WHEAT PRICES AND PRICE POLICY IN TUNISIA

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Agricultural Economics
Research Report No. 2

June 1970

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INTRODUCTION

In his recent book <u>Getting Agriculture Moving</u>, Mosher delineates five essentials for agricultural development, namely markets for farm products, constantly changing technology, local availability of supplies and equipment, production incentives for farmers, and transportation. He emphasizes that each of these is essential and without anyone of them there can be no agricultural development.[1] While the principal engine of agricultural development is probably technological change, production incentives for farmers as reflected mainly through market prices and price relationships between farm output and inputs can either retard or advance development.

The purpose of this study is to analyze Tunisian wheat prices and price policy and their possible impact on current efforts to expand wheat production in the country. After a brief description of trends in Tunisian wheat production and the organization of the marketing system for wheat, this study proceeds to analyze (1) Tunisian wheat prices relative to world wheat prices, (2) trends in Tunisian wheat prices and the relationship of bread wheat (ble tendre) prices to durum (ble dur) prices, (3) wheat prices in Tunisia relative to other commodity prices, and (4) wheat prices relative to farm input prices.

WHEAT PRODUCTION IN TUNISIA

Wheat has been an important agricultural commodity in North Africa, of which Tunisia is a part, dating back to Roman times. Currently nearly one-third of the arable land in the country is devoted to wheat which typically accounts for about one-fifth of the value of agricultural output. Recent agricultural development plans

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in Tunisia have called for the transfer of some of the poorer wheat lands into labor intensive tree crops such as apricots, almonds, and olives as well as into permanent pasture. Nevertheless, wheat will probably continue to occupy an important place in Tunisian agriculture because alternative crops suited to dry land farming are limited..3/

In view of the importance of wheat in Tunisia's farm economy, the Government of Tunisia is now devoting high priority to increasing wheat production through the introduction of new high yielding varieties and the application of science and technology to wheat farming.

Two major breakthroughs in plant breeding in recent years are embodied in new wheat varieties developed in Mexico with assistance of the Rocekfeller Foundation. First, these new wheats are short-strawed and responsive to fertilizer. Second, they are relatively insensitive to differences in length of day and light intensity, and consequently, are adaptable to many areas throughout the world.

Mexican wheat varieties were planted on 32 farms in different parts of Tunisia with the proper fertilization and management practices in the fall of 1967. Preliminary results show that yields can be higher than with native varieties grown on the same farms.

While there is substantial evidence that wheat production in Tunisia could be increased through technological change such as new varieties, optimum fertilization, and other improved cultural practices, it cannot be overlooked that farmers must have adequate economic incentives to facilitate the adoption of these changes. Wheat prices should be favorable relative to prices of competing crops and commodities. Adequate supplies of fertilizer must not only be available, but fertilizer prices should be low relative to wheat prices to encourage its use by farmers. Finally, a unique problem in wheat price policy in Tunisia is the differential between durum prices and bread wheat prices. Since price differentials as well as yield differentials between the two wheats can influence the relative amounts produced of each, the economic rationale of these price differentials merits analysis.

MARKET ORGANIZATION AND WHEAT PRICES

Free marketing and pricing of wheat in the classical sense have virtually disappeared in most countries of the world. Nearly all wheat producing countries have instituted systems of supporting wheat prices to producers, and consequently, governments play a major role in wheat pricing and marketing. Tunisia is not an exception as the Tunisian

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3/For a discussion of trends and variabilities in Tunisian wheat production see J. D. Hyslop and R. P. Dahl, Wheat Production in Tunisia: Trends and Variabilities.

Government establishes prices to wheat producers and controls all of the wheat marketing including imports and exports.

There are three principal types of price guarantees to wheat producers in various countries throughout the world: (1) a guaranteed minimum price which sets a floor for domestic prices; (2) a guaranteed price range which permits domestic prices to fluctuate between floor and celing; and (3) a fixed price under which all producers receive the same price. The first type is most widely used and usually involves the least government interference with pricing and marketing. This system has been used by the United States where in recent years it has been modified to include direct income payments as well as guaranteed minimum prices to wheat producers who plant within acreage allotments set by the government. The second type has been widely used in Western Europe. It benefits the producer by guaranteeing minimum prices and the consumer by fixing maximum prices. The third type usually involves a government agency which buys all wheat at a fixed price.[4] This is the system used in Tunisia.

The government agency responsible for wheat marketing in Tunisia is the National Office for Cereals, Alimentary Legumes, and Other Agricultural Products, commonly referred to as the "Office of Cereals". This office was established in 1962 and superseded both the Provident Societies and what was called the "National Office of Cereals" which was originally a branch of the French Office of Cereals. This office assumed the commercial activities of the Provident Societies while the credit activities of the latter were turned over to the National Agricultural Bank which was established in 1959.[5] The principal functions of the Office of Cereals are:

1. To organize, control, and improve the production of cereals, cotton, and nutritional legumes.

2. To maintain a balance between supplies and needs of these commodities through purchasing and selling operations.

3. To organize and control the marketing of the commodities cited in (1) above.

4. To organize and control the production and distribution of livestock feed.[6]

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[4]Frank Barlow, Jr. and Susan Libbin, "International Grain Marketing, Pricing and Trade Policies," in Marketing Grain, North Central Regional Research Publication, No. 176, Purdue University Agricultural Experiment Station, January 1968.

[5]Duwaji, Ghazi, Economic Development in Tunisia, Frederick A. Praeger, Publishers, New York, 1967, page 103.

[6]Ibid., page 103.

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In other respects, the Office of Cereals is reported to have "defeated the middlemen", abolished the private trade in cereals, and dissolved the "Societe Tunisiennes de Prévoyance". The overall objective of the office is to maximize the farmer's income and to improve the quantity and quality of his agricultural production.7/

In carrying out its functions, the Office of Cereals purchases wheat directly from farmers or through marketing cooperatives which act as agents for the office. Producer prices for wheat are fixed each year by the government after consultation with a committee of representatives from the (1) Secretary of State for Plan and National Economy, (2) Under-Secretary of Agriculture, (3) National Union of Tunisian Farmers, (4) Flour Millers, (5) National Agricultural Bank, and (6) Office of Cereals.

Farm prices for wheat as established by this committee and administered by the Office of Cereals are announced in June or July of each year which is at harvest time for wheat that was planted the previous fall. This is in contrast to many other wheat producing countries with price support programs, including the United States, which announce wheat prices at planting time.

Farm prices for wheat in Tunisia do not vary throughout the year to reflect storage costs and, consequently, there is no economic incentive for farmers to store wheat after harvest for sale later in the year. Wheat is a seasonally produced commodity with consumption spread relatively uniformly throughout the year, so someone must store it from the time of production to consumption. This marketing function is performed by the Office of Cereals or marketing cooperatives which act as agents for the Office.

Producers prices for wheat of a given class and grade are also uniform throughout the country. In other words, they do not reflect differences in transportation and handling costs from the point of production to the consumption centers or large cities. Consequently, a farmer located a considerable distance from these consumption centers would receive the same price as a farmer adjacent to such centers.

In performing its function of purchasing wheat from farmers, the Office of Cereals maintains buying stations throughout the wheat producing areas. Farmers can sell their wheat directly to these buying stations. To an important extent, however, the Office of Cereals buys grain through a central wheat marketing cooperative, namely, Cooperative des Grandes Cultures (CGC). These cooperatives have grain handling and storage facilities in many villages in wheat growing regions through which the Office of Cereals can purchase wheat and hence does not have to maintain its own facilities.

7/La Presse, January 27, 1968.

The storage and handling facilities which formerly belonged to the
now defunct Cooperative des Agriculteur de Tunisie are modern, verticle,
concrete elevators at seven locations in Tunisia with a total storage
capacity of 170,000 metric tons. Its elevator at Djebel Djelloud, just
outside of Tunis, has a storage capacity of 60,000 metric tons with
excellent facilities for cleaning,. blending, aerating, storing wheat.
Another elevator owned by this cooperative at Bizerte has a capacity of
20,000 metric tons and has facilities for the automatic loading and un-
loading of sea-going vessels. A second former cooperative, SOCOBLE,
had elevators in ten locations with a total capacity of 76,500 tons.
The location and capacities of the elevators which now belong to CGC are
shown in Table 2.

These elevators have as modern and adequate grain handling and
storage facilities as would be found in most countries at a comparable
stage of economic development. Most of the wheat is shipped from point
to point within the country in bags. However, most storage - either
long term or short term - is done in bulk in elevators. The latter
facilitates the maintenance of wheat quality which is frequently a
problem if it must be stored for long periods in bags.

Table 2.--Location and Capacity of Principal Elevators

Former CCAT Location	Capacity (metric tons)	Former SOCOBLE Location	Capacity (metric tons)
Bizerte	20,000	Djebel Oust	30,000
Djebel Djelloud	60,000	Megrine	12,000
Manouba	50,000	Bou Salem	12,000
Mateur	*	Bou Arada	4,000
Medjez el-Bab	*	El Aroussa	1,000
Pont-du-Fahs	*	El Akhouat	4,000
Gaafour	*	Le Sers	6,000
		Le Kef	1,000
Total Capacity	170,000	Beja	3,000
		Ousseltia	3,500
*Transitory Elevators		Total Capacity	76,500

The Cooperative des Grandes Cultures functions primarily as an agent
for the Office of Cereals. They purchase grain from farmers at country
locations and store grain for the account of the Office of Cereals and
receive fees for their services. They also ship wheat in specified
quantities and grades to buyers who place orders with the Office of
Cereals.

An office with a monopoly on wheat marketing such as the Office of
Cereals in Tunisia is responsible for making adequate supplies avail-
able to consumers the whole year round. Consequently, it must maintain
necessary stocks to meet these distribution requirements and reserves
against year-to-year variations in output. Access to adequate storage
is important. While such storage is available mainly through the
Cooperative des Grandes Cultures, the Office of Cereals maintains some
supplementary facilities of its own.

Marketing margins for wheat from the farmer to the consumer are
also fixed in Tunisia by the same process as producer prices. In fact,
prices and margins are administratively determined from the farm price
of wheat through the price of bread at retail.

The prices and marketing margins for bread wheat in 1965-66 from
farm to retail are shown in Table 3.

Table 3.--Marketing margins for bread wheat in Tunisia, July 1, 1965 -
          June 30, 1966

	Price per quintal of wheat	Price per quintal of flour
Farm price of wheat	3d450	4d530
Plus:		
Transportation, storage, and operating cost of Office of Cereals	0d416	0d546*
Price to flour miller	3d866	5d076
Plus: Milling margin	0d525	0d689*
Wholesale price of flour	4d391	5d765**
Plus: Baker's margin	2d150*	2d821
Retail price of bread	6d541	8d586

* Some prices and margins were reported on the basis of a quintal of
wheat and some on the basis of a quintal of flour. To maintain consistency
within each column of the table, the prices were converted on the basis of
76.2 kilograms of flour for each quintal of wheat. The * in each column
indicates where each conversion was made.

** The wholesale price of one quintal of medium quality flour as sold
for home baking. It is assumed that this is also the price at which flour
is sold to commercial bakeries.

Source: Jabeur El-Abri, "Analyse des résultats de la compagne de
         commercialisation des céreales et légumineuses 1965/66".
         Secrétariat d'Etat au Plan et à l'Economie Nationale,
         Division due Developpement Agricole.

The first column of the table expresses the prices and marketing margins in terms of one quintal of wheat. The Office of Cereals paid the farmer 3d450 per quintal of wheat. This Office was allowed a margin of 0d416 per quintal to cover transportation, storage and its own operating costs. Consequently, its selling price to flour mills was 3d866 per quintal. The milling margin was fixed at 0d525 so the wholesale price of flour per quintal of wheat became 4d391. Finally, the baking margin was 2d150 which when added to the wholesale price of flour gave a retail price of bread of 6d541 per quintal of wheat.

Since one quintal of wheat would yield an average of only 0.76 quintals of flour, the prices and marketing margins expressed in terms of one quintal of flour are shown in the second column of the table for comparison purposes.

It is beyond the scope of this study to analyze the efficiency of the above marketing margins for bread wheat or how closely they might conform to margins as determined in a free market. Such information, while important, is not easy to obtain because the researcher is con-fronted with the problem of not having standards by which to measure performance. Abbott makes a similar point in a recently published article.

"As more marketing sectors are assigned to marketing boards and state-sponsored organizations (such as is the case in several newly independent African countries including Tunisia) or taken over by enterprises integrating production, processing and sales; information on margins will become increasingly necessary as a guide to administrative decision-making. Yet the growth of such organizations makes effective margin analysis more difficult.

The monopoly marketing boards of Burma, Senegal, etc., combine such differing activities that overall price-margin comparisons are meaningless. Material for comparison of sectional opera-tions either between boards or with other systems is difficult to obtain."8/

Marketing studies which may discover the means through which mar-keting efficiency can be increased and costs reduced should be supported by both the marketing boards themselves and the government agencies to which they report. Saving in marketing costs may be reflected in either higher prices to the farmer or lower prices to the consumer, or both.

8/J. C. Abbott, "The Development of Marketing Institutions," in H. M. Southworth and B. F. Johnston, Agricultural Development and Economic Growth, Cornell University Press, Ithaca, New York, 1967, page 373.

WHEAT PRICE POLICY AND THE AGRICULTURAL TERMS OF TRADE

The governments of most wheat producing countries of the world have programs which guarantee minimum prices to wheat producers. Historically, the objectives of these programs, as developed in the United States and Western Europe, were the maintenance of a reasonable degree of stability in wheat prices and the support of farm income. The maintenance of price stability was the principal objective of these programs in their early years, but increasingly the emphasis has shifted to the support of farm income through the use of minimum guaranteed prices.

In contrast, one well-known economist has recently presented evidence that many countries in the early stages of economic development have followed just the opposite course in their overall economic policy. That is, prices to agricultural producers have been deliberately kept at low levels to maintain low food and raw material prices. From the point of view of economic development, the purpose has been to facilitate the transfer of investment capital from the agricultural sector of the industrial.

It is inevitable that agriculture must provide a substantial share of the capital for economic growth that can be generated internally in underdeveloped countries where agriculture contributes a substantial share toward the gross national product and more than half of the population derive their livelihood from agriculture. However, if such capital is extracted at too rapid a rate through the deliberate depression of the agricultural terms of trade (the prices of agricultural commodities relative to prices of non-farm goods and services) a country may fail to achieve the minimum growth in agriculture that is necessary to achieve its overall growth targets. This minimum growth in agriculture may be quite high according to Krishna[9] because population growth together with the effect of growing incomes may result in increases in the demand for food as much as 4 percent per year.[10] If food output grows at a slower rate, a developing country will be forced to use scarce foreign exchange to finance food imports.

Failing to achieve the necessary minimum growth in agricultural output necessary to sustain overall growth objectives, many developing countries have abandoned their policies of maintaining low farm prices

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[9]/Raj Krishna, "Agricultural Price Policy and Economic Development," Ibid., page 498.

[10]/Ibid., page 501.

and substituted, in their stead, prices designed to provide incentives
for increased agricultural production. Under the latter, guaranteed
minimum prices to producers have been introduced in countries that
heretofore had no such programs. In other countries price guarantees
have been increased substantially to provide necessary incentives to
farmers to expand food output. In India, for example, the government
guaranteed price of wheat was increased from $78.63 per metric ton in
1964/65 to $103.98 per ton in 1965/66.11/ The Communist countries,
including the Soviet Union and those of Eastern Europe, have also
substantially increased agricultural prices to producers in recent
years in an attempt to expand food output which in the past had grown
too slowly to achieve overall growth objectives.

Since many developing countries have recognized the incentive effect
of agricultural prices in economic development, we now turn to analysis
of wheat prices and the agricultural terms of trade in Tunisia.

TUNISIAN WHEAT PRICES AND WORLD PRICES

One basis of judging the level of producer wheat prices in Tunisia
is to compare them with producer prices in other countries. There are
many difficulties in making precise comparisons of producer wheat prices
among countries, some of which are: (1) trade disequilibrium between
hard and soft currency areas so conversions of national currency quota-
tions into dollars may not reflect the "true" comparative purchasing
power of wheat prices in various countries, (2) wheat quality differences
and lack of uniformity in grades and standards among countries,
(3) price quotations for different locations, and (4) differences in
price support systems and types of government payments to producers.12/
Despite these difficulties, comparison of the basic producer prices
for wheat among countries provides some basis for judging the relative
magnitude of wheat prices in an individual country.

As shown in Figure 1, basic producer prices for wheat (used as a
basis for government guaranteed prices in 1966-67 ranged from $45.93
per metric ton in the United States to $187.39 per ton in Finland. It
should be noted, however, that the $45.93 per ton in the United States
is only the price support loan. In addition to this guaranteed min-
imum price, farmers participating in the 1966 wheat program received
marketing certificates (direct income payments) which had an average

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11/International Wheat Council, World Wheat Statistics 1967, page 52.

12/Frank D. Barlow, Jr., and Susan A. Libbin, op. cit.

Figure 1. Basic Producer Prices for Wheat--U.S. $ per metric ton, 1966/67.

Country	Price
United States	45.93
Argentina	48.87
Canada	50.71
Ecuador	55.48
Australia	63.93
United Kingdom	70.18
Mexico	73.12
New Zealand	74.22
Kenya	74.96
Pakistan	76.06
U.A.R. (Egypt)	77.53
Yugoslavia	80.10
Tunisia	83.78
South Africa	85.98
Morocco	87.08
Turkey	88.92
France	90.39
Austria	95.17
Ireland	97.00
Belgium	97.37
Italy	98.11
Greece	98.47
Algeria	101.41
India	103.99
Germany F.R.	110.60
Spain	110.97
Sweden	110.97
Portugal	114.64
Brazil	119.42
Japan	139.63
Norway	152.49
Switzerland	159.10
Finland	187.39

U. S. Dollars per Metric Ton

Source: International Wheat Council, <u>World Wheat Statistics</u>, 1967.

value of about $22.05 per ton of wheat produced by program participants, so the guaranteed minimum wheat price to participating farmers in the United States was actually about $67.97 per ton of wheat produced. Figure 1 also shows that producer prices for wheat are considerably lower in the principal exporting countries such as the United States, Canada, Australia, and Argentina than in the principal commercial importing countries -- notably the developed countries of Western Europe and Japan. France, the only European country which is traditionally an exporter of wheat, had the highest producer wheat prices, $90.39 per ton, of any of the important exporting countries.

India, Pakistan, and Egypt have been three of the largest non-commercial importers of wheat in recent years. Producer prices for wheat in these countries were $103.98, $76.06, and $77.53 per ton, respectively.

The North African countries of Algeria, Morocco, and Tunisia, have also been relatively large non-commercial wheat importers under such government programs as U.S. Food for Peace. These three countries are important producers of durum wheat and prices shown for them in Figure 1 are farm prices for durum. Bread wheat has a lower price in all three countries. Producer prices for durum were the highest in Algeria at $101.41 per ton. They were, the lowest in Tunisia at $83.77 per ton while in Morocco they were $85.98. Prior to 1964, when the Tunisian dinar was devalued, producer prices for durum were nearly equal in Tunisia and Algeria.

Durum wheat typically commands a premium over other wheats in world markets. The size of this premium varies considerably from year to year primarily in response to variations in the supply of durum. When one considers that the wheat price for Tunisia in Figure 1 represents a higher valued wheat than most other countries except Algeria and Morocco, it is evident that Tunisian wheat prices are not high relative to those in other wheat importing countries.

TRENDS IN WHEAT PRICES

As indicated previously, wheat prices in Tunisia are adminstratively set each year. Base farm prices for both bread wheat and durum were changed relatively little during the decade 1956/57 to 1966/67. The base prices of both wheats were increased in 1958/59, particularly for durum, the price of which was increased 5d010 per metric ton from the previous year, while the base price for bread wheat was increased only 1d510. Prices were reduced the following year, however, and remained at 34d450 per metric ton for bread wheat and 42d450 per metric ton for durum during the period 1959/60 through 1966/67.

A major adjustment was made in wheat prices in 1967/68, when bread wheat prices were increased 8d550 per metric ton and durum prices were raised 6d000 per metric ton. Since bread wheat prices were increased more than durum prices, the price differential between the two wheats

was reduced to 5d000 per metric ton, the smallest differential during
the entire period. This indicates that the Government of Tunisia may
be attempting to increase bread wheat production relative to durum
production and recognition of price policy as one means of achieving
this objective.

Tunisia's current production of bread wheat does not cover its
requirements so substantial quantities must be imported each year.
In the five years 1960/61 to 1964/65, imports of bread wheat aver-
aged 223,000 metric tons per year -- much of which came from the U.S.
under the Food for Peace Program. On the other hand, Tunisia has been
a traditional exporter of durum, with durum exports averaging 64,000
metric tons during the five years 1960/61-1964/65.

Although the average yield of bread wheat in Tunisia for the
period 1946-1966 was approximately twice that of durum, more than
five times as much land resources have been devoted to durum as to
bread wheat.13/ The economic rationale of producing lower yielding
durum for export while importing higher yielding bread wheat depends
upon world price differentials between the two wheats which will be
analyzed subsequently.

As shown in Table 4, the net price received by farmers for wheat
in Tunisia is lower than the base farm price because of taxes levied
on wheat marketing. These taxes are approximately 10 percent of the
base farm price. In 1967/68, the base farm price per metric ton of
bread wheat was 43d000. Taxes levided on each ton were 4d212 so the
net farm price was 38d788.

Since taxes are levied on all wheat marketings, it is illegal
for farmers to sell wheat to anyone other than the Office of Cereals
or their authorized purchasing agents who must collect the taxes when
wheat is sold to them by farmers. Another reason why it is illegal
for farmers to sell wheat to anyone other than the Office of Cereals
is that the latter has a monopoly on secondary wheat sales in the
country. As previously discussed, it sells wheat to flour millers or
directly to consumers at a fixed margin above the base farm price for
wheat which is the price it pays the farmer. It should be recognized,
however, that substantial quantities of wheat are marketed outside of
these official channels through the weekly markets which take place
all over Tunisia. The Consumption Survey of 1966 gave some indication
of the importance of this "parallel" market.

Price Relationships Between Durum and Bread Wheat. Durum and
bread wheat have different end uses. Durum wheat (Triticum durum) is
used primarily for pasta products, macaroni, and spaghetti, and in these

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13/Hyslop and Dahl, op. cit., page 13.

Table 4.--Farm Prices, Marketing Taxes, and Net Prices Received by Producers for Wheat, Tunisia 1956/57- 1967/68

Year beginning July 1	Bread wheat			Durum			Price differentials; Durum less bread wheat, net prices	Price ratios; Durum: Bread wheat base prices
	Base price	Taxes	Net price	Base price	Taxes	Net price		
	Tunisian dinars per metric ton							
1956/57	34^d.500	2^d.334	32^d.166	39^d.670	2^d.631	37^d.039	4^d.873	1.15:1
1957/58	34.500	2.834	31.666	39.670	4.631	35.039	3.373	1.15:1
1958/59	35.960	4.408	31.552	44.680	3.547	41.133	9.581	1.24:1
1959/60	34.450	3.637	30.863	42.000	3.231	38.769	7.906	1.22:1
1960/61	34.450	3.637	30.863	42.000	2.891	39.109	8.246	1.22:1
1961/62	34.450	2.437	32.063	42.000	2.891	39.109	7.046	1.22:1
1962/63	34.450	2.437	32.063	42.000	2.891	39.109	7.046	1.22:1
1963/64	34.450	3.637	30.863	42.000	4.891	37.109	6.246	1.22:1
1964/65	34.450	2.437	32.063	42.000	2.891	39.109	7.046	1.22:1
1965/66	34.450	2.646	31.854	42.000	3.145	38.855	7.001	1.22:1
1966/67	34.450	2.646	31.854	42.000	3.145	38.855	7.001	1.22:1
1967/68	43.000	4.212	38.788	48.000	4.544	43.456	4.668	1.12:1

products it has no really good substitute. In Tunisia, it is also the preferred raw material for couscous, a staple in the Tunisian diet. Per capita utilization of durum wheat for food in Tunisia is the second largest of any country in the world. In 1960/61, per capita utilization of durum for food in Tunisia was 55.9 kilograms per capita - this was second only to Algeria, which had a per capita utilization of 88.3 kilograms.[14]/ However, the 1966 Consumption Survey resulted in an estimate of durum wheat consumption in Tunisia during that year of 89 kilograms per capita.

The production of durum wheat is much more concentrated geographically in the world than is bread wheat. The main producing areas are the countries in the Mediterranean basin, North America, and particular areas in the USSR and Argentina. Since durum production is concentrated in semi-arid regions, variations in weather often cause world production to vary substantially from year to year. Another factor contributing to variations in durum production is the shift of acreage from durum to other wheats following years when durum prices are low. Generally durum yields are lower than other wheat yields in most of the main durum producing areas of the world because technological advance in the breeding of higher-yielding varieties has been less impressive than with other wheats. The resulting lower profitability of durum (except in periods of scarcity and high prices) causes growers to shift to other wheats when supplies are abundant and prices are low.[15]/

Variations in durum production, coupled with an inelastic demand, which is due in part to the poor substitutability of other wheats for durum in pasta products, results in wide price fluctuations for durum from year to year. This is well illustrated in Figure 2 which shows the market price differentials between durum and northern spring wheat, a good quality bread wheat, in the United States. U.S. price data are presented here as being close approximations to world wheat prices. No other long-term price series are currently available to show world price relationships.

In 1954, due to short supplies of durum its price rose to $149,55 per metric ton, a premium of $52.55 per ton over that of northern spring. Durum supplies subsequently increased due to increased plantings, and the differential between the prices for the two wheats fell. The short harvest in 1961 again sent durum to a substantial ($34.17) premium over northern spring. Since 1963, however, durum supplies have been ample, and its price has tended to remain very close to, or even below, the price of northern spring wheat. It is interesting to note, however, that 1963 was the first year since 1949, a period of 14 years, in which the price of durum equaled that of northern spring wheat

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14/A World Survey of the Production, Grade, Prices and Consumption of Durum Wheat, International Wheat Council, 28 Haymarket, London, S.W.1, November 1963, page 10.

15/Ibid., page 2.
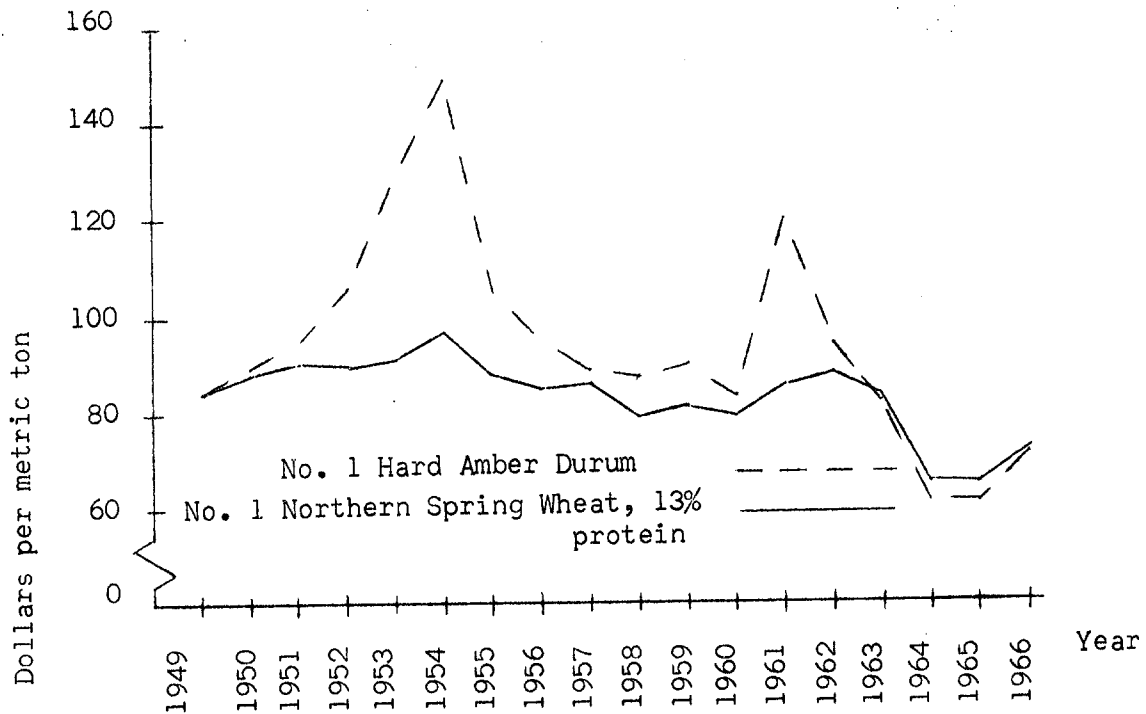
Figure 2 Northern spring wheat and durum, annual average cash prices at
Minneapolis, years beginning July 1, 1949-1966.

Source: USDA, Economic Research Service, Statistical Bulletin 423, Food
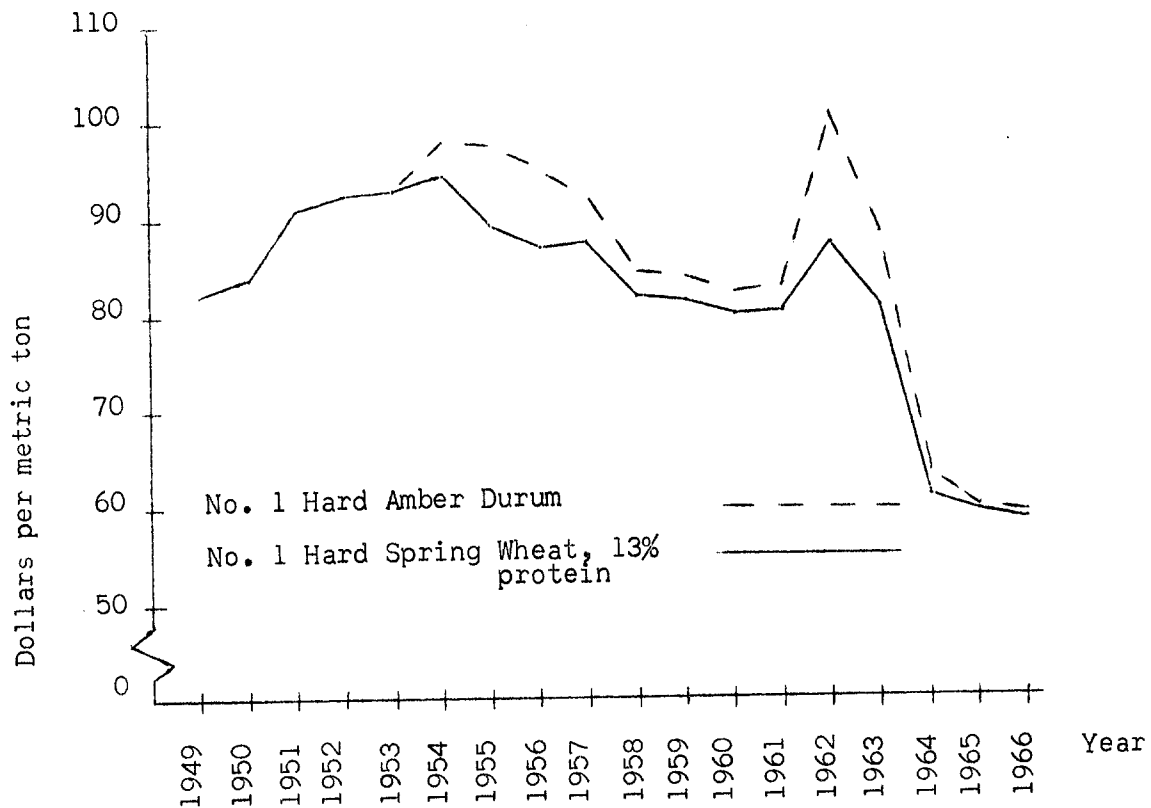Grain Statistics through 1967, April, 1968 (See Appendix Table 3)

Figure 3 Northern spring wheat and durum, annual average terminal price
supports at Minneapolis, crop years 1949-1966.

Note: Support prices for durum were equal to thos for Northern spring
from 1945-1953/

Source: Same as Figure 2. (See Appendix Table 3)

Partial data for the 1967-68 crop year again show durum at a premium over northern spring. During the five months, October 1967 through February 1968, the premium averaged $11.76 per ton.16/ The early indications as to reponse by farmers to this premium are shown by the prospective plantings for 1968. The USDA reported in March 1968 that durum wheat plantings were expected to be 20 percent more than those in 1967 at 1.4 million hectares.17/

An important implication of these year-to-year changes in price and production is the tremendous flexibility in durum production possessed by large countries such as the United States and Canada relative to small countries such as Tunisia. This is illustrated by the situation existing in the state of North Dakota from which more than 85 percent of U.S. durum production comes. During the five years 1961-1965, total wheat area averaged 2.4 million hectares of which 720 thousand were in durum.18/ In Tunisia the total wheat area averaged 1.1 million hectares. Of this 931 thousand were in durum.19/ Although durum production in North Dakota tends to be concentrated within a small area of the state, the state's entire wheat producing area is available for expansion under profitable market conditions. Thus the 20 percent expansion from 1967 to 1968 (the same percentage increase is estimated for North Dakota), which is large by any standards, might be very difficult in Tunisia.

In Figure 3 (on the same page as Figure 2) are shown the support prices at terminal market places in the U.S. for durum and northern spring wheat. These guaranteed minimum prices represent the U.S. Government's attempts to provide support for the incomes of wheat farmers and still try to maintain some measure of flexibility in response to changing market situations. As is expected, government support prices tend to change, from year-to-year, less drastically than do the market prices, and their changes tend to lag behind those of the market. Thus, in comparing Figures 2 and 3, it is seen that the guaranteed minimum prices did not recognize any premium for durum until 1954, at least three years after the premium in the market began its quite dramatic rise to the peak in 1954. Similarly, the market premium peak in 1961 was not matched in price supports until the following year, and price supports for durum were maintained at a premium over those for northern spring wheat for several years after the market price had fallen below that of northern spring.

16/USDA, Economic Research Service, Wheat Situation, March 1968.

17/USDA, Statistical Reporting Service, Crop Production, March 15, 1968

18/USDA, Economic Research Service, Crop Production, 1967 Annual Summary, December 19, 1967.

19/Hyslop and Dahl, op.cit., page 4.

The price of durum in Tunisia has been maintained at a considerably higher level than the price of bread wheat as compared with recent trends in the world market. This is well illustrated by the data in Figure 4. Except for 1961, the ratio of the base price for durum to that for bread wheat in Tunisia has been well above that in the United States. As shown in Table 4 the difference between durum and bread wheat prices to the farmer (base prices less taxes) has been around seven dinars per ton. The economic rationale behind this seemingly excessive price for durum relative to bread wheat was the special trading relationship Tunisia enjoyed with France. Tunisia exported durum to France in exchange for imports of French bread wheat. France maintained a sizeable premium for durum (in 1964 the internal price of durum at 117.21 dollars in France was 1.17 times the price of bread wheat at 100.31 dollars per ton),[20] and Tunisia was able to trade durum for bread wheat on these terms. This arrangement has since been terminated, and, although the unified internal prices in the EEC are still at approximately the same ratio to one another,[21] Tunisia is subject to the same set of tariffs and trade regulations by which any other exporter to the EEC is bound.

Despite the ending of this special trading relation, a high price ratio for durum relative to bread wheat was maintained. Tunisia was in a position to import a large part of its soft wheat needs from the USA under PL 480.

However, it has more recently increased the price of bread wheat relative to durum. For the 1967 harvest, the base price for durum was increased to 48,000 per ton while that for bread wheat went to 43,000. As a result, the durum - bread wheat price ratio was reduced from 1,22:1 to 1.12:1. This has the effect of increasing production incentives for bread wheat relative to that for durum, and it should have some influence on increasing bread wheat production.

The recent adjustments in wheat prices in Tunisia are in accord with recent changes in world market price differentials between durum and bread wheat. The world durum supply situation has improved since 1962-63; since then world production has fluctuated around 14 million tons compared with an average level of close to 10 million tons in the previous four years.[22] As a result, world durum prices have declined relative to bread wheat prices.

Increased world durum production since 1962-63 has been due to (1) fortuitous balancing of good weather conditions in some regions with bad weather in others, (2) increased plantings of durum by Canadian

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20/Barlow and Libbin, op. cit., page 177.

21/Ibid.

22/Durum Wheat in 1964/65 and 1965/66, International Wheat Council, 28 Haymarket, London, S.W. 1, April 1967, page 20.

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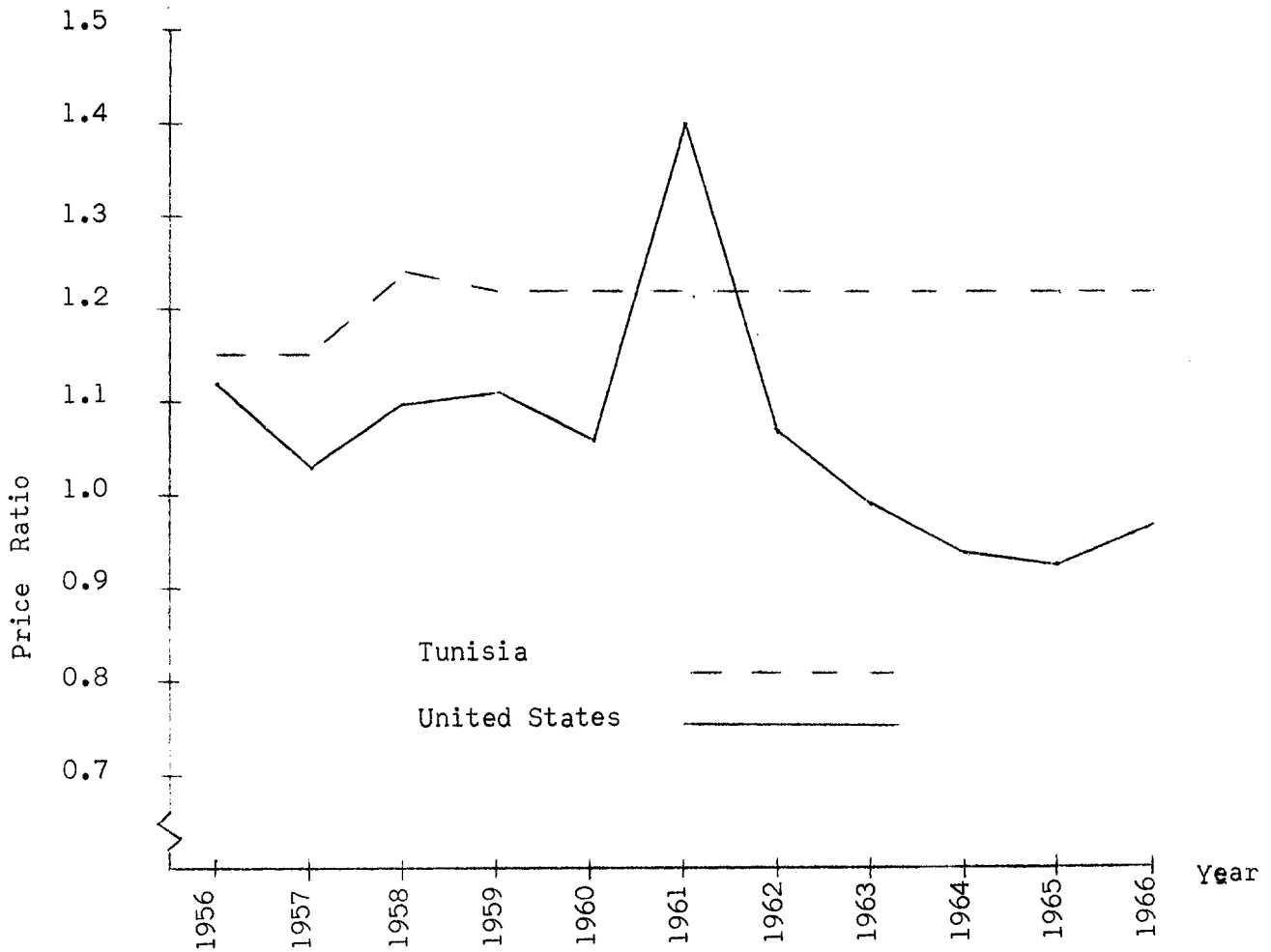
Figure 4. Ratios of the price of durum wheat to those of bread
wheat in the U.S. and in Tunisia.

Note: Tunisia ratios are based on the base prices for durum and
bread wheat paid by the Office des Cereales.

U.S. prices are annual average cash prices for No. 1 hard
amber durum and No. 1 Northern spring wheat, 13% protein
in Minneapolis.

Sources: Office des Cereales and Food Grain Statistics
through 1967
(See Table 4 and Appendix Table 3 for data)

producers in 1965, and (3) increased yields of durum compared with bread
wheat yields in the United States. In the early 1950's, durum yields
in the United States were about 25 percent below the overall yields of
other varieties, but with the introduction of new, disease resistant
varieties, durum yields increased to almost 30 percent above those of
other varieties in the 1960's.[23]/

What is an appropriate general price relationship between durum
and other wheats? The International Wheat Council points out that there
is no simple answer to this question. This organization goes on to
point out that presumably the ideal at the present time would be a
more or less stable premium for durum wheats above bread wheats at a
level which would provide reasonable returns for exporting countries
without being high enough to discourage consumption or to encourage
substitution in importing countries. The corresponding reduction of
wide price fluctuations might well lead to an expansion of demand, thus
bringing indirect as well as direct advantages to durum producers.[24]/

Thus far, durum wheat has been excluded from maximum price pro-
visions of successive International Wheat Agreement and under the new
International Grains Arrangement of 1967. This is mainly because
durum has normally been sold at a premium, which at times has bee con-
siderable, over bread wheats. The existence of this premium is due
partly to the poor substitutability of other wheats in pasta produc-
tion and partly to lower yields and greater risks inherent in durum
production.

TUNISIAN WHEAT PRICES: TRENDS AND COMPARISONS

Another way of analyzing wheat prices from the policy making point
of view is to examine trends in these prices relative to those of other
commodities important to the wheat producer. In this section, through
the use of diagrams, trends in the prices of durum and bread wheat over
time will be related to changes in the overall price level, changes in
the prices of other important agricultural commodities, and changes in
the prices of some important industrial products. The data from which
these diagrams were prepared are shown in Appendix Tables 4, 5 and 6.

The "Real" Price of Wheat. The first important comparison to be
made is that between the prices of wheat and the general price level.
Such a comparison is useful because it indicates the change in the
"terms of trade" for wheat relative to all other commodities as a group.
That is, it indicates changes in the quantity of all other goods for
which one unit of wheat can be exchanged. Thus it can be used as an
aid in judging the overall incentive effect of wheat prices in Tunisia.

23/Ibid., pages 17-21.

24/Ibid., page 21.

The Index of Wholesale Prices in Tunisia in current use is based
on commodity prices and weights from the year 1940. There are rather
serious flaws in this index which adversely affect its present-day
relevance. These flaws are probably such as to over-state the degree
of increase in the general wholesale price level since 1940 and also
between any two years subsequent to 1940 (see appendix). However,
since this is the only price index for Tunisia which covers the time
span under discussion, it was used in computing "real" prices for
wheat.

It is clearly shown in Figure 5 that the significant increases
in current prices for both durum and bread wheat since 1949 have been
outweighed by the larger increases in the general price level.
Through the harvest of 1966, the price of durum had increased from
2932 millimes per quintal to 4200 millimes.25/ Most of this increase
of about 43 percent was accomplished by 1951 when the durum price was
4140 millimes per quintal, 41 percent above the price in 1949. During
the same period (1945-1966), however, the wholesale price index had
risen so high that the "real" price of durum fell to 2207 millimes per
quintal -- a decline of over 24 percent. The increase in the price of
durum for the 1967 harvest to 4800 millimes still left the "real"
price of that wheat at 2419 millimes -- more than 17 percent below its
1949 level.

The pattern for bread wheat is almost identical to that for durum.
The current price of 3450 millimes per quintal in 1966 was 38 percent
greater than the 2500 millimes in 1949. All of this increase occurred
between 1945 and 1951. From 1951 through 1953, the current price of
bread wheat was 3600 millimes per quintal -- actually higher than that
paid from 1954 through 1966. In contrast, the real price of bread
wheat fell to 1803 millimes in 1966 -- more than 27 percent below its
1949 level. The increase in the current price to 4300 millimes per
quintal in 1967, a more substantial increase than that for durum,
brought the "real" price of bread wheat up to 2171 millimes. This was
13 percent below its price in 1949.

Prices for Wheat and Other Agricultural Commodities. The previous
comparison examined the prices of wheats relative to changes in the
general price level. It is also useful to examine the question of the
level of wheat prices from a more detailed point of view: comparing
changes in wheat prices with changes in the prices of some specific
products which are important to agriculture. First, wheat prices will
be examined in comparison with other agricultural prices. Later, the
comparison will be with the prices of some important non-agricultural
goods.

25/The millime is the direct descendant of the French franc which
was the unit of currency until the Banque Centrale de Tunisie became
the currency issuing institution in late 1958.
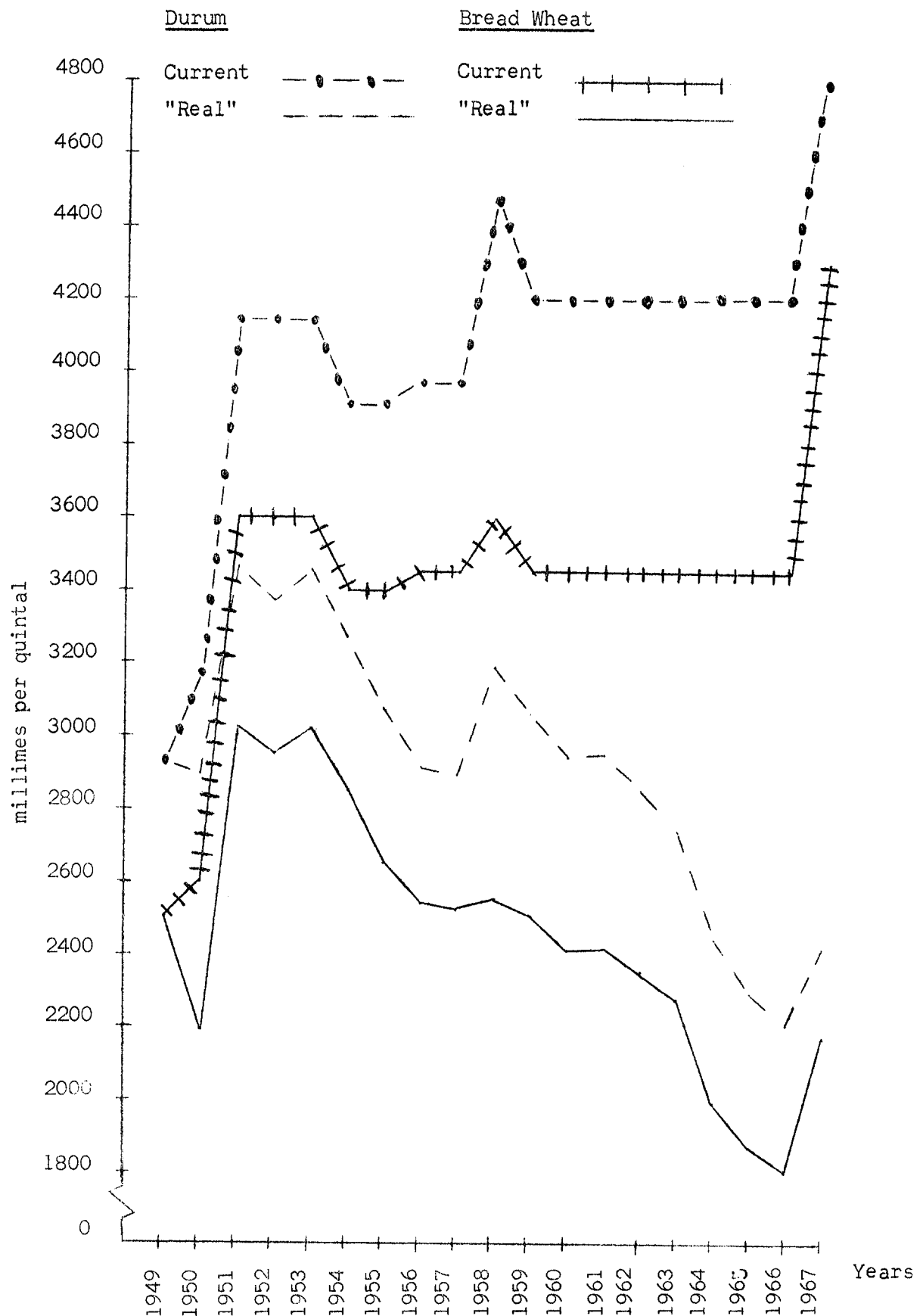
Figure 5   Wheat prices in Tunisia, 1949-1967: Current Prices and "Real" Prices
(current prices deflated by wholesale price index, 1949=100)

Sources: See Appendix Table 4.

Figures 6 and 7 show price relatives for durum and bread wheat, respectively, along with those for the average prices of horse beans, (fèves and féverolles) and those for livestock products, beef, lamb, and milk.

A price relative is the ratio of the price of a commodity in the current year to its price in the base year. The ratio is expressed as a percentage, and a price relative of 150 in any year would indicate that the price is that year 1.5 times the price for the product in the base year.

Price relatives are useful devises for examining price changes for diverse products and for prices reported at different levels in the marketing process. Thus the reported prices for durum and bread wheat are at the farm level, those for beef, lamb and horse beans are wholesale prices, and those for milk are retail prices. However, diagrams employing price relatives must be carefully interpreted since they are sensitive to the period selected as the base. The year 1949 was the first year for which data were readily available. Its selection as the base year was arbitrary. If the same data had been put on 1954 and 1955 as the base year, the price changes for wheat, for horse beans, and for milk would have appeared somewhat smaller while those for lamb and beef would have appeared to be greater. Yet, if carefully interpreted, the data on a 1954   1955 base would be described, except for the numbers used, much as are the present Figures 6 and 7 on the 1949 base, and the conclusions drawn would be exactly the same. As an example, the price relatives for horse beans on the 1949 base and on the 1954 base are compared in Table 5 below:

Table 5.--Comparison of price relatives for horse beans on 1949 and 1954 bases

Year	Price (mill/qx)	Price relative 1949 = 100	Price relative 1954 = 100	Ratio of price relatives on 1954 base
1949	2088	100.0	90.1	$\frac{90.1}{90.1} = 1.000$
1954	2317	111.0	100.1	$\frac{100.0}{90.1} = 1.110$
1967	6000	287.4	259.0	$\frac{260.0}{90.1} = 2.875$
Difference: 1967 less 1949		187.4	169.9	
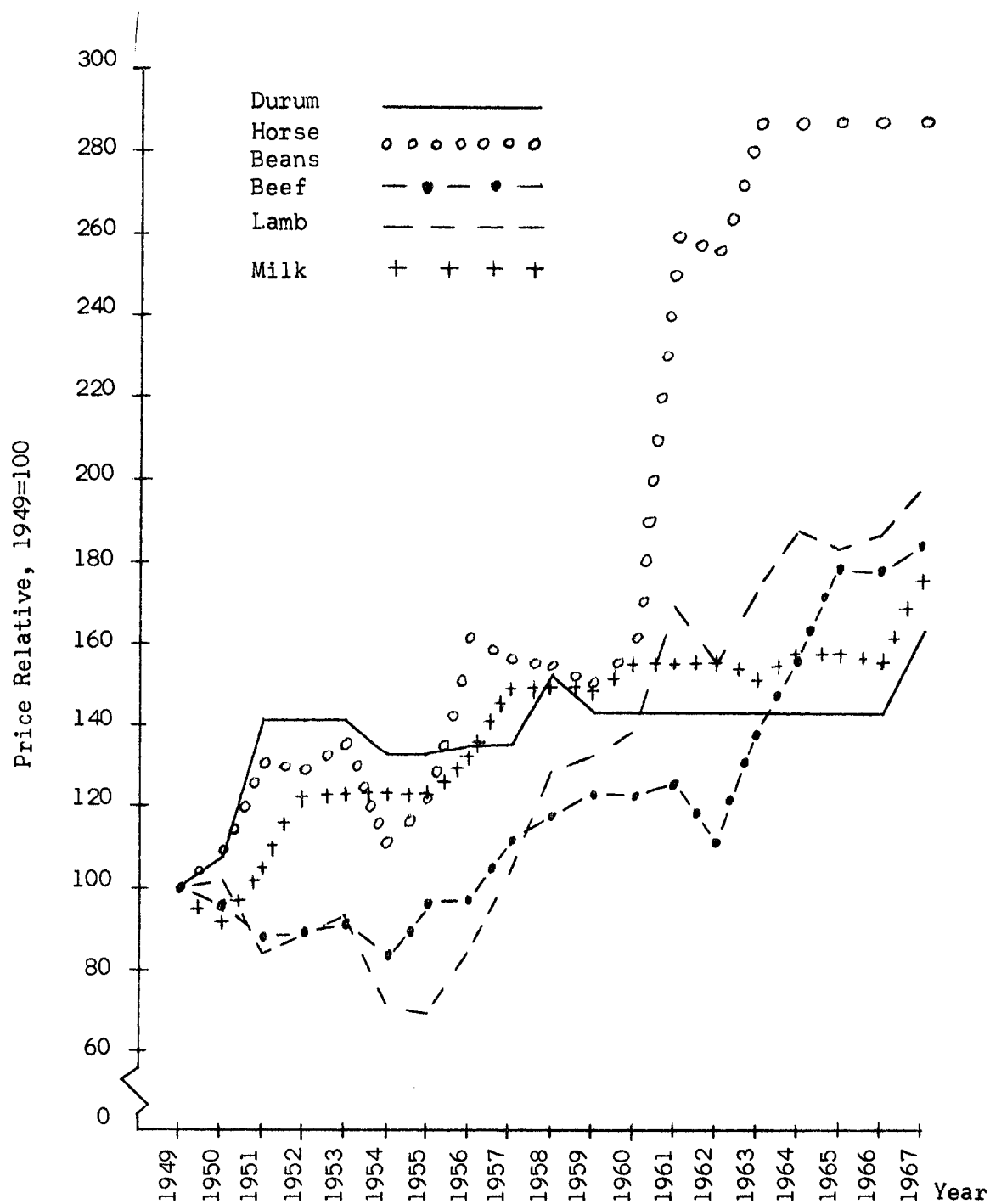
Figure 6. Price relatives for durum, horse beans, beef, lamb and milk, 1949-1967 (1949=100).

Sources: See Appendix Table 5.
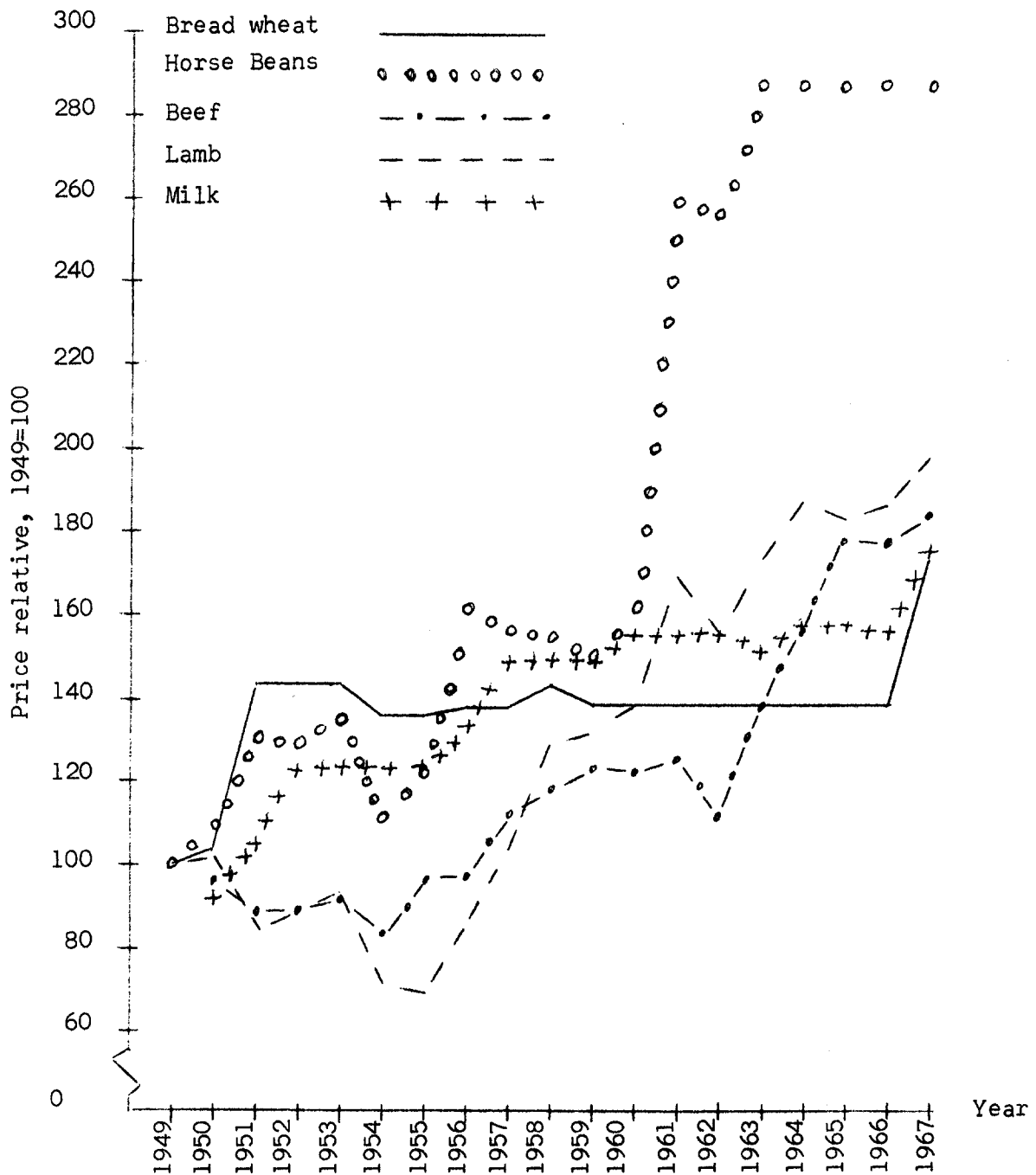
Figure 7   Price relatives for bread wheat, horse beans, beef, lamb and milk
            1949-1967   (1949=100)

Sources: See Appendix Table 5.

The table shows that the difference between the values of the price relatives (1949 = 100) for 1967 and for 1949 is 187.4 while the same difference for the price relatives on the 1954 base is only 169.9. Yet, whichever base is chosen, the ratios of 1954 and 1967 prices to the 1949 prices are, except for rounding error, exactly the same.

Turning back to the data as actually presented in Figures 6 and 7 it is observed that the prices of beef, lamb, and horse beans have risen relative to prices for durum, bread wheat, and milk since 1949. The increase for horse beans was quite striking, particularly between 1960 and 1963. In that three-year period the wholesale price for horse beans rose from 3375 millimes per quintal to 6000 millimes, an increase of almost 78 percent. In terms of the price relative, this was from 162 in 1960 to 287 in 1963.

Prices for wholesale meats, beef and lamb, tended to move together over the 1949-1967 period. They declined from 1949 to 1954-1955 and then rose, quite sharply, up to the present. Their overall (1949-1967) increases were 84 percent for beef and 98 percent for lamb. From 1954 to 1967, their price relatives increased from 84 to 184 for beef and from 71 to 198 for lamb. These represented increases of 122 percent and 179 percent for beef and lamb, respectively, between 1954 and 1967.

Over the full period, 1949-1967, prices for bread wheat, durum, and milk generally lagged behind those of the other commodities dis- cussed. Between those two years, the retail price of milk increased by 75 percent with a period of relative stability from 1957 through 1966. Base prices at the farm level for durum and bread wheat increased by 64 percent and 72 percent, respectively. Most of these increases occurred between 1949 and 1951, with another significant increase for the 1967 harvest. The period 1951 through 1966 was one of remarkable stability in wheat prices.

It may be possible to induce, from the behavior of these prices over time, certain principles governing agricultural price policy. These relate to the importance of overall price stability and to the importance of "politically sensitive" commodities in consumer's budgets.

In recent years Tunisia's attempts to achieve economic growth have met with considerable success. It has been estimated that be- tween 1960 and 1965, the per capita Gross Domestic Product grew, in real terms, at the annual compound rate of 3.3 percent.26/ The route

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26/Computed from data given in Les Comptes de la Nation, Tome II and Annexes Statistique ou Rapport sur le Budget Economique de l'Annee 1968. Both of these works are published by the Secrétariat d'Etat au Plan et à l'Economie Nationale.

toward development has, of course, included a fairly heavy emphasis on investment. Over the same period, 1960-1965, gross investment in fixed capital averaged 21 percent of GDP.27/ The cost of this investment in terms of foregone current goods and services was reflected in price level changes. Thus the cost of living index for the city of Tunis increased by 14.1 percent between 1960 and 1965. On an annual basis this is a compound rate of increase of 2.7 percent.28/

There can be no doubt that price stability for wheats and for milk is a reflection of the political importance of these commodities, particularly in relation to the quite significant increases in the overall cost of living. Wheat, of course, is a staple in the Tunisian diet, especially in the diets of the large mass of low income consumers. Milk is a "politically sensitive" food commodity throughout the world because its protective association with the health and development of children.

The price changes for horse beans can also be viewed in this same general framework. Before the harvest of 1962 prices for horse beans were uncontrolled. It was in 1962, after the 61 percent increase in price from 1960-61, that the trade in horse beans and chick peas was taken over by the Office des Céréales.

Prices for Wheats and Some Non-agricultural Commodities. It is equally useful to examine changes in wheat prices in relation to changes in the prices of some commodities which originate outside of agriculture but which, nevertheless, are important to farmers and to agricultural production.

Two price series were selected as being important which were readily obtainable from published sources. These were the price series for superphosphate, an important fertilizer which is locally produced, and the index of wholesale prices for industrial commodities. The price series for the third commodity, ammonitrate another important fertilizer, is not published on any regular basis. The price series for this commodity, from 1956 to 1967, was drawn together and made available by the Union Nationale des Agriculteurs. As of the present date, all nitrogen fertilizers are imported into Tunisia.

The price relatives computed from the data were set to the base year 1956 because this was the earliest year for which data for ammonitrate was available.

As shown in Figure 8, the only price which has not risen relative to the prices of wheats is that of ammonitrate. Part of this lack of increase is a reflection of a subsidy paid by the Tunisian

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27/Ibid.

28/Annuaire Statistique de la Tunisie, 1964 et 1965.
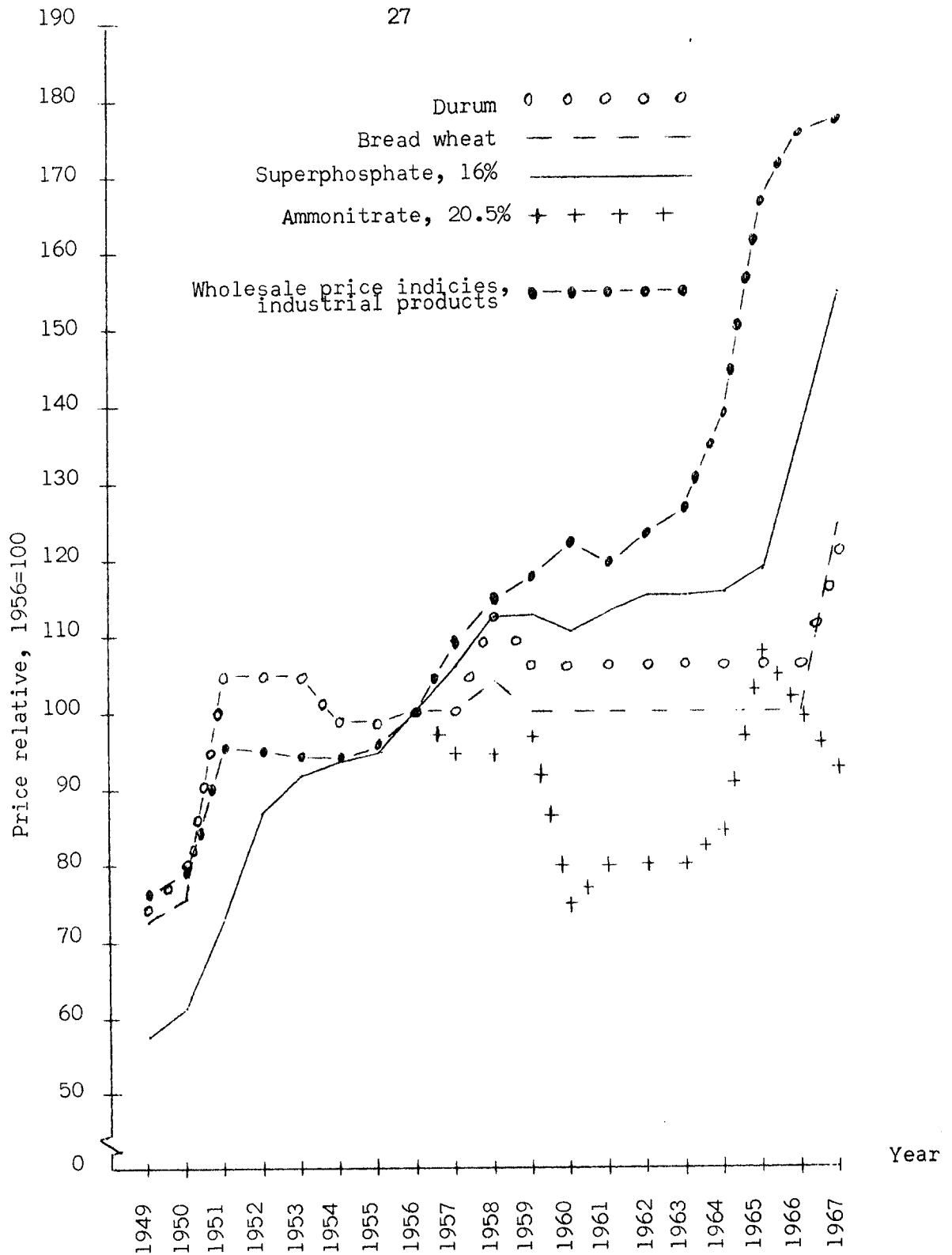
Figure 8. Price relatives for durum, bread wheat, superphosphate, ammonitrate, and the index of wholeslae prices for industrial products, 1949-1967 (1956 = 100)

Sources: See Appendix Table 6

Government to encourage its use. For nitrogen fertilizers this has amounted to between 30 and 40 dinars per ton of plant nutrient in recent years.[29]/ Other important factors have been the secular decline in the real costs of their production and distribution.[30]/

Turning to the other prices carried on the chart, that for super-phosphate and the price index for industrial products have risen considerably higher since 1949 than have the prices for wheat. The price relative for durum went from 73.9 in 1949 to 121.0 in 1967, while that for bread wheat increased from 72.5 in 1949 to 124.6. These were increases of 64 and 72 percent, respectively, for the two wheats. Over that same period the price of superphosphate and the value of the price index for industrial products more than doubled. The price relative for superphosphate increased from 57.6 in 1949 to 154.5 in 1967, an increase of 168 percent. The price relative (1956 = 100) for the index of industrial prices went from 75.9 to 177.3. This was an increase of 134 percent.

The meaning of these changes in price relatives can be illustrated by the change in the purchasing power of wheat. Since the base year for the price relatives is 1956, it is convenient to define a unit of the non-agricultural product as the quantity for which one quintal of wheat could be exchanged in 1956. With this definition, changes in purchasing power of wheat are shown in Table 6.

Table 6.--Purchasing Power of Wheat: The number of units of the non-agricultural commodity for which one quintal of wheat can be exchanged

Year	Durum			Bread wheat		
	Super-phos-phate (units)	Ammo-nitrate (units)	Indus-trial products (units)	Super-phos-phate (units)	Ammo-nitrate (units)	Indus-trial products (units)
1949	1.28	-	0.97	1.25	-	0.96
1956	1.00	1.00	1.00	1.00	1.00	1.00
1967	0.78	1.30	0.68	0.81	1.34	0.70

[29]/Food and Agriculture Organization of the United Nations, Annuaire de la Production, Vol. 20, 1966, page 604.

[30]/Gian S. Sahota, Fertilizer and Economic Development, New York, Frederick A. Praeger, Publishers, 1968.

One quintal of durum could have been exchanged for one unit of the bundle of industrial products in 1956. It could have been exchanged for 0.96 units in 1949. Today (1967), it could be exchanged for only 0.68 units. This indicates that the price of durum rose slightly relative to the industrial price index between 1949 and 1956 and fell rather sharply thereafter. The other numbers can be similarly interpreted. Those for bread wheat are slightly greater than those for durum in 1967. This reflects the somewhat greater price increase for bread wheat relative to that for durum for the 1967/68 marketing season.

In summary, the foregoing analysis has shown that (1) increases in current prices for both durum and bread wheat from 1949 to 1967 were outweighed by increases in the general price level so the real prices of both wheats declined over this period, (2) current prices of both durum and bread wheat also lagged behind price increases for other important agricultural commodities such as beef, lamb, and horse beans, and (3) prices of both wheats also have not increased as rapidly as prices of industrial products which probably reflect the overall level of input costs to farmers. Of the commodities studied, the only price which has not risen relative to wheat prices is that of ammonitrate.

In view of the above, it can be argued that farmers have not received economic incentives through the price mechanism to expand wheat output. If the agricultural production policy goal is to expand wheat output relative to that of other agricultural commodities, the Government of Tunisia might consider increases in wheat prices as one means of achieving this goal.

What is the nature of the supply response of Tunisian wheat farmers to changes in price? This question will be subjected to detailed analysis and presented in another paper. For the moment, it is possible to present a graphical analysis which suggests the responsiveness of farmers to changes in wheat prices.

WHEAT PRICE — QUANTITY RELATIONSHIPS

Changes over time in the land area devoted to wheat are related to the decision making process of farmers in Tunisia. The allocation of land area among crops is one of the principal means of adjustment to whatever forces the producer is responsive. Thus, examination of the changes in wheat area over time can provide some insight into the decision making process of farmers in Tunisia. It is possible to analyze changes in wheat area by types of wheat for both Tunisian and European farmers in Tunisia during the period 1945-58. These area changes are shown in Figures 9 and 10.
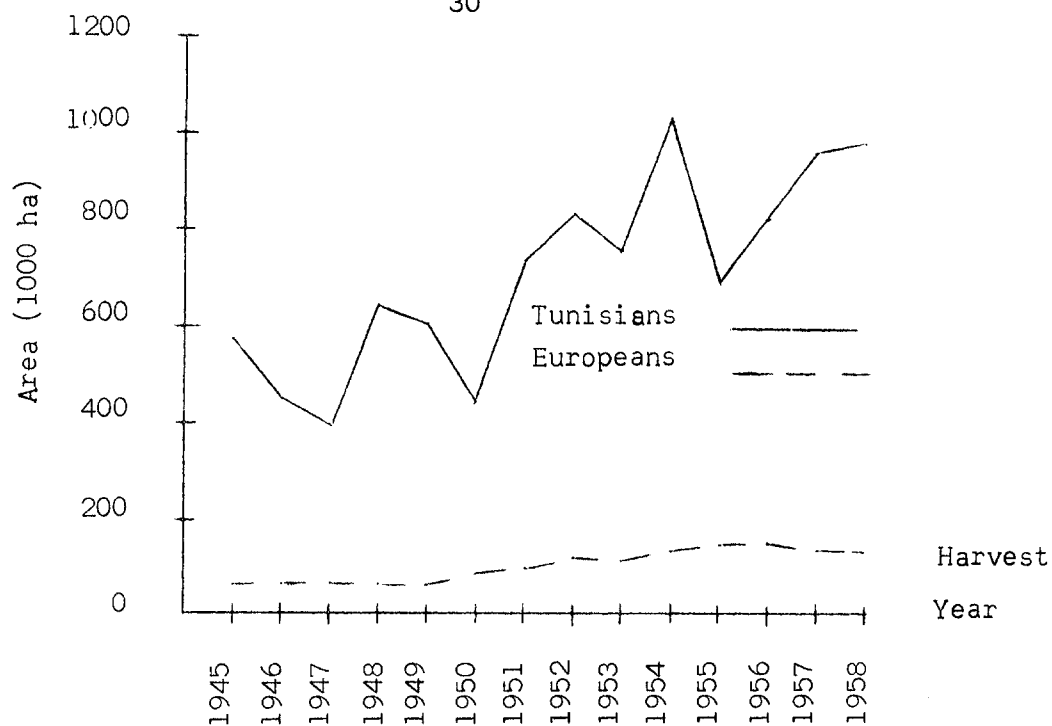
Figure 9. Area planted to durum by Tunisian and European farmers, 1945-58.

Sources; Appendix Table 9
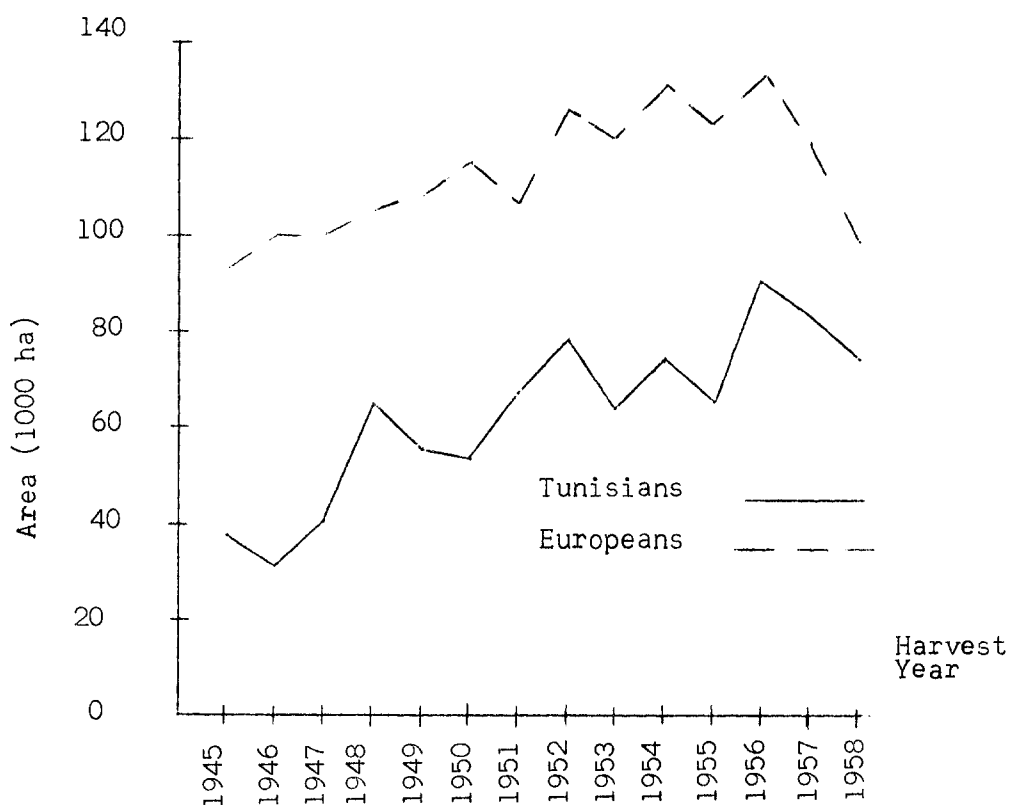
Figure 10. Area planted to bread wheat by Tunisian and European farmers, 1945-58.

Source: Appendix Table 9

Over the period, the area devoted to durum by both groups of farmers increased remarkably. The Tunisians' area almost doubled from 576 thousand hectares in 1945 (harvest year) to 976 thousand in 1958 (harvest year). The Europeans' acreage more than doubled from 63 thousand hectares to more than 130 thousand over the same period. Bread wheat area also increased, although there was a decline in the Europeans' area after 1955. The Tunisians' area more than doubled over the period from 31 thousand hectares to 75 thousand. The decline in the Europeans' bread wheat area after 1955 was not apparently a substitution of hectares in durum for those in bread wheat. After 1955, the Europeans' area in durum did not increase to replace the hectares removed from bread wheat.

The breakdown of the data between Tunisians and Europeans provides some opportunity to compare the two groups in their responsiveness to changes in price. The period studied was one of large price increases for both durum and bread wheat. As shown by Table 7, prices of both commodities increased by more than five times.

Table 7.--Producers' prices of blé dur and blé tendre in current francs per quintal - harvest years 1944-1957

Harvest year	Blé dur (durum)	Blé tendre (bread wheat)
1944	630	550
1945	900	800
1946	1255	1103
1947	1595	1400
1948	2645	2300
1949	2932	2500
1950	3172	2600
1951	4140	3600
1952	4140	3600
1953	4140	3600
1954	3910	3400
1955	3910	3400
1956	3967	3450
1957	3967	3450

Source: Annuaire Statistique de la Tunisie, various issues, 1946-1959.

The gross correlations between area planted to each wheat and that wheat's price lagged one year31/ indicate the likelihood of a positive relationship between supply and price for both European and Tunisian farmers. However, there are strong trend factors in both the price and area variables. To partially compensate for these trends, as well as to indicate that the relationship between bread wheat and durum is of primary importance, it was desirable to modify the price and quantity variables somewhat. The quantity variable was expressed as the percentage of total wheat area devoted to durum, and the price variable was expressed as the difference between the price of durum and that of bread wheat. The simple correlations between those modified variables for both Tunisian and European farmers is shown in Figure 11.

Although there is still some trend in the data, the positive relationship between price and quantity of durum relative to bread wheat is quite evident for the European farmers. And except for the harvest years, 1945 and 1946, such a relationship appears to exist for the Tunisian farmers as well.

In order to show that the choice between durum and bread wheat is also affected by their comparative yields, gross returns per hectare (i.e., average yield times price) were calculated for each wheat for both grups of farmers. These are shown in Table 8 for the years 1945 through 1958.

The scatter diagrams of percent of total wheat area in durum and difference between gross returns from durum and gross returns from bread wheat were plotted for Tunisian and European farmers (Figure 12). Again the positive relationship between financial returns and quantity supplied is apparent. In this figure it is more apparent for Tunisian farmers than in the previous diagram. However, the European farmers still appear to be more responsive to changes in their financial returns. This may be attributable in part to the fact that many small Tunisian farmers produce mainly for home consumption and, hence, produce durum which is preferred for couscous -- a staple in the Tunisian diet. Much of the durum produced by Tunisian farmers was produced in the Center and South of Tunisia while most of their bread wheat was grown in the North. This is reflected by the data in Table 8a which show that for Tunisian farmers, the gross returns per hectare from durum were almost invariably lower than those from bread wheat. Rainfall in the Center and South is much less plentiful and agricultural resources are limited. Consequently, there is a higher proportion of subsistence farmers who practice traditional farming methods. Euopean farmers, on the other hand, were concentrated on large farms on the most productive land in Northern Tunisia. Gross returns obtained by the Europeans from the two wheats were quite close to one

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31/A price lag of at least one year is required. Prices are announced at harvest time, too late to be guides for the production of the current crop.

Price difference,
durum less bread wheat
(mill./qx) 1/

Price difference,
durum less bread wheat
(mill./qx)

600

500

400

300

200

100

0

89.0   90.0   91.0   92.0   93.0   94.0

52   53   54
57   58
56   55
51
50

49

48

47

46
45

35.0   40.0   45.0   50.0   55.0

54
53   52
57   58
56   55
51
50

49

48

47

46
45

Tunisian farmers   Percent of wheat   European farmers   Percent of wheat
                        are in durum   area in durum
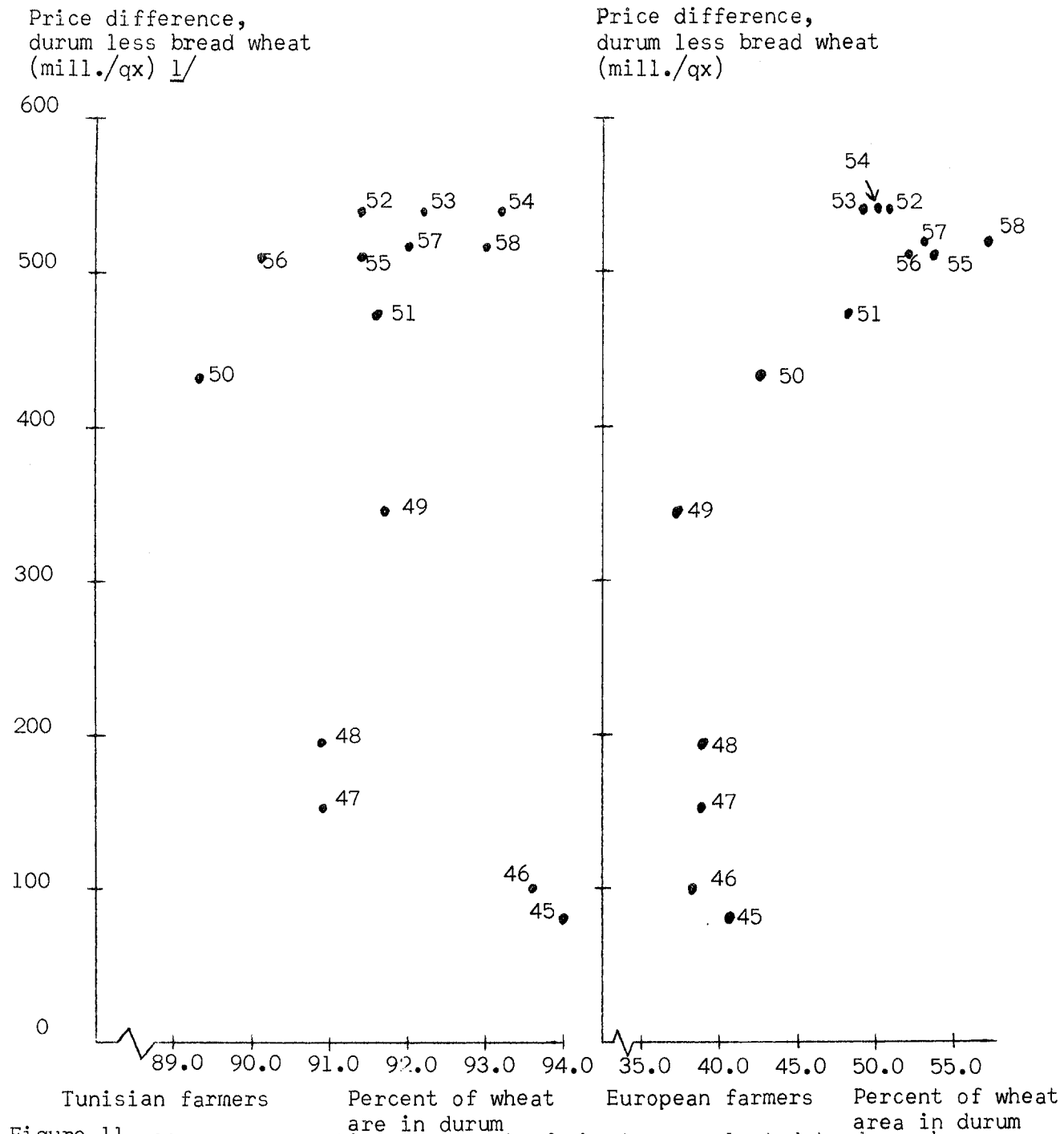
Figure 11. Simple correlation: Percent of wheat area planted to durum by
           Tunisians and Europeans and difference between the prices of durum
           and bread wheat. Price difference lagged one year. Harvest years
           1945-1958.

Source: Appendix Table 9.

1/ The Tunisian millime is the lineal descendant of the pre-1959 French Frame

Durum and bread wheat
difference in groos returns
per hectare, dinars per hectare 1/

Durum and bread wheat difference
in gross returns per hectare, dinars
per heactare

Percent of wheat
area in durum

Tunisian farmers

European farmers
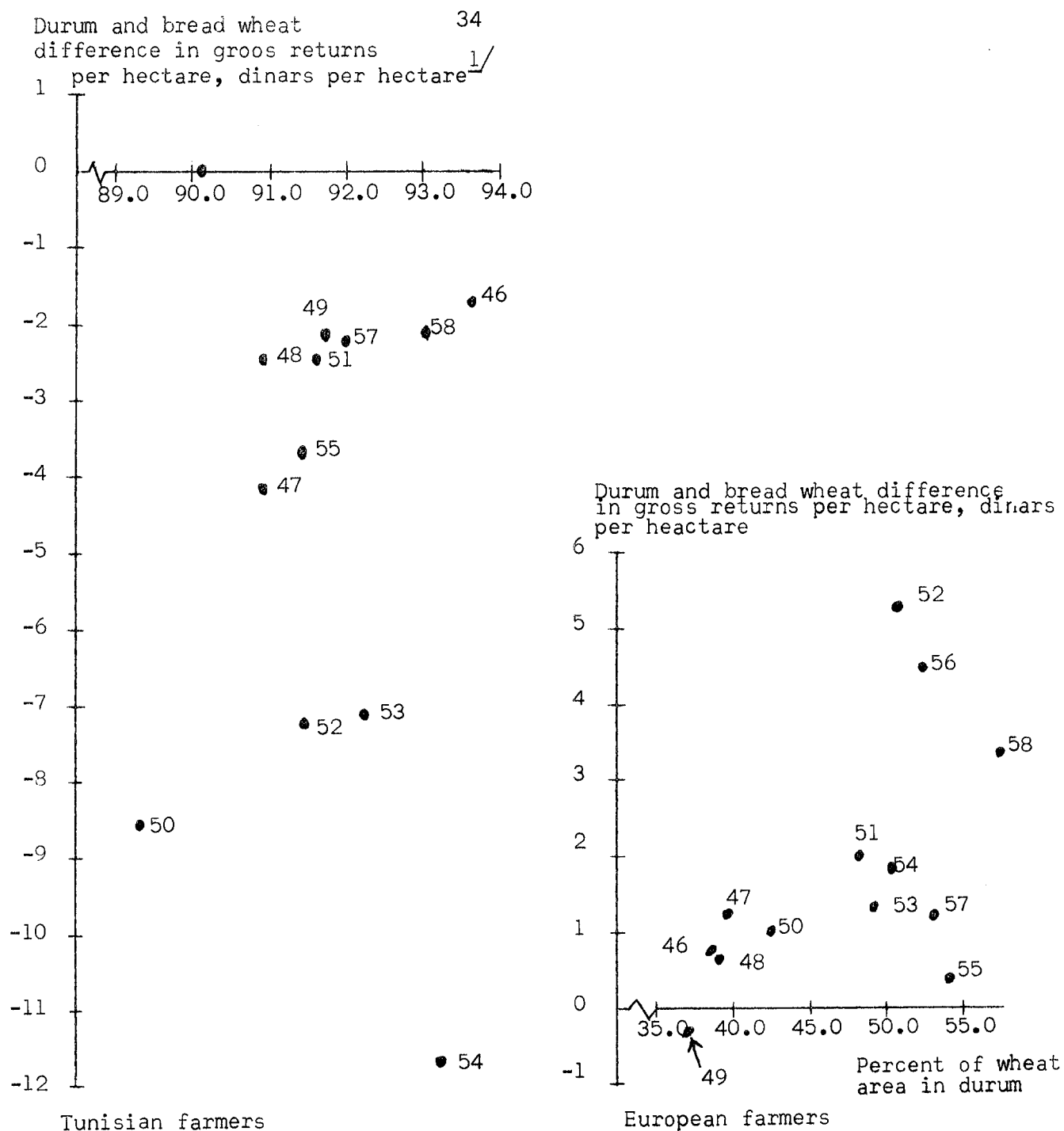
Figure 12.   Simple correlation: Percent of wheat area planted to durum by
Tunisians and Europeans and difference between the gross returns
per hectare from durum and bread wheat (durum less bread wheat)
lagged one year, Harvest years 1946-1958.

Source: Appendix Table 9

1/ The dinar is equivalent to 1000 millimes each of which is equivalent to
one pre-1959 French Frame.

Table 8a.--Durum and Bread Wheat: Prices average yields and gross returns per hectare for Tunisians, harvest years 1945-1958

Tunisian Farmers

Harvest year	Prices		Average yield per hectare		Gross returns per hectare		Difference (d/ha)
	Durum (mill/qx)	Bread wheat (mill/qx)	Durum (qx/ha)	Bread wheat (qx/ha)	Durum (d/ha)	Bread wheat (d/ha)	
1945	900	800	1.1	3.4	1.0	2.7	-1.7
1946	1255	1103	2.9	7.1	3.6	7.8	-4.2
1947	1595	1400	2.1	4.1	3.3	5.8	-2.5
1948	2645	2300	1.6	2.8	4.3	6.5	-2.2
1949	2932	2500	4.8	9.1	14.2	22.7	-8.5
1950	3172	2600	4.2	6.0	13.3	15.7	-2.4
1951	4140	3600	1.5	3.7	6.2	13.4	-7.2
1952	4140	3600	3.9	6.4	16.0	23.1	-7.1
1953	4140	3600	3.2	7.0	13.3	25.0	-11.7
1954	3910	3400	2.9	4.5	11.4	15.2	-3.8
1955	3910	3400	2.7	3.1	10.8	10.6	0.2
1956	3967	3450	2.7	3.7	10.7	12.9	-2.2
1957	3967	3450	2.7	3.7	10.6	12.7	-2.1
1958	4468	3956	3.1	4.5	13.7	16.3	-2.6

Source: Annuaire Statistique de la Tunisie, various issues, 1946-1958.

Table 8b.--Durum and Bread Wheat: Prices average yields and gross returns per hectare for Europeans, harvest years 1945-1958

| Harvest year | Prices | | European Farmers | | | | |
| | Durum (mill/qx) | Bread wheat (mill/qx) | Average yield per hectare | | Gross returns per hectare | | Difference (d/ha) |
			Durum (qx/ha)	Bread wheat (qx/ha)	Durum (d/ha)	Bread wheat (d/ha)	
1945	900	800	7.5	7.4	6.7	6.0	0.7
1946	1255	1103	10.5	10.8	13.2	11.9	1.3
1947	1595	1400	8.6	9.4	13.8	13.1	0.7
1948	2645	2300	6.8	7.9	18.0	18.3	-0.3
1949	2932	2500	10.6	12.0	31.2	30.1	1.1
1950	3172	2600	11.2	12.9	35.5	33.5	2.0
1951	4140	3600	9.0	8.9	37.3	32.0	5.3
1952	4140	3600	12.0	13.5	49.9	48.6	1.3
1953	4140	3600	11.7	13.0	48.5	46.7	1.8
1954	3910	3400	10.5	11.9	41.0	40.6	0.4
1955	3910	3400	7.1	6.8	27.6	23.1	4.5
1956	3967	3450	7.6	8.4	30.1	28.9	1.2
1957	3967	3450	8.3	8.5	32.8	29.4	3.4
1958	4468	3956	8.6	9.2	38.5	32.9	5.6

Source: Annuaire Statistique de la Tunisie, various issues, 1946-1958.

another with returns from durum being slightly higher during most of
this period (Table 8b).

This in no way implies that the Tunisians were less interested in
the market and prices than were the Europeans. It may be suggested
that their natural environment was a strong influence in retarding the
appearance of the interest.

With the departure of the colon farmers in the late 1950's and
early 1960's and the assumption of their former holdings by the state
and by cooperative farms, much of this differentiating influence has
been removed. Price levels and price relationships among wheats and
other crops may now be equally as important as other policy instru-
ments in controlling wheat production.

The primary influence of prices may be that of affecting the
profitability of farming and, in turn, the ability of agriculture
to bid resources away from other sectors of the economy. Consequently,
price policy does have a role to play in Tunisia's agricultural de-
velopment.

SUMMARY, CONCLUSIONS, AND POLICY IMPLICATIONS

The purpose of this study is to analyze Tunisian wheat prices and
price policy and their possible impact on current efforts to expand
wheat production in the country. The study describes the organization
of the marketing system for wheat in Tunisia and analyzes (1) Tunisian
wheat prices relative to world prices, (2) trends in Tunisian wheat
prices and the relationship of bread wheat prices to durum prices,
(3) wheat prices in Tunisia relative to other commodity prices, and
(4) wheat prices relative to farm input prices. Farmers' response in
hectares planted to changes in durum and bread wheat prices from
1945-1958 are also analyzed.

Wheat prices are fixed by the Government of Tunisia and admin-
istered by the Office of Cereals, a state trading monopoly. Farm
prices for wheat are announced in June or July of each year which is
at harvest time for wheat that was planted the previous fall. This
is in contrast to many other wheat producing countries including the
United States, which announce wheat prices at planting time. The
latter practice has the advantage over the former in that it
facilitates production decisions by farmers and, consequently, should
be considered by the Government of Tunisia.

Wheat prices and marketing margins are administratively determined
in Tunisia from the farm price of wheat through to the price of bread
at retail. Information on marketing margins and costs will become in-
creasingly important as a guide to administrative decision making if
misallocation of resources is to be minimized.

Analysis of wheat prices and price policy in Tunisia revealed that current Tunisian wheat prices are somewhat lower than those of other countries in North Africa and most other wheat importing countries. While significant increases in current wheat prices occurred in Tunisia between 1949 and 1967, these increases were outweighed by larger increases in the general price level. The "real" price of bread wheat (the current price deflated by the index of wholesale prices) declined 13 percent from 1949 to 1967. The "real" price of durum declined 17 percent during the same period. Such declines would not be significant had they been accompanied by improvements in production technology which lowered production costs. But indications are that such improvements have not occurred.

Increases in current wheat prices between 1949 and 1967 also lagged behind prices of other important agricultural commodities such as beef, lamb, and edible legumes. This undoubtedly reflects attempts by the Tunisian Government to hold down increases in the cost of living for the large mass of low income consumers for whom wheat is the largest item in their diets.

Wheat prices have also not increased as rapidly as prices of most industrial products which are important to farmers as they reflect input costs. One quintal of bread wheat could have been exchanged for one unit of the bundle of industrial products in 1956 while in 1967 it could have been exchanged for only 0.68 units. Of the commodities studied, the only price which has not risen relative to wheat prices is that of ammonitrate fertilizer. This is in part a reflection of a subsidy paid by the Tunisian Government to encourage its use.

The above results of price analysis lead to the conclusion that the Government of Tunisia might consider further price increases for wheat to act as incentives to producers to expand output if the production policy goal is to expand wheat output relative to that of other agricultural commodities.

To analyze the responsiveness of farmers to price changes, changes in areas planted to durum and bread wheat during the period 1945-1958 were studied. Large price increases for both durum and bread wheat occurred during this period, but price increases in durum were larger than for bread wheat. Both European and Tunisian farmers responded to these price changes by planting (1) more area to wheat, and (2) a larger proportion of the wheat area to durum. A positive relationship also existed between the gross returns per hectare (average yield times price) and the area planted to each wheat for both groups of farmers. European farmers were more responsive to changes in the financial returns of the two wheats. This is probably attributable to the fact that many small Tunisian farmers produce mainly for home consumption and, hence, produce durum which is preferred for couscous -- a staple in the Tunisian diet.

An important problem in wheat pricing in Tunisia is the administrative determination of the price of durum relative to bread wheat. Since these two wheats compete for the same production resources, price differentials influence their relative profitability and hence the amounts produced.

Durum and bread wheat have different end uses and different market structures. Durum is used primarily for pasta products, macaroni, spaghetti, and couscous, and in these products it has no good substitutes. Tunisia typically devotes more than 5 times as much land resources to the production of durum as bread wheat and per capita utilization of durum for food in Tunisia is the second largest of any country in the world.

Year to year variations in world durum production, coupled with an inelastic demand, which is due in part to the poor substitutability of other wheats for durum in pasta products, results in wide price fluctuations for durum. Durum normally sells at a premium, which is at times considerable, over bread wheat prices. Hence, it has been excluded from the maximum price provisions of successive International Wheat Agreements and the new International Grains Arrangement of 1967.

The price of durum in Tunisia until 1969 had been maintained at a higher level than the price of bread wheat as compared with recent trends in the world market. Except for 1961, the ratio of the farm price for durum to that of bread wheat in Tunisia has been well above that in the United States. The economic rationale behind the high prices for durum relative to bread wheat was the special trading relationship Tunisia enjoyed with France. France maintained a sizeable premium for durum (in 1964 the internal price of durum was 1.17 times the price of bread wheat) and Tunisia was able to trade its durum for French bread wheat on these terms. This arrangement has since been terminated, and although unified internal prices in the European Common Market are still approximately the same ratio to one another, Tunisia is subject to the same set of tariffs by which any other exporter to the Common Market is bound, and consequently, cannot obtain these high prices for durum. So long as durum could be exported to earn foreign exchange, and much of the bread wheat requirements, filled by imports for Tunisian dinars, from the United States, it was advantageous for Tunisia to follow a price policy which maximized durum production.

Tunisia increased the price of bread wheat relative to the price of durum for the 1967 harvest. As a result, the durum-bread wheat price ratio was reduced from 1.22 to 1 to 1.12 to 1. This should have the effect of increasing production incentives for bread wheat relative to that of durum.

These adjustments in wheat prices in Tunisia are in accord with changes in world market price differentials. The world durum supply situation has improved considerably since 1962-63 so world durum prices have declined relative to bread wheat prices.

If Tunisia is successful in negotiating some type of trading arrangement with the European Economic Community, it might be able to sell its durum at the substantial premiums maintained by the EEC over bread wheat. This would influence its price policy for durum - bread wheat price ratios. For the present, however, it would appear to be in Tunisia's best interest to keep its internal price ratios in close harmony with world market price ratios between the two wheats.

APPENDIX

INDEXES OF WHOLESALE PRICES IN TUNISIA[1]

Description

The wholesale price index for Tunisia ("Indices des Prix de Gros") is a value weighted index of the prices of 40 items. Its computational formula is an algebraic modification of the Laspeyres index, and is identically equivalent to the familiar formula

$$I_i = \frac{\Sigma P_i\; q_o}{\Sigma P_o\; q_o}$$

where the subscript i indicates the year (o indicating the base year), and the summation is over the included commodities.

The base year is 1940 (i.e., the value of the index in 1940 is 100) which is also the year for which value weights were established. Published wholesale price indexes on other base years are computed from this one by division.

The general index (Indice Général) is divided into four other indexes as follows:

Appendix Table 1.--Tunisian Wholesale Price Indexes

Index	Composition
Foodstuffs (denrées alimentaires)	17 domestic commodities 3 imported commodities 20 items
Industrial products (produits industriels)	11 domestic commodities 9 imported commodities 20 items
Domestic commodities (produits locaux)	17 foodstuffs 11 industrial products 28 items
Imported commodities (produits importées)	3 foodstuffs 9 industrial products 12 items

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[1]/Information on wholesale price indexes in Tunisia was obtained from the Service des Statistiques, Secrétariat d'Etat au Plan et à l'Economie Nationale.

Wholesale price indexes are commonly and usefully applied in statistical and econometric analyses and as indicators of price inflation or deflation. The limited (40 items) coverage and the distant base year raise the issue of the present day value of this index in such work. Apparently neither the coverage nor the weights have been changed since they were first established in 1940.

The problem of the distant base year may be described as follows: With any set of prices, consumers apportion their budgets among commodities so as to derive maximum satisfaction in spending. As price relationships among commodities change over time, consumers reapportion their expenditures among commodities to achieve a new position of maximum satisfaction. Thus the quantity combination of the bundle of commodities purchases will change over time, and at least a portion of this change will occur as a result of change in price. The price index, which is intended as a measure of the change in the overall price level, can only indicate the change in the average price of a bundle of commodities which is identical in all respects with that which existed in the base period. Since the composition of the bundle has changed, the original bundle is no longer relevant to the new situation. The price index does not perfectly represent a change in the overall price level. The greater the change in prices between any two periods and the more distant the base period, the poorer will be the index as a measure of inflation. The extreme examples of this phenomena are the introduction of new commodities into the bundle which did not exist in the base period, and the dropping out of commodities which are no longer purchased.

One does not have to know the present proportions in which commodities are being purchased (i.e., their present proper weights in the price index) to know that the index, as presently computed, is sadly out of date. Examples of the currently used weights (i.e., the weights for the base year 1940) will illustrate. (See the table at the end of this appendix.) In the foodstuffs index, and also the general index, tea receives a weight which is more than one-half that assigned to hard wheat and almost one-half that of soft wheat. The weight for pork is more than that for veal and greater than one-third of that given to mutton.

It is examples such as these which dictate that extreme care must be used in interpreting comparisons based on the wholesale price index. Recognizing these faults the Tunisian Government is currently in the process of reconstructing the wholesale price index with a new list of commodities and more recent weights. However, as explained below, there is a presumption that the errors in the present index will be such as to over-state increases in the level of wholesale prices since 1940.

The standard form for a price index of the Laspeyres[o] type is

$$(1) \quad I_i = \frac{\Sigma P_1 \, q_0}{\Sigma P_0 \, q_0}$$

o See page 43

By the use of indifference curves, it can be shown that the Laspeyres price index, as a measure of inflation, is biased upwards. Which means that there is, at least conceptually, a "true" index of inflation with which to compare the computed value of the index. For purposes of indicating the presence of the bias (but not measuring it, since measurement would require that the "true" value of the index be known) it is demonstrated that compensating a consumer, after a price increase, with a sum of money great enough to enable him to purchase the same bundle of commodities he did purchase before the price increase would, in fact, over-compensate him. This over-compensation occurs in the sense that he would be able to reach a higher level of indifference than that indicated by the bundle purchased before the price rise.

Errors, relative to a "true" measure of inflation, in any index computed from real world data may, however, be in either direction. There are at least two reasons for this. The first is due to the fact that the demonstration of upward bias is performed for a single consumer with a fixed indifference map. Changes in tastes and preferences or in income distribution could result in errors such that the computed index understates the "true" price level increase. It should be pointed out that the likelihood of this occurring increases with the passage of time. In Tunisia, for example, the departure of many Europeans since independence has undoubtedly altered the distribution of income as well as market preferences for certain commodities (e.g., pork).

The second possibility relates to the list of commodities included in the price index. This is a sampling problem and calls into question the validity of the index for all periods. Again, the importance of this as a source of error would seem to increase as the distance from the base period increased.

Nevertheless, formal economic theory has time and again been shown to be a powerful tool in the analysis of real-world problems. Despite

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o The Laspeyres index is called a "base weighted" index because the quantities included are those which existed in the base year. The contrasting form, the Paasch index, uses current period weighting. Its formula is

$$(2) \quad I_i = \frac{\Sigma P_i \, q_i}{\Sigma P_o \, q_i}$$

For computing price indexes, price data are generally easier to obtain than quantity data. The latter is often available only through detailed surveys. For this reason price indexes of the Laspeyres form are more frequently encountered.

the listed exceptions, there is a presumption that, whatever errors are present, the wholesale price index tends to overestimate the degree of inflation.

In computing a Laspeyres price index the formula is cometimes modified. One such modification is as follows:

$$I_i = \frac{\sum_j a_j \dfrac{P_{ij}}{P_{oj}}}{\sum_j a_j}$$

where

P_{ij} is the price of the jth commodity in the ith period

P_{oj} is the price of the jth commodity in the base period

$a_j = P_{oj} q_{oj}$ (q_{oj} being the quantity of the jth commodity purchased in the base period)

It is easily seen that the value given by this second formula is identical to that given by the first.

A further modification, and that employed for the Indice Général of wholesale prices in Tunisia, is to make the sum of the weights, the a_j, equal one or powers of 10. Thus the weight assigned to the jth commodity would be

$$A_j = \frac{a_j}{\sum_j a_j} \quad (j = 1, \ldots, n)$$

and

$$\sum_j A_j = 1$$

Denoting the value of the General Index (which includes all commodities in the list) by G_i, we have

$$G_i = \sum_j A_j \frac{P_{ij}}{P_{oj}} \quad (j = 1, \ldots, n)$$

If the first k of the n commodities in the general list are foodstuffs, then the price index for foodstuffs is given by the formula

$$F_i = \frac{\sum_j A_j \dfrac{P_{ij}}{P_{oj}}}{\sum_j A_j} \quad (j = 1, \ldots, k)$$

The other price indexes for groups of commodities within the general list are similarly constructed.

The following table lists the commodities in each of the wholesale price indexes, along with the base year weights and prices. It is not known what quantities were used in calculating weights. For example, in the case of local products, are these the quantities produced or the quantities consumed.

Appendix
Table 2.--List of commodities included in each of the wholesale price
indexes and their base year weights and prices

Commodity (j)	Unit	A_j	P_{oj} (Franc of 1940)
A. Locally produced foodstuffs			
Hard wheat	quintal	939	230
Soft wheat	"	1196	215
Barley	"	501	135
Oats	"	80	135
Corn	"	73	194
Potatoes	"	194	245
Horse beans	"	85	200
Chick peas	"	48	299
Edible oil	"	575	654
Wine	hectoliter	448	175
Beef	kilogram	205	6.9
Veal	"	75	10.9
Mutton	"	217	6.7
Pork	"	81	10.5
Fresh milk	hectoliter	89	240
Fresh butter	kilogram	77	23.7
Fresh eggs	100	378	47
ΣA_j (A)		5261	
B. Imported foodstuffs			
Refined sugar	quintal	656	516
Roasted coffee	"	74	1165
Black tea	"	547	8270
ΣA_j (B)		1277	

Appendix
Table 2.--(continued)

Commodity (j)	Unit	A_j	P_{oj} (franc of 1940)
C. Locally produced industrial products			
Phosphates	ton	42	180
Super phosphates	"	38	375
Iron ore	"	14	125
Lead ore	"	220	4057
Cement	"	99	297.8
Soap, 72 percent	quintal	181	325
Lumber, fir	cubic meter	88	1000
Lumber, oak	" "	119	1500
Cork	quintal	29	120
Wool, greasy	kilogram	223	15
Salt, table	quintal	17	70
ΣA_j (C)		1070	
D. Imported industrial products			
Coal	ton	413	524.7
Steel	quintal	127	199
Kerosene (pétrole)	hectoliter	217	195
Gasoline	"	225	87.5
Fuel oil (gaz-oil)	"	84	68
Alcohol (for beverage)	hectoliter 100°	31	2000
Alcohol (for perfume)	"	6	2470
Leather	kilogram	511	45
Cotton cloth	quintal	778	3316
ΣA_j (D)		2392	

47

From the preceding table, the denominators for the price indices
are as follows:

Food stuffs index (Groups A and B)
$\leq A_j$ (A and B) = 5261 + 1277 = 6538

Industrial products index (Groups C and D)
$\leq A_j$ (C and D) = 1070 + 2392 = 3462

Domestic commodities index (Groups A and C)
$\leq A_j$ (A and C) = 5261 + 1070 = 6331

Imported commodities index (Groups B and D)
A_j (B and D) = 1277 + 2392 = 3669

General index (Groups A, B, C, and D)
A_j (A, B, C, and D) = 5261 + 1277 + 1070 + 2392 = 10,000

Appendix
Table 3.--Wheat prices in the United States. Market prices for Northern Spring Wheat and Durum in Minneapolis and terminal (Minneapolis) support prices for Northern Spring and Durum in dollars per metric ton,° 1949-1966

Year beginning July 1	Market Prices		Price ratio Durum to Northern Spring	Terminal Support Prices	
	No. 1 Northern Spring, 13% protein ($/ton)	No. 1 Hard Amber Durum ($/ton)		No. 1 Northern Spring, 13% protein ($/ton)	No. 1 Hard Amber Durum ($/ton)
1949	84.14	84.14	1.00	81.94	81.94
1950	88.19	88.92	1.01	83.78	83.78
1951	90.02	95.17	1.06	90.76	90.76
1952	90.02	106.19	1.18	92.59	92.59
1953	91.13	129.71	1.42	92.96	92.96
1954	97.00	149.55	1.54	94.80	98.11
1955	88.19	105.46	1.20	89.66	97.74
1956	85.61	95.53	1.12	87.08	95.17
1957	86.35	88.92	1.03	87.82	92.23
1958	79.37	87.45	1.10	81.94	84.51
1959	81.20	90.39	1.11	81.57	84.14
1960	79.00	83.41	1.06	80.10	82.67
1961	85.98	120.15	1.40	80.47	83.04
1962	88.19	94.06	1.07	87.45	101.05
1963	83.41	82.67	0.99	80.47	88.55
1964	65.04	61.00	0.94	61.00	63.57
1965	65.40	60.63	0.93	59.53	59.89
1966	72.02	70.92	0.97	58.79	59.16

oConverted from dollars per bushel at the rate of 36.744 bushels per metric ton.

Source: U.S. Department of Agriculture, Economic Research Service, "Food Grain Statistics through 1967". Washington, D. C., April 1968.

Appendix
Table 4.--Price data for Figure 5. Durum, bread wheat, general index of wholesale prices, and "real" prices of durum and bread wheat

Harvest year	Durum			Bread Wheat		
	General wholesale price index, price of durum removed1/ (1949 = 100)	Current price (mill/qx)2/	"Real" price (mill/qx)2/	General wholesale price index, price of bread wheat removed1/ (1949 = 100)	Current price (mill/qx)2/	"Real" price (mill/qx)2/
1949	100.0	2932	2932	100.0	2500	2500
1950	109.5	3172	2897	110.0	2600	2185
1951	119.6	4140	3462	119.0	3600	3025
1952	122.7	4140	3374	122.1	3600	2948
1953	119.8	4140	3456	119.2	3600	3020
1954	119.6	3910	3269	119.2	3400	2852
1955	127.4	3910	3069	128.1	3400	2654
1956	136.0	3967	2917	135.8	3450	2541
1957	137.2	3967	2891	136.9	3450	2520
1958	140.1	4468	3189	140.8	3596	2554
1959	137.3	4200	3059	137.2	3450	2505
1960	142.8	4200	2941	143.3	3450	2408
1961	142.5	4200	2947	142.9	3450	2414
1962	147.2	4200	2853	146.7	3450	2352
1963	153.2	4200	2742	151.6	3450	2276
1964	172.0	4200	2442	172.9	3450	1995
1965	183.7	4200	2286	184.7	3450	1868
1966	190.3	4200	2207	191.4	3450	1803
1967	198.4	4800	2419	198.1	4300	2171

1/The price of the wheat was "removed" from the price index by subtracting $p_i^1 q_i^0$ from the numerator and $p_i^0 q_i^0$ from the denominator of the price index expression.

$$I = \frac{\sum\limits_i^W p_i^1 q_i^0}{\sum\limits_i^W p_i^0 q_i^0}$$

where the subscripts indicate the commodity and superscripts indicate the time period.

Appendix
Table 4.--Footnotes continued

2/Price in francs per quintal before 1959.

Sources: Annuaire Statistique de la Tunisie, various issues 1953-1965; Service des Statistiques, Sous/
Secrétariat de l'Agriculture and Service des Statistiques due Commerce.

Appendix Table 5.--Price Data for Figures 6 and 7. Wholesale prices and price relatives (1949=100) for Durum, Bread Wheat and Selected other Agricultural Products

Calendar year[1]	Durum		Bread wheat		Horse Beans		Beef[3]		Lamb[3]		Milk[4]	
	Current base price (mill/qx)[5]	Price relatives (1949=100)	Current base price (mill/qx)[5]	Price relatives (1949=100)	Current price (mill/qx)[5]	Price relatives (1949=100)	Current price (mill/kg)[5]	Price relatives (1949=100)	Current price (mill/kg)[5]	Price relatives (1949=100)	Current price (mill/1)[5]	Price relatives (1949=100)
1949	2932	100.0	2500	100.0	2088	100.0	122	100.0	142	100.0	48	100.0
1950	3172	108.2	2600	104.0	2291	109.7	118	96.3	146	102.1	45	92.8
1951	4140	141.2	3600	144.0	2726	130.6	109	89.0	120	84.2	51	105.2
1952	4140	141.2	3600	144.0	2692	128.9	110	89.4	127	89.1	60	123.7
1953	4140	141.2	3600	144.0	2823	135.2	112	91.8	134	93.7	60	123.7
1954	3910	133.3	3400	136.0	2317	111.0	102	83.7	101	70.9	60	123.7
1955	3910	133.3	3400	136.0	2562	122.7	118	96.3	98	68.8	60	123.7
1956	3967	135.3	3450	138.0	3375	161.6	120	97.6	120	84.2	64	132.0
1957	3967	135.3	3450	138.0	3250	155.7	138	112.2	148	103.5	72	148.5
1958	4468	152.4	3596	143.8	3221	154.3	145	118.4	183	128.4	72	148.5
1959	4200	143.2	3450	138.0	3150	150.9	152	123.7	188	131.9	72	148.5
1960	4200	143.2	3450	138.0	3375	161.6	150	122.4	196	137.9	75	154.6
1961	4200	143.2	3450	138.0	5417	259.4	154	125.7	241	169.5	75	154.6
1962	4200	143.2	3450	138.0	5368	256.8	136	111.4	222	155.4	75	154.6
1963	4200	143.2	3450	138.0	6000	287.4	170	138.8	248	173.7	73	150.5
1964	4200	143.2	3450	138.0	6000	287.4	190	155.1	266	187.0	76	156.7
1965	4200	143.2	3450	138.0	6000	287.4	218	178.0	262	183.5	76	156.7
1966	4200	143.2	3450	138.0	6000	287.4	218	177.5	265	186.0	75	154.6
1967	4800	163.7	4300	172.0	6000	287.4	226	184.1	282	197.5	85	175.3

[1]/Harvest year for durum and bread wheat
[2]/Prices paid to farmers before deduction of the marketing tax
[3]/Simple average of prices for 1st and 3rd qualities
[4]/Prices at retail in Tunis
[5]/Francs per unit before 1959
Source: Same as those for Appendix Table 4.

Appendix Table 6.--Price data for Figure 8. Wholesale Prices and Price Relatives (1956=100) for Durum, Bread wheat, Superphosphate, Ammonitrate, and the Index of Wholesale Prices for Industrial Products

Calendar year[1]	Durum[2] Current base price (mill/qx)[5]	Durum[2] Price relatives (1956=100)	Bread wheat Current base price (mill/qx)[5]	Bread wheat Price relatives (1956=100)	Superphosphate 16% Current price (mill/tons)[5]	Superphosphate 16% Price relatives (1956=100)	Ammonitrate 20.5%[3] Current price (mill/tons)[5]	Ammonitrate 20.5%[3] Price relatives (1956=100)	Industrial Products[4] Industrial Index (1940=100)	Industrial Products[4] Index (1956=100)
1949	2932	73.9	2500	72.5	5568	57.6			1560	75.9
1950	3172	80.0	2600	75.4	5903	61.1			1606	78.2
1951	4140	104.4	3600	104.3	7063	73.1			1961	95.4
1952	4140	104.4	3600	104.3	8398	86.9			1940	94.4
1953	4140	104.4	3600	104.3	8867	91.7			1930	93.9
1954	3910	98.6	3400	98.6	9045	93.6			1929	93.9
1955	3910	98.6	3400	98.6	9165	94.8			1960	95.4
1956	3967	100.0	3450	100.0	9667	100.0	31400	100.0	2055	100.0
1957	3967	100.0	3450	100.0	10285	106.4	31600	94.6	2243	109.1
1958	4468	112.6	3596	104.2	10874	112.5	31600	94.6	2351	114.4
1959	4200	105.	3450	100.0	10900	112.8	32400	97.0	2415	117.5
1960	4200	105.9	3450	100.0	10671	110.4	24933	74.6	2510	122.1
1961	4200	105.9	3450	100.0	10940	113.2	26770	80.1	2456	119.5
1962	4200	105.9	3450	100.0	11140	115.2	26770	80.1	2535	123.4
1963	4200	105.9	3450	100.0	11140	115.2	26770	80.1	2606	126.8
1964	4200	105.9	3450	100.0	11172	115.6	28300	84.7	2856	139.0
1965	4200	105.9	3450	100.0	11462	118.6	36160	108.3	3423	166.6
1966	4200	105.9	3450	100.0	13300	137.6	----[6]	----[6]	3608	175.6
1967	4800	121.0	4300	124.6	14940	154.5	31000	92.8	3643	177.3

1/Harvest year for wheat.
2/Price paid to farmers before deduction of marketing tax.
3/Price of Ammonitrate delivered to farm.
4/Index on 1940 base changed to 1956 base by division.
5/Francs per unit before 1959.
6/No report.
Sources: For durum, bread wheat and superphosphate, same as Tables 4 and 5 of Appendix. Price data for ammonitrate was obtained from Union National des Agriculteurs Tunisiens.

52

Appendix Table 7.--Area, production, and yield of durum and bread wheat and gross returns per hectare for each by Tunisian farmers in Tunisia, 1944-1958

Harvest years	Durum					Bread Wheat					Difference in gross returns per hectare: durum less bread wheat
	Area	Production	Yield	Base price	Gross returns per ha.	Area	Production	Yield	Base price	Gross returns per ha.	
	(1000 ha.)	(1000 qx.)	(qx/ha.)	(franc/ql.)	(franc/ha.)	(1000 ha.)	(1000 qx.)	(qx/ha.)	(franc/ql.)	(franc/ha.)	(franc/ha.)
1944	499	1,050	2.10	630	1,323	25	50	2.00	550	1,100	223
1945	576	634	1.10	900	990	37	125	3.38	800	2,704	-1,714
1946	450	1,300	2.89	1,255	3,627	31	219	7.06	1,103	7,787	-4,160
1947	401	830	2.07	1,595	3,302	40	165	4.13	1,400	5,782	-2,480
1948	643	1,055	1.64	2,645	4,338	64	180	2.81	2,300	6,463	-2,125
1949	604	2,920	4.83	2,932	14,162	55	500	9.09	2,500	22,725	-8,563
1950	443	1,850	4.18	3,172	13,259	53	320	6.04	2,600	15,704	-2,445
1951	735	1,100	1.50	4,140	6,210	67	250	3.73	3,600	13,428	-7,218
1952	830	3,200	3.86	4,140	15,980	78	500	6.41	3,600	23,076	-7,096
1953	757	2,440	3.22	4,140	13,331	64	445	6.95	3,600	25,020	-11,689
1954	1,021	2,967	2.91	3,910	11,378	74	330	4.46	3,400	15,164	-3,786
1955	690	1,897	2.75	3,910	10,753	65	203	3.12	3,400	10,608	145
1956	820	2,218	2.70	3,967	10,711	90	337	3.74	3,450	12,903	-2,192
1957	958	2,545	2.67	3,967	10,592	83	305	3.67	3,450	12,662	-2,070
1958	976	2,997	3.07	4,468	13,718	74	336	4.54	3,596	16,326	-2,608

Source: Republic of Tunisia, Secretariat of State for Plan and for the National Economic and Annuaire Statistique de la Tunisie, various issues 1946-1959.

Appendix Table 8.--Area, production, and yield of durum and bread wheat and gross returns per hectare from each by European farmers in Tunisia, 1944-1958

Harvest years	Durum					Bread Wheat					Difference in gross returns per hectare: durum less bread wheat
	Area	Production	Yield	Base price	Gross returns per ha.	Area	Production	Yield	Base price	Gross returns per ha.	
	(1000 ha.)	(1000 qx.)	(qx/ha.)	(franc/ql.)	(franc/ha.)	(1000 ha.)	(1000 qx.)	(qx/ha.)	(franc/ql.)	(franc/ha.)	(franc/ha.)
1944	61	400	6.56	630	4,133	65	380	5.85	550	3,190	943
1945	63	471	7.48	900	6,732	93	690	7.45	800	5,960	772
1946	62	650	10.48	1,255	13,152	100	1,081	10.81	1,103	11,923	1,229
1947	66	570	8.64	1,595	13,781	100	935	9.35	1,400	13,090	691
1948	67	455	6.79	2,645	17,960	105	834	7.94	2,300	18,262	-302
1949	64	680	10.63	2,932	31,167	108	1,300	12.04	2,500	30,100	1,067
1950	85	950	11.18	3,172	35,463	115	1,480	12.87	2,600	33,462	2,001
1951	100	900	9.00	4,140	37,260	107	950	8.88	3,600	31,968	5,292
1952	122	1,470	12.05	4,140	49,887	126	1,700	13.49	3,600	48,564	1,323
1953	116	1,360	11.72	4,140	48,521	120	1,555	12.96	3,600	46,656	1,865
1954	132	1,383	10.48	3,910	40,977	131	1,563	11.93	3,400	40,562	415
1955	144	1,016	7.06	3,910	27,605	123	837	6.80	3,400	23,120	4,485
1956	145	1,102	7.60	3,967	30,149	133	1,115	8.38	3,450	28,911	1,238
1957	135	1,115	8.26	3,967	32,767	119	1,015	8.53	3,450	29,429	3,338
1958	133	1,146	8.62	4,468	38,514	99	907	9.16	3,596	32,939	5,579

Source: Republic of Tunisia, Secretarial of State for Plan and for the National Economic and Annuaire Statistique de la Tunisie, various issues 1946-1959.

Appendix Table 9.--Data for figures 11 and 12. Areas in durum, bread wheat, and total wheat and total wheat area in durum; price and gross returns per hectare differences in previous year; Tunisian and European farmers, 1945-1958

Harvest year	Tunisian farmers						European farmers					
	Area in durum	Area in bread wheat	Total wheat area	Percent of total in durum	Price and gross returns differences from previous year, durum less bread wheat		Area in durum	Area in bread wheat	Total wheat area	Percent of total in durum	Price and gross returns differences from previous year, durum less bread wheat	
					Price per quintal	Gross returns per ha.					Price per quintal	Gross returns per ha.
	------(1,000 ha.)------			(pct.)	-----(francs)----		------(1,000 ha.)------			(pct.)	-----(francs)-----	
1945	576	37	613	94.0	80	223	63	93	156	40.4	80	943
1946	450	31	481	93.6	100	-1,714	62	100	162	38.3	100	772
1947	401	40	441	90.9	152	-4,160	66	100	166	39.8	152	1,229
1948	643	64	707	90.9	195	-2,480	67	105	172	39.0	195	691
1949	604	55	659	91.7	345	-2,125	64	108	172	37.2	345	-302
1950	443	53	496	89.3	432	-8,563	85	115	200	42.5	432	1,067
1951	735	67	802	91.6	472	-2,445	100	107	207	48.3	472	2,001
1952	830	78	908	91.4	540	-7,218	122	126	248	50.8	540	5,292
1953	757	64	821	92.2	540	-7,096	116	120	236	49.2	540	1,323
1954	1,021	74	1,095	93.2	540	-11,689	132	131	263	50.2	540	1,865
1955	690	65	755	91.4	510	-3,786	144	123	267	53.9	510	415
1956	820	90	910	90.1	510	145	145	133	278	52.2	510	4,485
1957	958	83	1,041	92.0	517	-2,192	135	119	254	53.1	517	1,238
1958	976	74	1,050	93.0	517	-2,070	133	99	232	57.3	517	3,338

Source: Appendix tables 8 and 9.