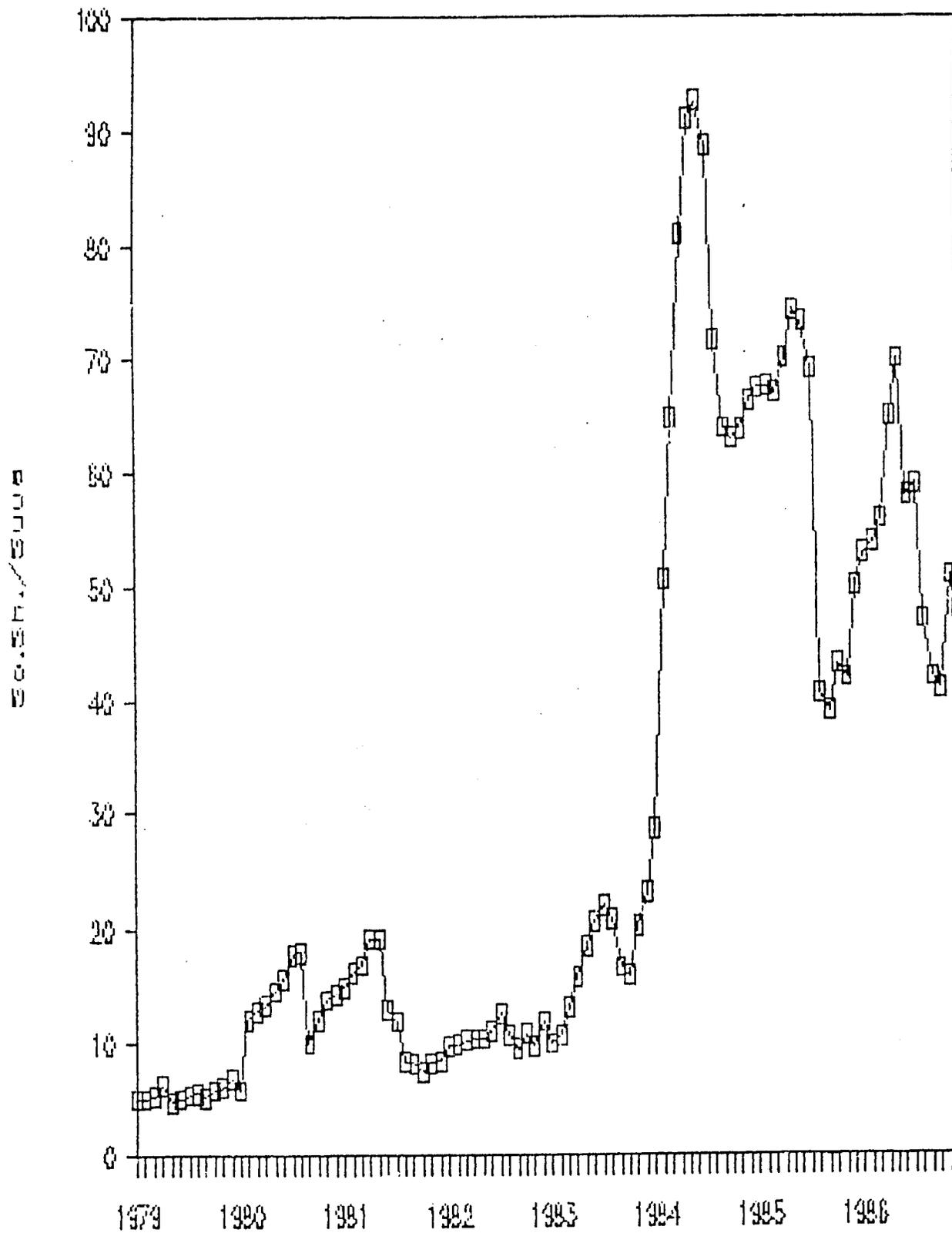
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1979	5.0	5.0	5.2	6.2	4.7	5.0	5.4	5.5	5.1	5.8	6.0	6.8
1980	5.8	12.0	12.8	13.3	14.6	15.6	17.8	18.0	10.0	12.0	13.8	14.4
1981	14.9	16.3	16.9	19.2	19.2	12.9	11.9	8.3	8.2	7.5	8.2	8.4
1982	9.7	9.9	10.2	10.4	10.4	11.0	12.6	10.7	9.5	10.8	9.7	11.9
1983	10.0	10.7	13.1	15.9	18.5	20.7	22.0	20.9	16.7	16.0	20.3	23.1
1984	28.5	50.8	54.7	81.0	91.0	92.5	88.7	71.6	63.9	63.0	63.8	66.3
1985	67.5	67.6	67.0	70.1	74.4	73.3	69.1	40.6	39.0	43.2	42.0	50.2
1986	53.0	54.0	56.0	65.0	70.0	58.0	59.0	47.2	42.0	41.0	51.0	48.0

Source: Central Statistics Department (Ministry of National Planning).

After examining nominal price trends, it is useful to reflate the nominal prices to 1977 constant prices and plot them. As shown in Figure 2, real maize prices reached their highest levels in 1980 and the first half of 1981, and again in 1984, particularly before the Gu harvest. The maize and sorghum crops of 1980 were mediocre, and the 1983 sorghum crop was a failure, which likely contributed to the price rises. The decline in sorghum output in 1983 reduced the overall availability of locally produced cereals, which affected maize prices in 1984.

Nominal Retail Prices for Maize

in Megadishu from Jan. '79 to Dec. '86



□ Nominal Price

Table 3

REAL RETAIL PRICES FOR
MAIZE SOLD IN MOGADISHU
(So. Sh./Suus)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1979	4.2	4.2	4.4	4.9	3.4	3.7	4.0	3.9	3.7	3.8	4.0	4.4
1980	3.7	7.3	7.5	7.0	6.9	7.3	7.8	7.4	4.0	4.7	5.4	5.5
1981	5.4	5.7	5.5	6.2	6.2	4.1	3.5	2.6	2.5	2.3	2.6	2.6
1982	2.9	2.8	2.9	2.9	2.8	2.9	3.2	2.7	2.3	2.6	2.3	2.8
1983	2.4	2.4	2.9	3.4	3.7	3.9	4.1	3.8	2.8	2.7	3.4	3.7
1984	3.8	5.7	6.8	8.9	9.0	8.7	8.0	6.9	6.2	5.8	5.8	5.8
1985	5.7	5.6	5.2	5.2	5.0	4.9	4.7	2.9	2.8	2.9	2.9	3.4
1986	3.4	3.3	3.3	3.6	3.6	2.9	2.9	2.4	2.1	2.0	2.7	2.5

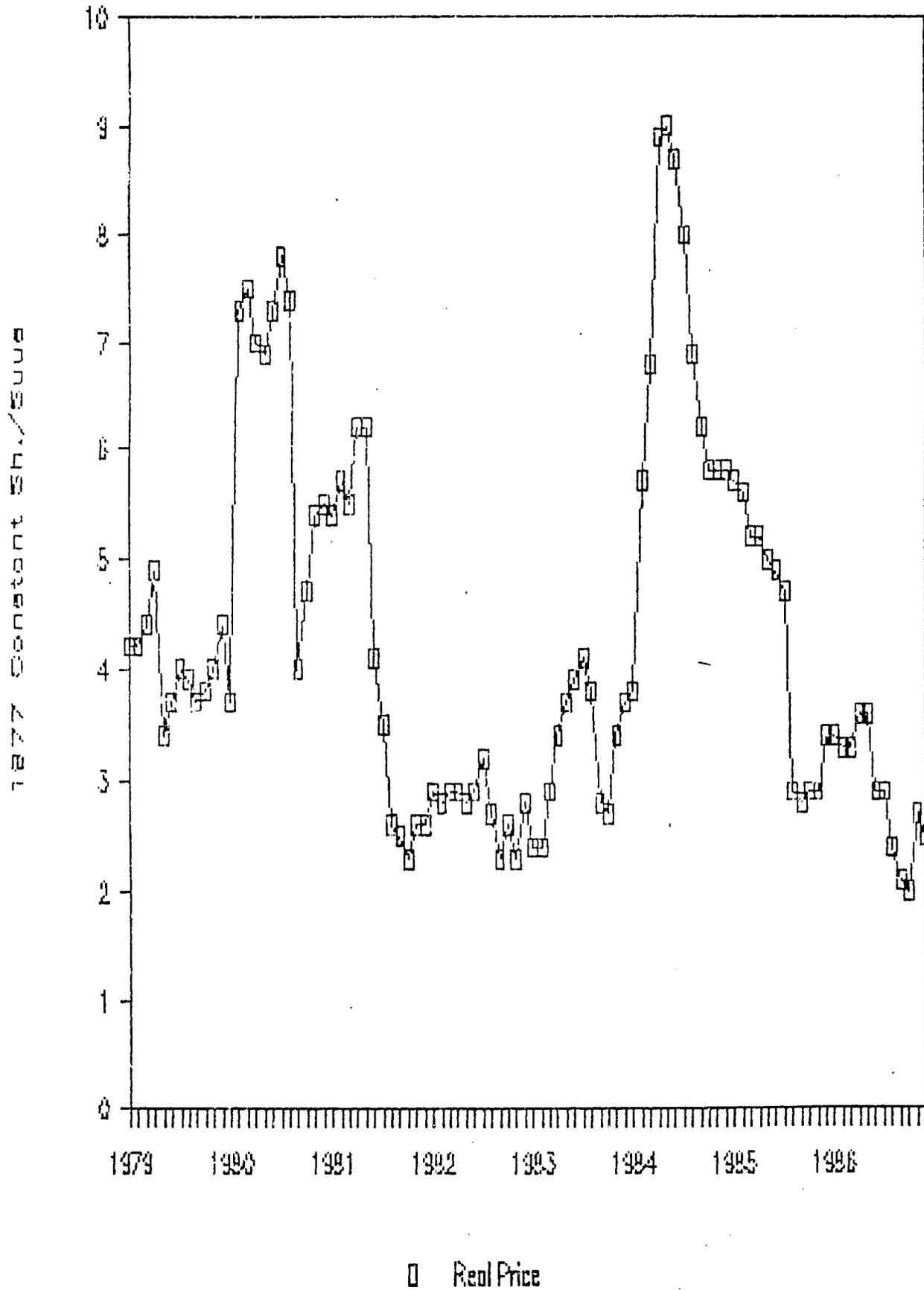
Source: Calculated from Table 1.

Note: Retail prices are reflatd using the monthly general CPI index for Mogadishu published by the Central Statistics Department (Ministry of National Planning). The reflatd prices are expressed in 1977 constant Shillings.

Other factors, such as the aggregate level of locally produced and imported cereals stocks, as well as the level of grain imports relative to earlier years, likely contributed to the precipitous rise in maize prices. ADC stocks were relatively low and quickly depleted in 1980 and 1984. Privately held stocks were likely low as well, particularly in 1980, after successive years of mediocre grain production, and as it was illegal to hold locally produced cereal stocks privately before 1982.

Real Retail Prices for Maize

in Mogadishu from Jan. 79 to Dec. '86



After peaking in 1984, real maize prices declined quite dramatically in 1985 and 1986. This was due in large part to the good Gu rains of 1985 and 1986, and the accompanying bumper maize and sorghum crops. Aggregate supply of domestically produced grains expanded significantly in the past two years, producers were able to rebuild depleted or low levels of stocks, and farmers sold surpluses to private traders and ADC.

5.0 Seasonal Price Variation

Retail prices vary within the year largely as a function of the available supply of maize and competing grains. The magnitude of seasonal price variation is illustrated clearly in Table 4 and Figure 3. Since the Gu maize is harvested in late August and September, one would expect that prices would reach their lowest point of the year during the period just after the harvest. Prices would then rise moderately until the Der harvest in January, level off or drop slightly depending on the Der harvest, and then rise steadily until the next Gu harvest.

The Grand Seasonal Index (GSI), which shows how prices have behaved in the various months over the past eight years, confirms the expected pattern. It unambiguously shows that retail prices have dipped during the three months of September, October, and November. The index value of 77.3 for the month of September indicates that the price in that month is 22.7% below the overall

average of the past eight years.²

Table 4

GRAND SEASONAL INDEX
FOR
MOGADISHU RETAIL MAIZE PRICES

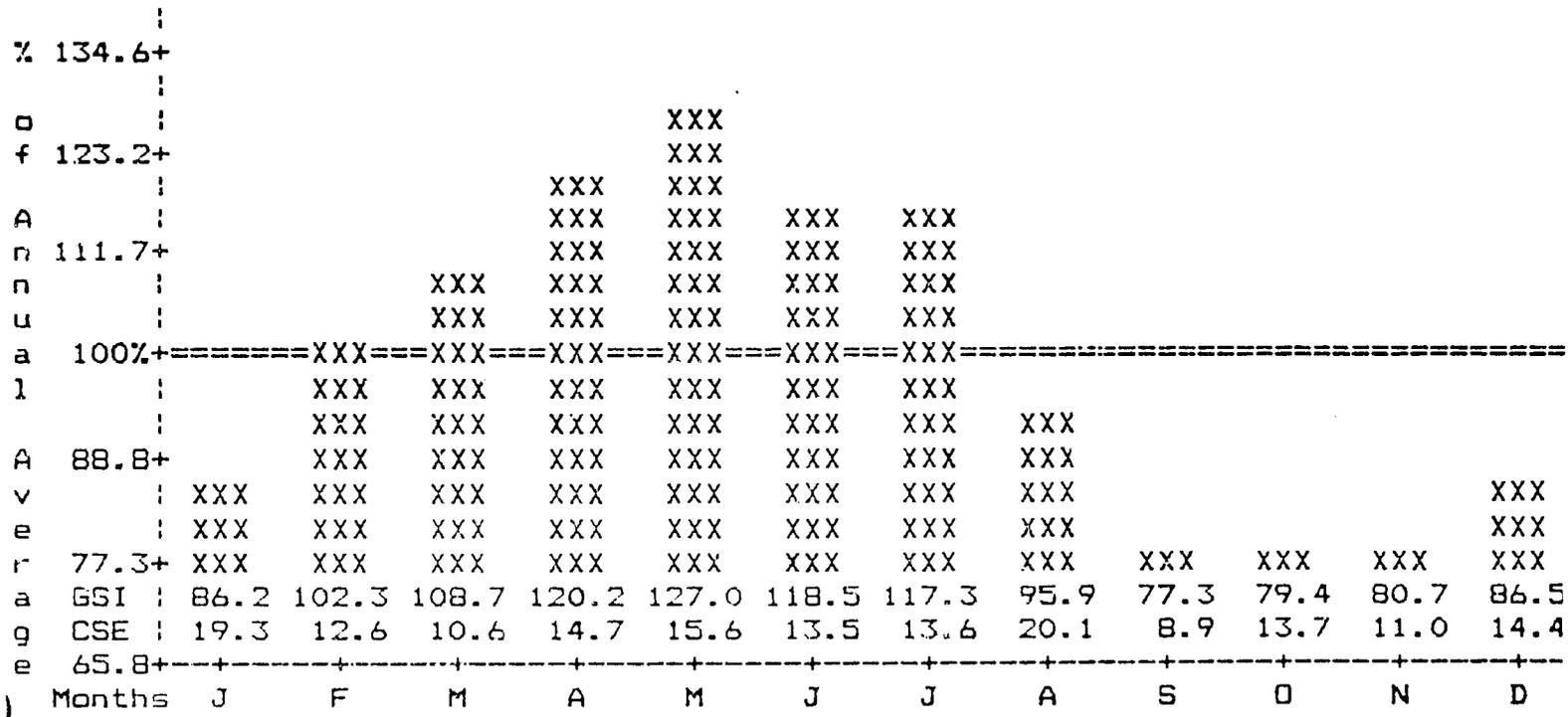
MONTH	AVERAGE SEASONAL INDEX	STANDARD ERROR	GRAND SEASONAL INDEX
JAN	83.63	18.78	84.76
FEB	91.88	13.67	93.12
MAR	102.87	13.74	104.25
APR	117.25	16.57	118.83
MAY	127.21	14.49	128.92
JUN	128.12	8.64	129.85
JUL	121.38	3.27	123.01
AUG	93.07	14.50	94.33
SEP	78.29	10.44	79.34
OCT	79.04	17.93	80.10
NOV	76.54	13.21	77.57
DEC	84.76	18.92	85.90

Source: Computed from Table 1.

As shown in Figure 2, maize prices are seasonally highest in the March-July period, peaking in May at 127.0. This is perhaps sooner in the marketing year than expected, as the Gu crops are not harvested before late August. One reason for this may be that food aid arrivals are larger and more frequent during the months of June and July, which would increase the aggregate grain supply and dampen maize prices.

²An average monthly index value equals 100.0. Any index value above 100.0 means that monthly retail maize price over the past eight year period is seasonally higher than average, while an index value below 100.0 indicates a seasonally lower than average price. See Goetz and Weber (1986) for an in-depth explanation of seasonal price analysis techniques.

Figure 3
GRAPH OF THE GRAND SEASONAL INDEX
FOR
MOGADISHU RETAIL MAIZE PRICE FROM JAN. 1979 TO DEC. 1986



GSI. IS THE GRAND SEASONAL INDEX
 CSE. REPRESENTS THE CORRECTED STANDARD ERROR

THE 100% LINE IN THE BARCHART REPRESENTS THE AVERAGE OF 30.563 CURRENCY UNITS OVER THE 8 YEAR PERIOD OF ANALYSIS OF COMMODITY PRICE DATA.
 THE MONTH INDEX VALUE INDICATES BY HOW MANY PERCENTAGE POINTS EACH MONTH'S VALUE LIES ABOVE OR BELOW THE ANNUAL AVERAGE.
 THE STANDARD ERROR OF 19.3 FOR JANUARY INDICATES THAT THE JANUARY VALUE WILL SLIE WITHIN PLUS OR MINUS 19.3 PERCENTAGE POINTS OF ITS MEAN IN 7 OUT OF 10 YEAF

6.0 Policy Implications of Seasonal Maize Price Patterns

In a well functioning economy, prices of a storable commodity such as maize should rise after the harvest to reflect the costs of storing maize, the opportunity cost of the capital tied up as maize inventory, and post-harvest losses. In instances where seasonal price variability becomes excessive, some type of government action may be expected or even required to improve the situation.

The first of such problematic circumstances under which government intervention may be required is at the time of a major drought and domestic production shortfall, during which retail prices of such staple cereals as maize are in excess of the costs of holding maize. During such times, the government needs to take effective steps to hold down retail commodity prices by either releasing its own food security reserves or by importing (commercial or food aid) maize and injecting it into the market.

A second situation where the government may need to intervene is when retail maize prices are far in excess of the costs involved in holding maize. This situation may arise as a result of a non-competitive market situation where a relatively small number of traders collude to extract high prices from consumers (or to pay low prices to farmers). This type of trader behavior is far more likely to be found in isolated rural areas, where markets are poorly integrated into the national cereal markets, market information is poor, and rural producers and consumers are at a bargaining disadvantage relative to traders.

In large urban markets and their surrounding market sheds, such as Mogadishu, where there are many buyers and sellers and where cereals supply and price information is widely available, such speculative or exploitative trader behavior is uncommon. Empirical studies in other African countries and regions of the developing world have generally shown little evidence of collusive behavior in grain trading in and around major urban markets, despite the views of many government officials to the contrary.

Another possible problem that might require government intervention is the case of marked seasonal price variability due to inefficiencies in the marketing system. These inefficiencies take the form of high marketing costs or poor integration of markets within a country or region. Investments in improved infrastructure and communications are often required to overcome high marketing costs and poor market information.

To effectively address any malfunctions in the marketing system, policy-makers need to gather and interpret market and price information continually. By monitoring seasonal and secular price trends for key agricultural commodities, policy-makers will develop a better feel for inter- and intra-annual variability of prices.

A certain degree of price variability is not only normal but desirable so as to induce farmers and private traders to store commodities for sale during periods of relative scarcity. Without predictable price variability and private incentives to

store, the government will be forced to assume most of the commercial-type storage functions, which typically proves to be very costly. Government storage of large quantities of grain has a very high opportunity cost. Resources tied up in costly storage programs cannot be used for productive investment elsewhere, such as in irrigation development or export promotion. Therefore, to the extent that it is possible, the GDS and other developing countries should view a certain degree of seasonal price variability as normal, desirable and indeed necessary for encouraging farmers and private traders to store grains and other storable commodities.

This argument is not meant to be interpreted as discouraging any government intervention that might affect prices. Clearly, any excessive variability in prices might require offsetting government responses, such as releasing/buying stocks or increasing/reducing imports of grain. The disturbingly abrupt rise in real maize retail prices from February through July 1984 is one period during which seasonal price variability appears to have been excessive. As such, it may have been a period during which some form of government intervention or change in policy may have been suitable and desirable.

7.0 Plans for Further Price Analysis

As of this writing, the only time-series price data available in Somalia for a period of several years or more are collected by the Central Statistical Department of the Ministry

of National Planning at the retail level in Mogadishu. Given scarce GOS resources, this was a logical place to begin collecting price data. Other agricultural price data, though not available in longer time-series, are also collected by other agencies and projects, such as the National Extension Service and the Planning Division of the MDA, for areas and markets outside Mogadishu. Such additional data collection needs to be encouraged. Moreover, every effort should be made to analyze these price data soon after they are collected and to provide policymakers with timely interpretations of price trends. With such analyses policymakers will be able to make better informed decisions regarding producer floor prices, releases of grain from stocks and stock acquisition, and the level and timing of cereals imports.

Beginning in September 1986 and extending into 1987, the Food Security project will monitor retail prices in Mogadishu, wholesale and farm level prices in the Lower and Middle Shebelli regions, and retail prices in selected towns in Southern Somalia, including Jenale, Jowhar, Buulo Burti, Baidoa, Kismayo, and Jilib. Periodic price reports will be issued for the benefit of policy-makers, other GOS staff, wholesale traders and importers, and other interested parties (e.g., projects, donor agencies). We welcome comments on this initial working paper and later price reports in the spirit of fostering a frank and critical assessment of current price levels, price trends, and price policies.

Appendix

Monthly Maize Retail Price Forecasts for 1987

Accurate forecasts of maize prices throughout the year have significant public and private payoff to decision-makers, giving them ample time to alter their decisions based on the forecasts. The government needs projected monthly price levels to determine whether it is necessary to intervene during periods of abnormally high and excessive retail prices of such staple cereals as maize. Public and private maize trading institutions require price forecasts to improve the timing of their purchases and sales decisions.

This appendix presents an example of the practical usefulness of seasonal price analysis, using the above described GSI index computed from the available data for Mogadishu. Monthly maize price in Mogadishu are projected for the 1987 calendar year.

The 1987 monthly projections are calculated using December 1986 GSI and retail price of one Shood of maize as a basis and the GSI value for each month.

To show how correctly the GSI model predicts retail maize prices, let us see a comparison of actual monthly prices and predicted prices for 1986. The 1986 monthly mean of prices and the GSI were used as the basis for the monthly projections together with each monthly GSI index.

Table A shows the actual and predicted monthly retail maize prices for the 12 months of 1986. The mean monthly actual prices is 17.90 So. Sh./Suus while the mean for the predicted prices is 17.89 So. Sh./Suus. The difference between actual and predicted prices is a negligible So. Sh. 0.01, and with a spread of 2.6 and minus 1.9 on the upper and lower sides respectively.

Table 5

Comparison Between 1986 Actual & Predicted Prices
(So. Sh. per Shood)

<u>Month</u>	<u>Actual Prices</u>	<u>Predicted Prices</u>	<u>Difference</u>
January	17.7	15.4	2.3
February	18.0	18.3	-0.3
March	18.7	19.5	-0.8
April	21.7	21.5	0.2
May	23.3	22.7	0.6
June	19.3	21.2	-1.9
July	19.7	21.0	-1.3
August	15.7	17.2	-1.5
September	14.0	13.8	0.2
October	13.7	14.2	-0.5
November	17.0	14.4	2.6
December	16.0	15.5	0.5
Average	17.90	17.89	0.01

From the above, we can evaluate the predictive power of using the GSI index for monthly price forecast. The graph on Page 20 further illustrates the close link between the forecasts and

actual 1986 prices.

Let us now look at the 1987 monthly projection of retail maize prices.

Table B

1987 Monthly Retail Maize Price Projection
(Quintal equivalents are in Parenthesis³)

<u>Month</u>	<u>Projected Price</u> (So. Sh./Shood)	<u>Month</u>	<u>Projected Price</u> (So. Sh./Shood)
January	15.9 (2270)	July	21.7 (3100)
February	18.9 (2700)	August	17.7 (2530)
March	20.1 (2870)	September	14.3 (2043)
April	22.2 (3170)	October	14.7 (2100)
May	23.5 (3357)	November	14.9 (2129)
June	21.9 (3128)	December	16.0 (2286)

The above forecasts are based on the following assumptions;
a) similar rate of inflation in 1987 as in 1986, and b) forecast does not account for food aid arrivals or ADC sales that might depress prices.

³. A Shood weighs approximately 700 grams. Thus, multiplying the Shood price with 143 gives the 100 Kg. retail price equivalent.

Comparison of Actual & Predicted

1988 Monthly Retail Moize Prices

