

AGENCY FOR INTERNATIONAL DEVELOPMENT WASHINGTON, D. C. 20523 BIBLIOGRAPHIC INPUT SHEET		FOR AID USE ONLY Batch #24	
1. SUBJECT CLASSIFICATION	A. PRIMARY Agriculture		AE70-0000-G236
	B. SECONDARY Distribution and marketing--Morocco		
2. TITLE AND SUBTITLE Review of grain storage, handling, & distribution: Morocco			
3. AUTHOR(S) Ackels, A.A.; Pedersen, J.R.			
4. DOCUMENT DATE 1969	5. NUMBER OF PAGES 188p.	6. ARC NUMBER ARC MR631.23.K16	
7. REFERENCE ORGANIZATION NAME AND ADDRESS Kan. State			
8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publisher, Availability) (In Food grain drying, storage, handling, and transportation rpt. no. 10)			
9. ABSTRACT			
10. CONTROL NUMBER PN-RAB-415		11. PRICE OF DOCUMENT	
12. DESCRIPTORS Grain crops Morocco Storage		13. PROJECT NUMBER	
		14. CONTRACT NUMBER CSD-1588 GTS	
		15. TYPE OF DOCUMENT	

MR
631.23
K14

Food Grain Drying, Storage, Handling
and Transportation

No. 10

April 1969

REVIEW of
**GRAIN STORAGE,
HANDLING & DISTRIBUTION**
MOROCCO
1969



FOOD & FEED GRAIN INSTITUTE
KANSAS STATE UNIVERSITY
MANHATTAN, KANSAS 66502

Review
GRAIN STORAGE, HANDLING AND DISTRIBUTION
IN MOROCCO-1969
Resume

Kansas State University through the Food and Feed Grain Institute contract with AID to provide technical assistance in Food Grain Drying, Storage, Handling and Transportation was requested to participate in a study of the grain storage problems of Morocco.

This report presents the findings of the Kansas State team and is intended to either provide recommendations for solutions to problems or suggest further work that needs to be accomplished to arrive at economic plans for action. Although this study could not provide the depth of detail and verification required by Manual Order 1221.2 the data presented may be used as a basic guide to the work needed for the fulfillment of Manual requirements.

Review of the grain storage situation in Morocco presents two clearly defined problems: (1) The glut of grain resulting from the bumper 1968 crop fills most of the existing storage space and leaves very little covered storage for the 1969 crop, and (2) Modernization of cereal production methods and improved varieties should yield constantly increasing volume of grain to be handled and stored in the commercial sector.

The present lack of storage space can be relieved by every agency of government offering all idle space for temporary storage of the surplus grain. Of specific potential, are hangers, warehouses, fuel storage tanks and other buildings at idle air bases. Port elevators at Casablanca and Safi should be utilized for storage and a minimum of "transit" space held. Flour mills should be induced to fill existing storage space. Storage fees should be offered to public warehouses and other businesses which might have space available for safe grain storage. Export policies should be established to reduce present burdensome surplus. To protect the grain carryover improved inspection and fumigation procedures are outlined.

To provide adequate storage for anticipated increased production and needs in the future requires a long range storage plan. Rough estimates indicate adequate storage space exists at present with a reasonable carryover, however, within a few years space will not be adequate. A dynamic long range storage plan, in depth, should be prepared by an expert team. Of prime importance is the development of dependable statistics. Orderly expansion of storage depends on accurate definition of the exact amount of storage needed, where it should be located, when it should be built and cost of providing it. Once requirements are determined, storage can be promoted by means such as incentives offered to commercial storage operators to construct new storage space preferably of the concrete or metal bulk silo type, construction financed by maximum practical use of capital from the internal private sector, or to the extent that the private sector does not respond to inducements, (such as guaranteed volume and duration of storage) the GOM should build large bulk bin annexes to existing SCAM storage elevators. The potential for increased farm storage should be evaluated by first determining losses which occur in present "matmoras", underground storage pits.

Study of opportunities for upgrading grain utilization are recommended, first, only in sufficient depth to determine whether opportunity exists and then, if indicated full feasibility studies for each. Areas to consider are: feed milling, wet corn milling (starch and sugar), alcohol production, and substitution of rye for wheat flour in breads.

Preface

The Kansas State University team that conducted the study and prepared this report are grateful for the assistance provided by the Ministry of Agriculture, Morocco and the AID Mission in Morocco. We particularly want to express our appreciation to the following people:

Ministry of Agriculture and its Agencies

Mr. M'Hamed Bargach, Minister of Agriculture
Mr. Seddik Abou Ibrahim, Secretary General, MAF
Mr. Mohamed Brick, Director, OCIC
Mr. Mohamed Guessous, Director, SCAM
Mr. Salah Boudalaa, SCAM
Mr. Rachid Haddaoui, Director, DEAEJ
Mr. Jean Canis, Asst. to the Minister

AID Mission

Mr. Philip Birnbaum, Director
Mr. Gaylord Walker, Food and Agriculture Officer
Dr. R. J. Edwards, Agronomy Advisor
Mr. M'Hamed B. Naciri, Interpreter to the team

Without their assistance this report could not have been produced.

A. A. Ackels
John Pedersen

Review of
GRAIN STORAGE, HANDLING and DISTRIBUTION
in MOROCCO - 1969

Table of Contents

	Page
Preface	i
Table of Contents	ii
List of Tables	iv
List of Figures	vii
List of Maps	viii
Section I INTRODUCTION.....	1
Government.....	1
Economy.....	2
Education.....	3
Employment.....	3
Geography.....	3
Climate.....	4
Population.....	4
Land.....	5
The Grain Trade.....	6
Section II DATA.....	8
Mensuration Equivalents.....	9
List of Common Abbreviations.....	11
Population.....	16
Cereal Crop Production.....	24
Imports and Exports of Cereals.....	42
Commercialization and Disappearance of Cereals.....	53
Pertinent Abstracts from the "Manual Regulating the Marketing of Wheats and Secondary Cereals".....	95
Cereal Storage Facilities.....	101
Cereal Grain Processing Facilities.....	112
Livestock Population.....	117
Section III ANALYSIS OF THE GRAIN TRADE.....	119
Farm Production.....	119
Farm Marketing or Rural Collection.....	120
Storage.....	122
Transportation.....	125
Commercial Marketing.....	125
Industrial Conversion.....	131
Retail Marketing.....	133
Consumption.....	133
Section IV RECOMMENDATIONS.....	136
The Present Burdensome Surplus.....	136
1. Availability of Space in Other Government Agencies.....	136
2. Port Elevators.....	137
3. Flour Mills.....	137
4. Public Warehouses and Other Businesses.....	137
5. Improved Inspection and Fumigation.....	137
6. Surplus Disposal.....	141

Long-term Needs and Programs.....	141
1. Private Sector.....	142
a. Incentives.....	142
b. Private Bulk Storage.....	142
c. Construction Materials.....	142
d. Capitalization.....	143
2. Government Sector.....	143
a. Annexes to Existing Storage.....	143
b. Long-range Storage Plan.....	144
c. Bulk versus Warehouse Storage.....	144
d. Farm Storage.....	145
e. Formula Feed Production.....	147
f. Corn Production and Utilization.....	148
g. Industrial Utilization of Cereal Products.....	148
h. Other Long-range Potential for Human Consumption....	149
i. Rye Production and Utilization.....	149
j. Government Agencies Involved in Grain Marketing.....	151
k. Statistics, Future Studies and Implementation of Recommendations.....	151
Cereal Marketing in Morocco.....	154
Priority of Recommendations.....	156
BIBLIOGRAPHY.....	157

List of Tables

Table		Page
	<u>Population</u>	
1	Population Estimates for Morocco	17
2	Moroccan Moslem Population by Province - 1960	19
3	Moroccan Moslem Population by Province - 1968	20
4	Moroccan Moslem Population by Province - 1973	21
5	Moroccan Moslem Urban Population - 1960, 1968, 1973	22
6	Status of the Agricultural Population by Province - 1960	23
	<u>Cereal Crop Production</u>	
7	Cereal Harvest Times	25
8	Total Production of Cereals and Area - Morocco 1961-62/1967-68	26
9	Cereal Grain Production for Morocco by Province, 1962-1968	30-35
10	Production of the Four Major Cereal Crops in Morocco, 1965-1968	36
11	Production of the Four Major Cereal Crops in Morocco by Province, 1967-68 Crop Year	37
12	Comparison of Production Data for Major Cereal Grains from Various Sources	38
13	Cereal Production for Morocco - - 10-Year Moving Average	39
14	Land Tenure by Sector and Farm Size - 1964	41
	<u>Imports and Exports of Cereals</u>	
15	Imports of Cereal Grains to Morocco, 1963 to 1969	43
16	Imports of Four Major Cereal Grains to Morocco (DEAEJ) 1964-1968	44
17	Comparison of Import Data - O.C.I.C. vs DEAEJ	45
18	Exports of Cereal Grains from Morocco, 1963 to 1969	46
19	Exports of Cereal Grains and Grain Products from Morocco, 1964-1968 (DEAEJ)	47
20	Comparison of Export Data - O.C.I.C. vs DEAEJ	48
21	Annual Average Imports and Exports of Cereal Grains - Morocco	49
22	Comparison of Annual Average Imports and Exports - Morocco, 1939-1966	50
23	Annual Imports and Exports of Cereal Grains at Various Ports in Morocco, 1958-1967	51
24	Imports of all Grains Received at Ports During 1966-67 Crop Year	52
	<u>Commercialization and Disappearance of Cereals</u>	
25	Area and Production of Cereal Grains in Morocco, 1960-1967	54
26	Summary of Wheat (Durum and Bread Wheat) Supply and Utilization in Morocco, 1960-1967	55
27	Summary of Wheat Products Supply and Utilization in Morocco, 1960-1967	56
28	Summary of Barley Supply and Utilization in Morocco, 1960-1967	57
29	Summary of Barley Products Supply and Utilization in Morocco, 1960-1967	58-59
30	Summary of Corn Supply and Utilization in Morocco, 1960-1967	60

Table		Page
	<u>Commercialization and Disappearance of Cereals</u>	
31	Summary of Corn Products Supply and Utilization in Morocco, 1960-1967	61
32	Summary of Oat Supply and Utilization in Morocco, 1960-1967	62
33	Summary of Sorghum and Millet Supply and Utilization in Morocco, 1960-1967	63
34	Summary of Sorghum and Millet Products Supply and Utilization in Morocco, 1960-1967	64
35	Summary of Rye Supply and Utilization in Morocco, 1960-1967	65
36	Summary of Rye Products Supply and Utilization in Morocco, 1960-1967	66
37	Summary of Paddy Rice Supply and Utilization in Morocco, 1960-1967	67
38	Summary of Paddy Rice Products Supply and Utilization in Morocco, 1960-1967	68-69
39	Summary of Imports of Cereal Grains in Morocco, 1960-1967	70
40	Summary of Exports of Cereal Grains in Morocco, 1960-67	71
41	Consumption and Disappearance of Cereal Grains in Morocco, 1960-1967	72-74 72-74
42	Approximate Domestic Per Capita Disappearance of Cereals	75
43	Three Additional Estimates of Per Capita Disappearance of Cereals	77
44	Cumulative Monthly Commercialization of <u>Bread Wheat</u> in Morocco, 1957-1967	78
45	Cumulative Monthly Commercialization of <u>Durum Wheat</u> in Morocco, 1957-1967	79
46	Cumulative Monthly Commercialization of <u>Barley</u> in Morocco, 1957-67	80
47	Cumulative Monthly Commercialization of <u>Corn</u> in Morocco, 1957-67	81
48	Commercialization of the 1967 Crop in Morocco, 1967-68	82-83
49	Regional Commercialization of Cereals from May 15, 1967 Through April 16, 1968 in Morocco	84-85
50	Cumulative Commercialization of the 1968 Crop in Morocco, 1968-69	86-87
51	Commercialization of Cereals from April 15, 1968 to March 31, 1969 (IN Q)	88-89
52	Maximum Commercialization of Cereals by Regions	90
53	Annual Variation in Percentage of Four Principal Cereals Commercialization in Morocco, 1957-1966	91
54	Comparison of Annual Production and Marketing Deviation From 10 Year Average, 1957-1966	91
55	Percent of Production Commercialization in Morocco, 1957-1966	92
56	Ten Year Moving Average of Principal Cereal Production Commercialized in Morocco, 1947-1966	92
57	Commercialization of the Four Principal Cereals by Storage Organization	93
58	Relative Importance of Marketing (Gathering) Organizations, 1965-66 Crop Year	94
59	Commercial Volume - % in Storage by September 30 Average 10 yrs. 1957-66	94

Table		Page
	<u>Cereal Storage Facilities</u>	
60	Cereal Grain Storage Capacities by Type and Location in Morocco	103-108
61	Summary of Cereal Grain Storage Capacities by Type and Organization	109
62	Major Cereal Stocks in Storage as of 15 April, 1969	110
63	Preliminary Calculations Indicative of New Grain Storage Required if (and when) Domestic Production Reaches Sufficiency for the Nation	111
	<u>Cereal Grain Processing Facilities</u>	
64	Location, Name and Annual Capacities of Industrial Flour Mills in Morocco, 1968/69 Crop Year	113-114
65	Comparison of Urban Population, Consumption and Commercial Wheat Milling Capacities of Provinces in Morocco, 1968/69	116
66	Omitted	
	<u>Livestock Population</u>	
67	Population of Cattle, Sheep, Goats, Swine, and Poultry in Morocco, 1960-1967	118

List of Figures

	Page
Figure 1. Effect of Amount and Timing of Rainfall with Temperature on Barley Yield.....	26
Figure 2. Areas Planted to Four Major Cereal Grains.....	28
Figure 3. Comparison of Area Planted and Total Production of Four Major Cereal Grains in Morocco.....	29
Figure 4. Cereal Production for Morocco--Ten-Year Moving Average....	40
Figure 5. Approximate Per Capita Disappearance Compared with Total Domestic Disappearance of Cereals.....	76

List of Maps

	Page
Morocco Population Distribution, 1960.....	18
Grain Storage Facilities, Location and Capacity.....	102
Major Flour Mills, Location and Capacities.....	115
Hard Surfaced Roads (Major) - Morocco.....	126
Hard Surfaced Roads - Kenitra, Meknes, Fes Area.....	127
Hard Surfaced Roads - El-Jadida, Casablanca, Rabat Area.....	128
Railroad System - Morocco.....	129
O.C.I.C. Inspection and Control Locations.....	130

SECTION I

1

INTRODUCTION

Kansas State University was requested to provide technical assistance, in a study of the grain storage problems in Morocco, by reason of its contract with the Agency for International Development (AID). Mr. Carl Ferguson of the North Africa Office, AID/Washington, D.C., was the source of information and agreement for the work to be undertaken by the Kansas State team.

This report records the findings of the Kansas State study. Effort was made to investigate the grain storage problems, present and future, in Morocco. It is intended that this report shall either provide recommendations for solutions or suggest the further work that needs to be done to arrive at economic plans for action.

Although this study could not provide the depth of detail and verification required by Manual Order 1221.2 entitled, "Feasibility Studies, Economic and Technical Soundness Analysis, Capital Projects," the work was so conducted that we believe the data that follows may be used as a basic document, or guide, to the work needed for the fulfillment of manual requirements for any loan application that results from our recommendations.

The Ministry of Agriculture in Morocco is in the process of developing its statistical services. As of this time there is little continuity to the grain trade data. The data covering the production and consumption of grains that do not reach commercial channels are deemed to be intelligent estimates rather than a physical tally. Unless inconsistencies could be observed in the information, this team has accepted the data offered by the Government of Morocco (hereinafter GOM) as valid, without further verification.

USAID/Morocco requested that the units of measurement used in this report be the metric system commonly used in Morocco and the Dirham for currency. We have generally adhered to that request. A conversion chart covering those units found useful to the preparation and understanding of the information is included in the work that follows.

For those who are not intimately familiar with Morocco, some background data on the nation may help one to understand its grain economy.

Government

Morocco is a constitutional monarchy, governed at present by King Hassan II. Independence from France and Spain was attained in 1956.

A constitution adopted by popular vote in 1962 established two houses of Parliament - a House of Representatives elected every four years by popular vote, and a Chamber of Counselors serving for six years, elected by representatives of local government, commerce, industry, agriculture, artisans, and the labor unions. The constitution proclaims the Nation to be Moslem, democratic, and establishes Arabic as the official language. The King appoints the Prime Minister and some nineteen Cabinet Ministers. He presides over cabinet meetings, signs treaties, and he may dissolve the Parliament at will. The King is the religious head (Iman) of Morocco.

The national capital is Rabat. The country is divided into twenty provinces named after the provincial capital cities.

Economy

Of a gross domestic production in 1965 of Dirhams 9,710,000,000 agriculture accounted for DH 3,150,000,000 or about one third. Morocco is an emerging nation in industrial production.

Morocco has a record of a highly fluctuating balance of payments as reflected by the 1959-67 statistics. The greatest annual deficit in that period was DH 370,000,000 and the greatest annual surplus was DH 380,000,000. The highly variable agricultural production results appear to have the greatest effect on the current accounts. Foodstuffs appear to constitute the greatest single drain on foreign exchange, and phosphate rock the largest export and earner of foreign exchange. Foodstuffs in the aggregate, led by citrus, are certainly the number two export and some years may exceed phosphates.

Although current budgets have been balanced in many years, the addition of needed capital expenditures has resulted in deficit financing of GOM operations from 1962 thru 1967 in amounts varying from DH 492,000,000 to DH 1,110,000,000. Foreign loans have been a major source of the deficit financing.

Data taken from the "Moroccan Bank for Foreign Trade" statistics indicates that the resultant of spending beyond the internally generated resources has resulted in inflation, but not at a particularly oppressive rate in recent years. They are:

Index of Wholesale Prices-Local Products (1939=100)

1961 = 3696

1967 = 4575

An increase of 3.5 to 4% compounded annually.

Cost of Living Index-Casablanca (1958-59=100)

December 1964 = 127

December 1967 = 127.7

No significant rate of change in the stated period.

Total Money Supply

31 December 1964 = DH 3,778,000,000

31 December 1967 = DH 4,468,000,000

An increase of 5.5 to 6% compounded annually.

Tight wage and price controls at retail have apparently held consumer prices in line, however, that result may have been attained at the expense of business profit with resulting low interest in, and generation of, private sector capital investment.

Education

Literacy in Morocco is low. It is estimated that between 10-20% of the people are literate, with most commentators estimating about 15%. Literacy in the cities is higher than in rural areas. Significant gains are being made. As of 1966 it is estimated that at least 45% of the country's seven-year-olds were in school. Most reports stress the need of education and technical training as an essential, concurrent element in the development of Moroccan industry. Modern tools and methods will accomplish little without skilled people to use them effectively.

Employment

Unemployment and underemployment among the unskilled and illiterate people constitutes a major problem. With skilled people sorely needed and opportunity readily available to them, it is estimated that there are probably between 20% and 30% of the economically active urban people unemployed and 40% to 50% of the rural workers grossly underemployed.

The economically active work force in Morocco probably approximates 5.2 million people at the present time.

Like most developing nations, the crying need is for capital to develop the internal productive potential. Most commentators seem in agreement that the internal resource potentials of land and people are great. Education and industrial training are needed for the intelligent, industrious people, plus modern facilities for them to use, so that they may effectively compete in an industrialized world.

Geography

Morocco is slightly larger than the State of California. It occupies a land area of roughly 450-500,000 square kilometers (172,000-193,000 square miles) on the northwest coast of Africa, between 27 and 36° north latitude and between 2 and 14° west longitude. The approximation of area results from the undefined border on the south between Morocco and Algeria, its neighbor to the south and east. The nearly 2750 kilometers (1700 miles) of coastline lie on both the Atlantic ocean and the Mediterranean Sea.

The rugged Rif mountains rise sharply from the northern Mediterranean coast of Morocco to as high as 1800 meters (6000 feet). The high Atlas mountains with peaks to 4000 meters (13,000 feet) run parallel to the Atlantic approximately 125 miles inland from the coast-line. This range (about 725 kilometers in length and 65 km wide (450 miles x 40 miles) divides Morocco into two general climatic regions. Minerals and water for irrigation and hydro electric power are derived from the mountains.

The middle Atlas mountains form a plateau on the Atlantic side of the high range.

Climate

On the Atlantic side of the high Atlas mountains, the climate is semi-tropical, similar to that of southern California, but slightly more humid. The area constitutes the major agricultural producing section of Morocco. Summers, May through September, are warm and virtually without rain. The remainder of the year is mild with frequent but irregular amounts of rainfall. Annual irregularity of the rainfall is responsible for year to year variations in crop yields. On the east side of the high Atlas mountains a region of dry steppes merges with the Sahara desert. A mild climate with abundant rainfall in the west exists along the Mediterranean coast.

Seasonal variations along the Atlantic coastal zone are only slight, with average temperatures ranging from 55° F to 75° F (13° C to 24° C). The interior zone has greater temperature variations, not only between summer and winter but between day and night. For example, average temperatures at Fez and Marrakech range from 5° F to 85° F (-15°C to 29°C).

Population

Present population estimates are based on the official census of January 1960 which indicated a population of 11,626,232. Of this total, 95.2% were Moslem. Average density according to the 1960 census was 25.3 inhabitants per square kilometer. Rate of annual increase was estimated as 2.74% for Morocco, with 2.53% and 3.24% for rural and urban populations, respectively. Distribution of population was calculated at 26.3% urban and 73.7% rural according to the 1960 census.

Recent estimates of the population place the 1967 population between 13,553,000 and 14,140,000 with annual rates of increase between 2.74 and 3.3 percent.

The high rate of population increase is due to the increased Moslem birth rate and a declining death rate from improved health services.

Rates of increase in urban and rural areas are not equal and, in addition to the natural rates of increase, are affected by the movement of rural inhabitants to urban areas. For the period 1962-1970, urban average rates of increase for the Moslem population are estimated to be 5.2 percent with 3.7 percent a result of natural increase and 1.5 percent a result of rural migration to urban areas. The rural rate of increase is estimated at approximately 2.6 percent.

With approximately 15 million people occupying roughly 500,000 square kilometers, the average density is about 30 persons per square kilometer. It should be pointed out, however, that a considerable land area is desert and that if only inhabitable areas were considered the density would be somewhat greater.

The native population of Morocco is mostly a mixture of Arab and Berber strains. Berbers were the original inhabitants. Arabs migrating from the Middle East over the centuries have intermarried with the Berbers to form an Arabized-Berber population which constitutes the largest ethnic group in

Morocco. Berbers still form a large ethnic group with many of the mountain dwellers totally of Berber origin. At present roughly 98 percent of the total population is composed of Moroccan Moslems with nearly half less than 15 years old.

According to 1966 figures from the Moroccan Ministry of Public Health, rural families had an average of 5.16 persons and urban families had an average of 4.27 persons. Using these figures and rural population figures for 1969 indicates that roughly 1,975,000 families are involved in the production of the Moroccan food supply.

About 30 percent of the population makes up the total labor force, with roughly half of the labor force devoted to agriculture.

Land

Between 15 and 20 percent of the total land area of Morocco is arable and is used in production of cereals, legumes, annual horticulture, industrial crops, forages, other crops, vineyards and orchards, or is temporarily fallow. An equal amount of land is used as permanent pasture. The remainder is in forest, marshes, or is non-arable land.

Of the 15 to 20 percent of cultivated land, more than half is devoted to the production of cereal grains and about another 30 percent is temporarily fallow but will generally be rotated in cereal production.

A classification of land by ownership based on legal origin of the land title is important in Moroccan agriculture because of its influence on agricultural development problems. Briefly, the various groupings of land under this classification are as follows:

Collective Lands - Tribal lands acquired through history of occupation. Individuals assigned cropping rights for short periods.

Melk Lands - Privately owned lands, either foreign or Moroccan. (Most foreign-owned land is farmed by modern methods, some of which has been sold to Moroccans).

Habous Land - Owned by religious organizations and rented out for cropping.

Guich Land - Land given to various tribes by government in recognition of military service.

Domanial Lands - Government-owned lands rented to tenants for cultivation.

Recuperated Lands - Land expropriated from French colonials by the Moroccan Government for redistribution to Moroccan farmers. Cultivated in large units by the Government until redistribution.

Moroccan land is further classified according to farming methods-modern and traditional.

Traditional methods of farming are characterized by small land holdings, dependence on unreliable climatic conditions, and primitive production methods. It is estimated that roughly 93 percent of the land devoted to agriculture is farmed in the traditional method, with approximately 90 percent of the land used in all cereal production farmed by traditional methods. Percentages of land used in the production of cereals by traditional methods and modern methods are as follows:

<u>Cereal</u>	<u>Method of Farming</u>	
	<u>Traditional</u>	<u>Modern</u>
Bread Wheats	75	25
Durum Wheats	85	15
Barley	97	3
Corn	96	4
Oats	63	37
Sorghum	96	4
Canary Grass	80	20
Millet	100	0
Rye	<u>100</u>	<u>0</u>
Total	90	10

The modern sector consists of approximately 10 percent of the land devoted to cereal production. Most of the land in the modern sector was formerly owned by Europeans and was held in relatively large parcels and farmed using modern methods. It is generally assumed that the traditional sector is largely a subsistence-type farming, whereas most of the modern sector is devoted to commercial grain production.

The Grain Trade

The grain trade in Morocco is fractionated both in its movements to market and in its control by government agencies.

Approximately 75 percent of the estimated cereal grain production is either utilized on the farm or traded in local markets (souks) without governmental measurement or control. The remaining 25 percent enters commercial channels through legitimate dealers, licensed dealers, the cooperatives, or millers. Typically rural, uncontrolled needs are satisfied first and the surpluses only are commercialized. The amounts commercialized; therefore, vary widely with the size of the crop.

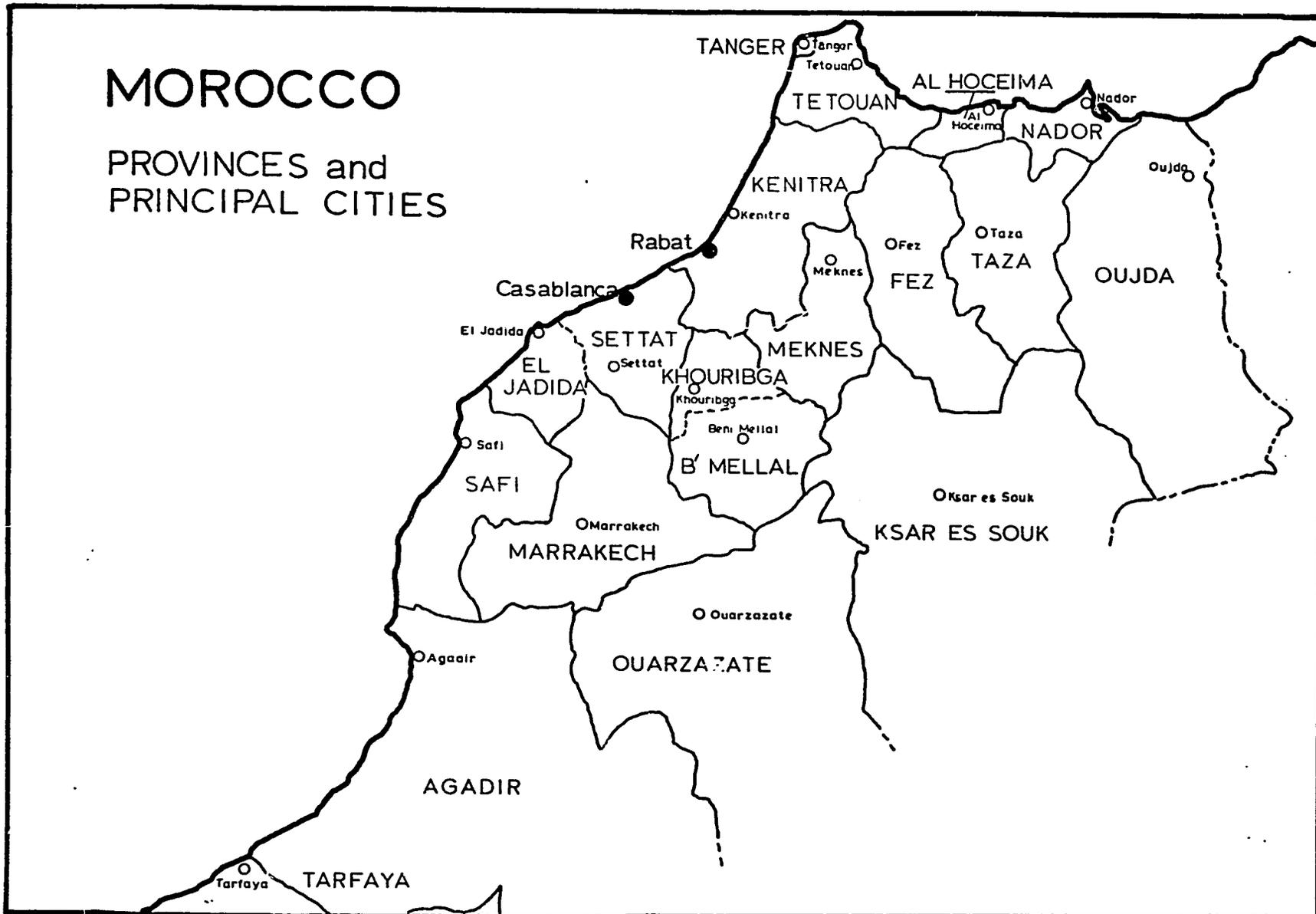
Much of the cereal crop success is quite dependent on the time and amount of rainfall. Rainfall amounts and timing vary markedly in Morocco, resulting in wide differences in annual cereal production.

The commercialized sector of the grain trade is largely under government price control administered by the governmental marketing agency for cereals (OCIC).

Commercialized bread wheats are tightly controlled, both as to price and physical movement by OCIC. Commercialized durum wheat and barley are supported as to price by OCIC but may move internally without control. Corn and minor cereals are not under GOM price or movement control.

MOROCCO

PROVINCES and PRINCIPAL CITIES



SECTION II

DATA

The information included in this section, in its tables and graphs, is believed to be indicative of trends. The GOM is now in the process of establishing a more extensive and dependable statistical system for collecting and publishing data for agriculture and related business. Heretofore, collection and dissemination of such statistical data has been spread among various agencies. Much of the data that follows came from special studies.

Quite extreme variations between data purporting to portray the same information were routinely found. Often such data were found to be at variance by 25% or more. Efforts at rationalization of such differences were generally unsuccessful.

We believe the time series data to be at least indicative of trends because the methods of accumulating most of such data appeared to be consistent from year to year. The numbers, however, are open to question as to their accuracy.

Accurate data needed to intelligently provide definitive answers to the questions raised in this study will require further development. This should probably be the first order of business for long range planning.

We include herein much contradictory data purporting to report the same information. We do not do so in support of the recommendations we make. It is done to concentrate as much of the available information, as this team was able to find, in one place, so that any later studies or planners, can assess the data problem without redoing the same effort.

Projections of cereal production into the future that have been made are not deemed to be useful by those who made them. We have not included such data in this report. As of this time, average production of recent years is the most useful projection data.

As of this time, the only active improvement efforts in depth that are underway for cereals are for wheat production, and particularly bread wheats. It is believed that all of the cereals offer highly profitable opportunities for improved husbandry.

Some data concerning the rates of commercialization of cereals is available and shown. We were unsuccessful in obtaining rates of out turn (consumption), by month, through the years. Such data will be needed to calculate definitive storage and processing requirements for the future.

Mensuration Equivalents

Volume

1 U.S. (Winchester) bushel = 1.2445 cubic feet

1 Cubic Foot = 0.8036 U.S. Bushel

1 U.S. Bushel = 35.2379 Liters

1 Cubic Foot = 28.316 Liters

1 Liter = 0.02838 U.S. Bushel

1 Liter = 0.03532 Cubic Foot

Area

1 Acre = 0.40469 Hectare

1 Hectare = 2.47104 Acres

1 Hectare = 0.01 Square Kilometer = 10,000 Sq. Meters

1 Square Foot = 0.0929 Square Meters

1 Square Meter = 10.76387 Square Feet

1 Square Kilometer = 0.3861 Square Mile

1 Square Mile = 2.5899 Square Kilometers

Weight

1 Kilogram = 2.20462 Pounds

1 Metric Ton = 2,204.62 Pounds = 1,000 Kilograms

1 Metric Ton = 1.10231 U.S. (Short) Ton

1 Pound = 0.45359 Kilogram

1 U.S. (Short) Ton = 0.90719 Metric Ton

1 Quintal = 0.1 Metric Ton = 220.462 Pounds

Length

1 Meter = 39.37 Inches

1 Foot = 0.3048 Meters

1 Kilometer = 0.62137 U.S. Statute Mile

1 U.S. Statute Mile = 1.60925 Kilometers

U.S. Standard Bushel Weight Per Quintal

1 Quintal = 3.67 U.S. Bushels 60 lb. Wheat

1 Quintal = 4.59 U.S. Bushels 48 lb. Barley

1 Quintal = 3.94 U.S. Bushels 56 lb. Corn

1 U.S. Std. 60 lb. Bus. of Wheat = 0.272 Quintal

1 U.S. Std. 48 lb. Bus. of Barley = 0.218 Quintal

1 U.S. Std. 56 lb. Bus. of Corn = 0.254 Quintal

Currency

1 U.S. Dollar = 5.06 Dirhams

1 Dirham = 0.19763 U.S. Dollars

1 Dirham = 100 Morocco Francs

1 Morocco Franc = 0.0019763 Dollars

1 U.S. Cent = 5.06 Morocco Francs

List Of Common Abreviations Used In Morocco

AMES	Association Marocaine pour l'Etudes des Sols Moroccan Association for Soil Studies
BEPC	Brevet d'Etudes du Premier Cycle High School Lower Certificate
BEPI	Bureau d'Etudes et de Participations Industrielles Office of Industrial Studies and Participation
BIRD	Banque Internationale de Reconstruction et de Developpement International Bank for Reconstruction and Development
BIT	Bureau International du Travail International Labor Organization
BM	Banque du Maroc Bank of Morocco
BMCE	Banque Marocaine pour le Commerce Extérieur Moroccan Bank for Foreign Trade
BMCI	Banque Marocaine pour le Commerce et l'Industrie Morroccan Bank for Commerce and Industry
BNDE	Banque Nationale pour le Developpement Economique National Bank for Economic Development
BO	Bulletin Officiel Official Bulletin
BRPM	Bureau de Recherche et de Participation Minieres Bureau of Mine Research and Participation
BVA	Bureau des Vins et Alcools Office of Wines and Alcohols
CAF	Coût - Assurance - Frêt Cost - Insurance - Freight
CAP	Certificat d'Aptitude Professionnelle Certificate of Vocational Aptitude
CCI	Chambre de Commerce et de l'Industrie Chamber of Commerce and Industry
CDG	Caisse de Depot et de Gestion Deposit and Management Fund
CEDES	Centre d'Etudes pour le Développement Economique et Social Center of Economic and Social Studies and Development

CEDIES	Centre d'Etudes et d'Informations Economiques et Sociales Center of Economic and Social Studies and Information
CEP	Certificat d'Etudes Primaires Primary School Certificate
CESM	Certificat d'Etudes Secondaires Musulmanes High School Lower Certificate
CMA	Cooperatives Marocaines Agricoles Agriculture Moroccan Cooperatives
CMV	Centre de Mise en Valeur Agricole Work Center (Irrigated Area)
CNCA	Caisse Nationale de Crédit Agricole National Bank of Agricultural Credit
COFITEK	Compagnie de Filature et de Textiles Spinning and Textiles Company
COMAGRI	Compagnie Marocaine Agricole Moroccan Agriculture Company
COMAPRA	Compagnie Marocaine des Produits Agricoles Moroccan Company of Agriculture Products
Connt.	Connaissance Bill of Lading
CONSUMAR	Compagnie Sucrière Marocaine de Raffinage Moroccan Sugar Company (Refining)
CRM	Croissant Rouge Marocain Moroccan Red Crescent
CT	Centre de Travaux Work Center (Dry Land)
CTM	Compagnie des Transports Marocains Moroccan Transport Company
DERRO	Développement Economique et Rural du Rif Occidental Western Rif Agricultural and Economic Development
DMVA	Direction de la Mise en Valeur Agricole Direction of Agricultural Development
DRA	Direction de la Recherche Agronomique Directorate of Agronomic Research
DRS	Défense et Restauration des Sols Soil Conservation

E & F	Eaux et Forets Waters and Forests
EMA	Ecole Marocaine d'Administration Moroccan School of Administration
FIC	Foire Internationale de Casablanca Casablanca International Fair
FMI	Fonds Monétaire International International Monetary Fund
Istiqlal	(Partie de..) Political Party
MAP	Maghreb Agence Presse Maghreb Press Agency
Mouvement Populaire	(Partie du..) Political Party
OCAM	Organization Commerciale des Agriculteurs au Maroc Moroccan Commercial Organization of Citrus Grovers
OCE	Office de Commercialisation et d'Exportation Bureau of Marketing and Exports
OCIC	Office Chérifien Interprofessionnel des Céréales Royal Interprofessional Office of Cereals
OCP	Office Chérifien des Phosphates Royal Office of Phosphates
OIE	Office International des Epizooties International Office of Epizootiss
OL	Opération Labour Operation Plough
OMC	Office Marocain d'Echange Moroccan Exchange Office
OMS	Organisation Mondiale de la Santé World Health Organization
ONMT	Office Marocain National du Tourisme National Moroccan Office of Tourism
ONE	Office National de l'Electricité National Office of Electricity
ONCF	Office National des Chemins de Fer National Office of Railways

ONI (1)	Office National des Irrigations National Office of Irrigation
ONMR (1)	Office National de Modernisation Rurale National Office of Rural Modernization
ONT	Office National des Transports National Office of Transports
ONTS	Office National du Thé et du Sucre National Office of Tea and Sugar
ONU	Organisation des Nations Unis U.N.
ORMVA	Office Regional de Mise en Valeur Agricole Regional Agriculture Development Office
PN	Promotion Nationale National Promotion
PRAM	Projet de Révalorisation Agricole au Maroc Moroccan Agriculture Revalorization Project
PTT	Postes, Télégraphes, Téléphones General Post Office
REI	Régie des Exploitations Industrielles Agency of Industrial Exploitations
RTM	Radiodiffusion Television Marocaine Moroccan Radio and Television
SCAM	Société Cooperative Agricole Marocaine Moroccan Agriculture Cooperative Company
SMD	Société Marocaine de Distribution Morroccan Distribution Co. (Water and Electricity)
SMEP	Société Marocaine des Engrais Pulverisés Moroccan Co. of Powdered Fertilizers
SNCE	Société Nationale des Conduites d'Eau National Company of Water Pipes
SOCAD	Société de Crédit Agricole et de Prévoyance Agriculture Credit and Insurance Company
SOGETIM	Société Générale d'Etudes et Travaux d'Irrigation au Maroc Company of Studies and Irrigation Works in Morocco

(1) - Merged into OMVA : Office of Agriculture Development, which itself became DMVA.

SOMACA	Société Marocaine de Construction Automobile Moroccan Company for Automobile Construction
SOTRAC	Société des Travaux Chérifiens Cherifian Works Company
SSNM	Société des Sciences Naturelles au Maroc Society of Natural Sciences in Morocco
SUNAB	Sucrerie Nationale du Beht National Sugar Plan of Beht
SUTA	Sucrerie du Tadla Tadla Sugar Plant
TP	Travaux Publics Public Works
UGTM	Union Générale des Travailleurs Marocains Moroccan Workers General Union
UMA	Union Marocaine de l'Agriculture Moroccan Agriculture Union
UMT	Union Marocaine du Travail Moroccan Work Union
UNEM	Union Nationale des Etudiants Marocains Moroccan Students National Association
UNFP	Union Nationale des Forces Populaires National Union of Popular Forces (Political Party)
USTL	Union Syndicale des Travailleurs Libres Free Workers Union Association
ZLE	Zone de Libre Echange Free Exchange Zone

Population

The first real census was made in 1951-52, although population counts had been made in the former French Protectorate area about every five years since 1921. This census was considered to have undercounted by 5%. Less regular counts were made in the former Spanish Protectorate over the same period. The first unified census of Morocco was taken in 1960. All demographic data must be treated with caution and considered as estimates, since the lack of series of comparable data and large probable errors in earlier data make establishment of trends or projections difficult.

Rates of population increase from different sources vary. The national rate of population increase appears to be slightly above 3.0%. Rates of increase in urban areas are generally higher, ranging between 2.4 and 7.7 per cent with an average of 5.2%. For the period 1960-1973 the natural rate of increase is estimated at 3.7% with an additional 1.5% due to rural exodus to urban areas.

TABLE 1

POPULATION ESTIMATES FOR MOROCCO*

(X 1000)

Year	Total Population			Moroccan Moslem			Moroccan Israelites And Others
	Urban	Rural	Total	Urban	Rural	Total	
1967	4,380	9,760	14,140	4,130	9,750	13,880	260
1968	4,610	9,970	14,580	4,370	9,970	14,340	240
1969	4,860	10,190	15,050	4,630	10,190	14,820	230
1970	5,125	10,400	15,525	4,910	10,400	15,310	215
1975	6,260	11,480	17,760	6,105	11,480	17,585	175
1980	7,870	12,400	20,270	7,730	12,400	20,130	140
1985	9,950	13,050	23,000	9,810	13,050	22,860	140

* Based upon projections by the Ministry of Economic Affairs, Division of Plans and Statistics, Bureau of Demography, March 1968.

This chart is based upon 1952-1960 estimated rates of increase of:

Rural Growth = 2.6% per annum
 Urban Growth = 5.3% per annum (Includes 2.3% Rural-Urban Migration)
 National Growth = 3.0% per annum

Various GOM agencies and other sources purporting to report the same data, quote the national rate in the range of 2.74% to 3.4%.

The last actual census was conducted in 1960. The next census is reported to be scheduled for 1970.

MOROCCO
POPULATION DISTRIBUTION
1960

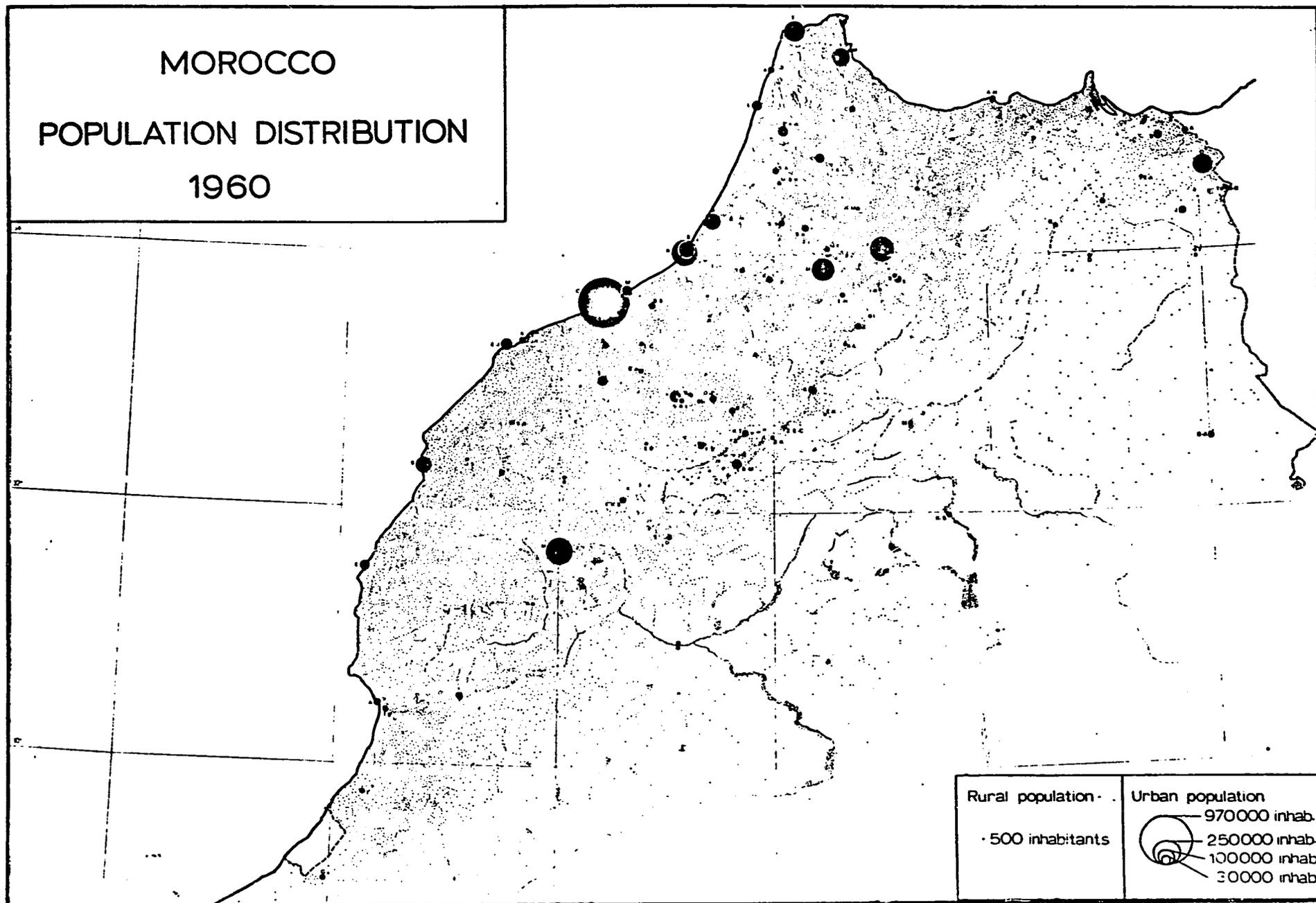


TABLE 2 MOROCCAN MOSLEM POPULATION¹ BY PROVINCE - 1960²
(Based on 1960 Census)

PROVINCES	1 9 6 0		TOTAL
	URBAN	RURAL	
Agadir	54,732	783,743	838,475
Al Hoceima	11,180	177,827	189,007
Beni Mellal	63,055	406,685	469,740
Casablanca	212,963	996,803	1,209,766
Fez	238,460	568,912	807,372
Ksar Es Souk	22,370	352,023	374,393
Marrakech	259,461	966,638	1,226,099
Safi	99,799	631,292	731,091
Meknes	207,004	340,642	547,646
Nador	16,317	326,709	343,026
Ouarzazate	8,519	421,037	429,556
Oujda	180,755	257,266	438,020
Kenitra	169,958	849,997	1,019,955
Tanger	101,374	22,104	123,478
Tarfaya	1,517	16,728	18,245
Taza	35,360	406,480	441,840
Tetouan	164,274	446,217	610,491
Prefecture of:			
Rabat - Sale	256,297	36,700	292,997
Casablanca	808,821	147,911	956,732
TOTAL	2,912,216	8,155,713	11,067,929

¹ Comprises 95.2% of Total Population

² Source: Royaume du Maroc, Cabinet Royal, Haut, Commissariat au Plan et a la Promotion Nationale, Population Marocaine Musulmane Estimée en 1968 et 1973.

TABLE 3 MOROCCAN MOSLEM POPULATION¹ BY PROVINCE - 1960²
(Based on 1960 Census)

PROVINCES	1 9 6 8		
	URBAN	RURAL	TOTAL
Agadir	80,000	890,000	970,000
Al Hoceima	16,000	215,000	231,000
Beni Mellal	91,000	500,000	591,000
Casablanca	330,000	1,240,000	1,570,000
Fez	330,000	690,000	1,029,000
Ksar Es Souk	32,000	425,000	457,000
Marrakech	340,000	1,200,000	1,540,000
Safi	153,000	770,000	923,000
Meknes	310,000	430,000	740,000
Nador	25,000	415,000	440,000
Ouarzazate	12,000	495,000	507,000
Oujda	275,000	320,000	595,000
Kenitra	270,000	1,065,000	1,335,000
Tanger	150,000	30,000	180,000
Tarfaya	5,000	20,000	25,000
Taza	51,000	490,000	541,000
Tetouan	240,000	555,000	795,000
Prefecture of:			
Rabat - Sale	410,000	45,000	455,000
Casablanca	1,250,000	175,000	1,425,000
TOTAL	4,370,000	9,970,000	14,340,000

¹ Comprises 98.4% of Total Population

² Source: Royaume du Maroc, Cabinet Royal, Haut, Commissariat au Plan et a la Promotion Nationale, Population Marocaine Musulmane Estimee en 1968 et 1973.

TABLE 4 MOROCCAN MOSLEM POPULATION¹ BY PROVINCE - 1960²
(Based on 1960 Census)

PROVINCES	1 9 7 3		TOTAL
	URBAN	RURAL	
Agadir	100,000	890,000	990,000
Al Hoceima	19,000	240,000	259,000
Beni Mellal	110,000	560,000	670,000
Casablanca	430,000	1,380,000	1,810,000
Fez	410,000	750,000	1,160,000
Ksar Es Souk	40,000	475,000	515,000
Marrakech	430,000	1,335,000	1,765,000
Safi	200,000	855,000	1,055,000
Meknes	390,000	480,000	870,000
Nador	30,000	480,000	510,000
Ouarzazate	14,000	515,000	529,000
Oujda	340,000	360,000	700,000
Kenitra	350,000	1,210,000	1,560,000
Tanger	200,000	35,000	235,000
Tarfaya	7,000	25,000	32,000
Taza	65,000	570,000	635,000
Tetouan	300,000	620,000	920,000
Prefecture of:			
Rabat - Sale	550,000	50,000	600,000
Casablanca	1,625,000	195,000	1,820,000
TOTAL	5,610,000	11,025,000	16,635,000

¹ Comprises 98.9% of Total Population

² Source: Royaume du Maroc, Cabinet Royal, Haut, Commissariat au Plan et a la Promotion Nationale, Population Marocaine Musulmane Estimee en 1968 et 1973.

TABLE 5 MOROCCAN MOSLEM URBAN POPULATION - 1960, 1968 and 1973

	1 9 6 0	1 9 6 8	1 9 7 3
Prefecture of Casablanca (1)	808,821	1,250,000	1,625,000
Prefecture of Rabat-Sale (1)	256,297	410,000	550,000
City of Kenitra	75,062	120,000	160,000
City of Safi	76,871	120,000	160,000
City of Marrakech	222,479	285,000	360,000
City of Fez	198,064	270,000	335,000
City of Meknes	150,429	225,000	290,000
City of Tanger	101,574	150,000	200,000
City of Oujda	90,615	140,000	180,000
City of Tetouan	78,446	115,000	150,000
Other Urban Population by Province:			
Agadir	54,732	80,000	100,000
Al Hoceima	11,180	16,000	19,000
Beni Mellal	63,055	91,000	110,000
Casablanca	212,963	330,000	430,000
Fez	40,396	60,000	75,000
Ksar Es Souk	22,370	32,000	40,000
Marrakech	36,982	55,000	70,000
Safi	22,928	33,000	40,000
Meknes	56,575	85,000	100,000
Nador	16,317	25,000	30,000
Ouarzazate	8,519	12,000	14,000
Oujda	90,140	135,000	160,000
Kenitra	94,896	150,000	190,000
Tarfaya	1,517	5,000	7,000
Taza	35,360	51,000	65,000
Tetouan	85,828	125,000	150,000
Urban Population of Morocco	2,912,216	4,370,000	5,610,000

(1) Population of the Urban Section.

Source: Royaume du Maroc, Cabinet Roral, Haut, Commissariat au Plan et a la Promotion Nationale, Population Marocaine Musulmane Estimee en 1968 et 1973.

TABLE 6

STATUS OF THE AGRICULTURAL POPULATION BY PROVINCE, 1960

	Persons/Km ²	Rural Population/ Km ² Cultivated	Hectares Cultivated/ Rural Persons	Pop. Active In. Agr. (X1000)	%
Agadir	15.8	189	1.3	317.0	85.9
Al Hoceima	53.2	350	0.8	64.6	86.5
Beni Mellal	33.3	105	2.2	171.8	86.3
Casablanca	92.2	61	3.3	434.2	57.0
Fez	45.0	100	2.8	205.0	70.2
Ksar Es Souk	3.2	435	0.7	113.4	81.9
Marrakech	44.0	110	2.2	411.5	80.3
Safi	54.7	75	3.2	267.6	82.1
Meknes	40.6	97	3.2	110.8	62.2
Nador	56.0	231	1.8	79.8	74.8
Ouarzazate	7.1	526	0.6	140.9	88.5
Oujda	10.3	86	3.4	85.9	64.5
Kenitra	63.0	84	2.6	317.3	67.1
Tanger	329.0	143	1.5	10.6	22.6
Tarfaya	-	-	-	6.0	75.8
Taza	20.0	159	1.7	153.6	88.4
Tetouan	60.7	294	0.9	175.4	75.3
Morocco Total	24.5	114	2.34	-	-

Source: Plan Quinquennal 1968 - 1972 Vol. III Le Development Economique Regional. MARS 1968

Cereal Crop Production

Cereal production data that were available appear to come from two general sources within the Ministry of Agriculture: l'Office Cherifien Interprofessionnel de Cereales (OCIC) and Direction de Etudes et des Affaires, Economiques et Juridiques (DEAEJ). There are discrepancies in the data available from each of the sources with the OCIC values, on the average, about 85% of the DEAEJ values.

Troin and Menard indicate discrepancies between the OCIC data and an annual agriculture census undertaken by the Direction du Plan et des Statistiques in 1964. OCIC values for total production of all cereals are 72%, 60% and 81% of census figures for 1964-65, 1965-66 and 1966-67, respectively. OCIC had traditionally based its estimates on a tax basis whereas the census is said to be based on a sampling of 87% of the production area.

Use of the production data for other than general trend evaluation would be unreliable. Because certain categories of data were only available from one or the other source (OCIC or DEAEJ), when evaluating the data the source should be considered.

TABLE 7 CEREAL HARVEST TIMES

Harvest time is a function of climatic conditions and means utilized for harvest. The following schedule is typical:

NORTH			
Barley	July 1	-	August 1
Durum Wheat	July 15	-	August 15
Bread Wheat	September 1	-	October 1
Corn	September 1	-	October 1
CENTER (Rabat, Fes, Meknes)			
Barley	May 15	-	June 15
Durum Wheat	June 1	-	July 1
Bread Wheat	July 1	-	August 1
Corn	August 1	-	September 1
SOUTH			
Barley	April 15	-	May 15
Durum Wheat	May 1	-	April 1
Bread Wheat	May 15	-	June 15
Corn	June 15	-	September 1

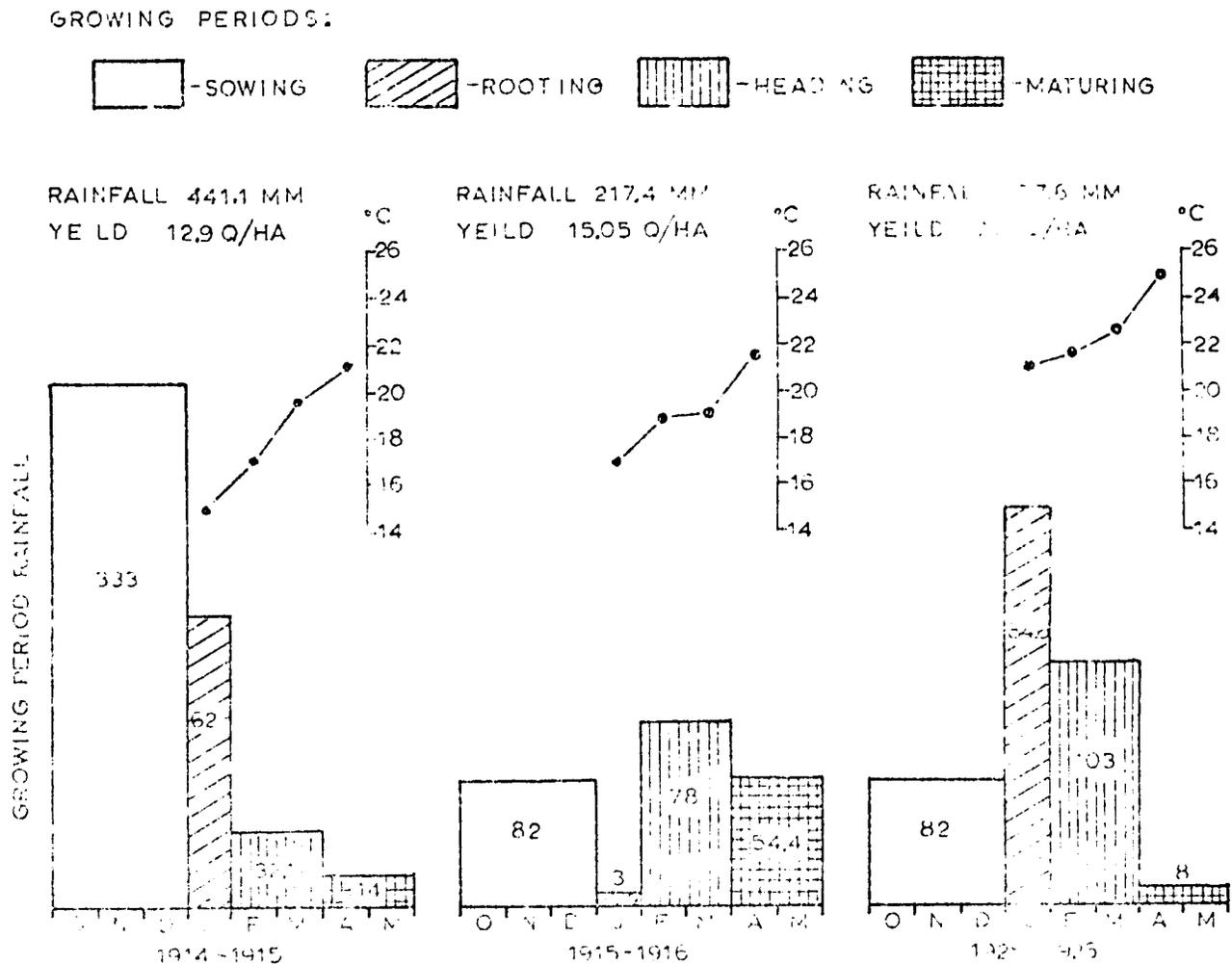
Source: Ministry of Agriculture - DEAEJ

TABLE 8 TOTAL PRODUCTION OF CEREALS AND AREA - MOROCCO - 1961-1962/1967-1968*

CROP YEAR	1961/62		1962/63		1963/64		1964/65		1965/66		1966/67		1967/68	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
					Area = X1000 Hectares:		Production = X1000 Quintals							
Bread Wheat	377.2	3,227.7	395.6	3,050.6	375.2	3,063.9	390.5	3,060.0	400.8	1,987.0	407.7	2,400.0	477.4	6,358.6
Durum Wheat	1,079.4	9,246.4	1,257.1	8,904.5	1,153.4	8,894.1	1,266.8	10,085.3	1,234.2	6,150.4	1,362.8	8,504.0	1,502.5	17,750.5
Barley	1,535.5	11,850.3	1,935.2	14,629.6	1,716.6	11,684.4	1,645.3	11,894.3	1,774.6	5,057.1	1,807.9	11,000.0	1,896.0	22,238.0
Corn	447.5	3,475.8	462.5	3,967.3	458.3	3,346.3	433.6	2,720.6	438.2	1,544.2	461.4	2,549.7	451.6	2,400.1
TOTAL	3,439.7	27,800.2	4,050.4	30,552.0	3,703.4	26,982.8	3,736.3	27,760.1	3,847.8	14,738.6	4,039.7	24,453.7	4,327.5	48,747.2
Oats	20.3	200.3	24.4	141.3	23.5	192.7	22.6	182.4	22.4	122.6	13.6	105.8	19.6	249.1
Canary Grass	33.9	274.1	35.5	269.2	30.7	249.6	39.8	278.4	34.4	188.3	33.9	218.9	35.8	324.2
Rye	4.3	19.3	4.0	16.6	2.6	11.4	10.7	45.5	1.9	6.3	3.1	14.4	2.6	20.6
Sorghum	110.7	683.6	155.3	922.2	109.8	639.1	64.5	391.6	84.1	305.3	82.6	505.0	79.6	606.1
Millet	14.4	74.8	8.6	59.0	11.5	55.3	17.3	87.1	5.6	21.4	6.6	31.0	6.3	52.9
Rice (F)	2.8	155.0	3.4	195.0	4.2	207.0	3.6	180.0	4.3	205.0	4.4	265.8	7.3	438.6
TOTAL	186.3	1,407.0	231.3	1,603.2	182.2	1,355.1	158.6	1,164.9	152.6	849.0	144.2	1,130.9	151.1	1,691.5
TOTAL ALL	3,626.0	29,207.2	4,281.8	32,155.2	3,885.5	28,337.8	3,894.8	28,925.0	4,000.5	15,587.6	4,184.0	25,584.6	4,478.6	50,438.7

* This data is at significant variance with the Ministry of Agriculture Data. Considered of primary use for trend analysis only.

FIGURE 1 Effect of Amount and Timing of Rainfall with Temperature on Barley Yield in Selected Years.

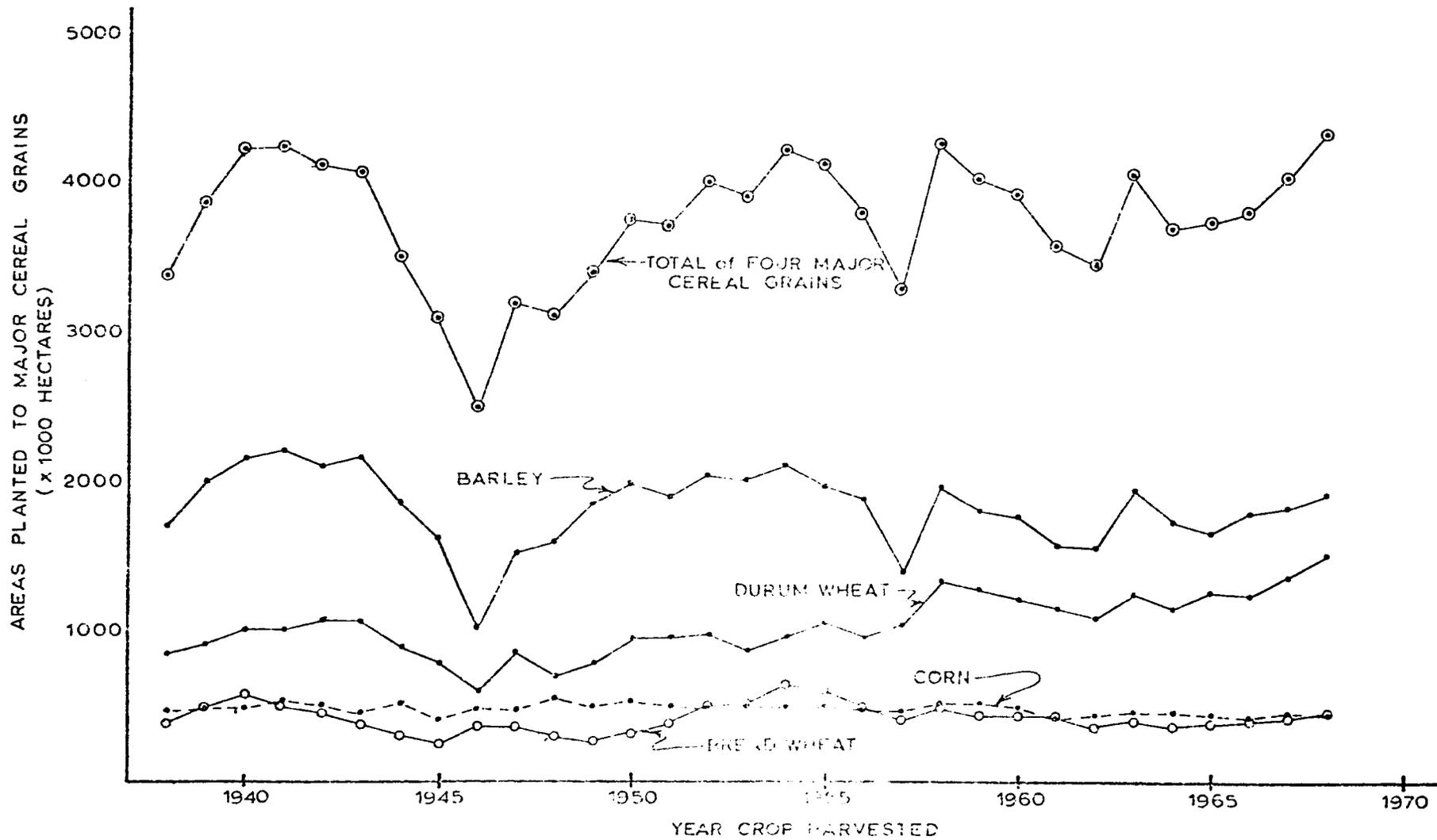


Three examples illustrating the effect of amounts of rainfall, the timing of rainfall, and temperature during the growing season on barley yields in the Abda area, under traditional culture.

Comments: In the growing year 1915-16, the lowest rainfall, 217 mm, reasonably well spaced, combined with moderate temperatures gave the highest yields. In 1914-15, a very wet year, 441 mm, with much of the rain concentrated in the planting season, with moderate temperatures gave lower but good yields. In 1925-26, a year of average total rainfall, 278 mm, a hot, dry spring resulted in quite low barley yields.

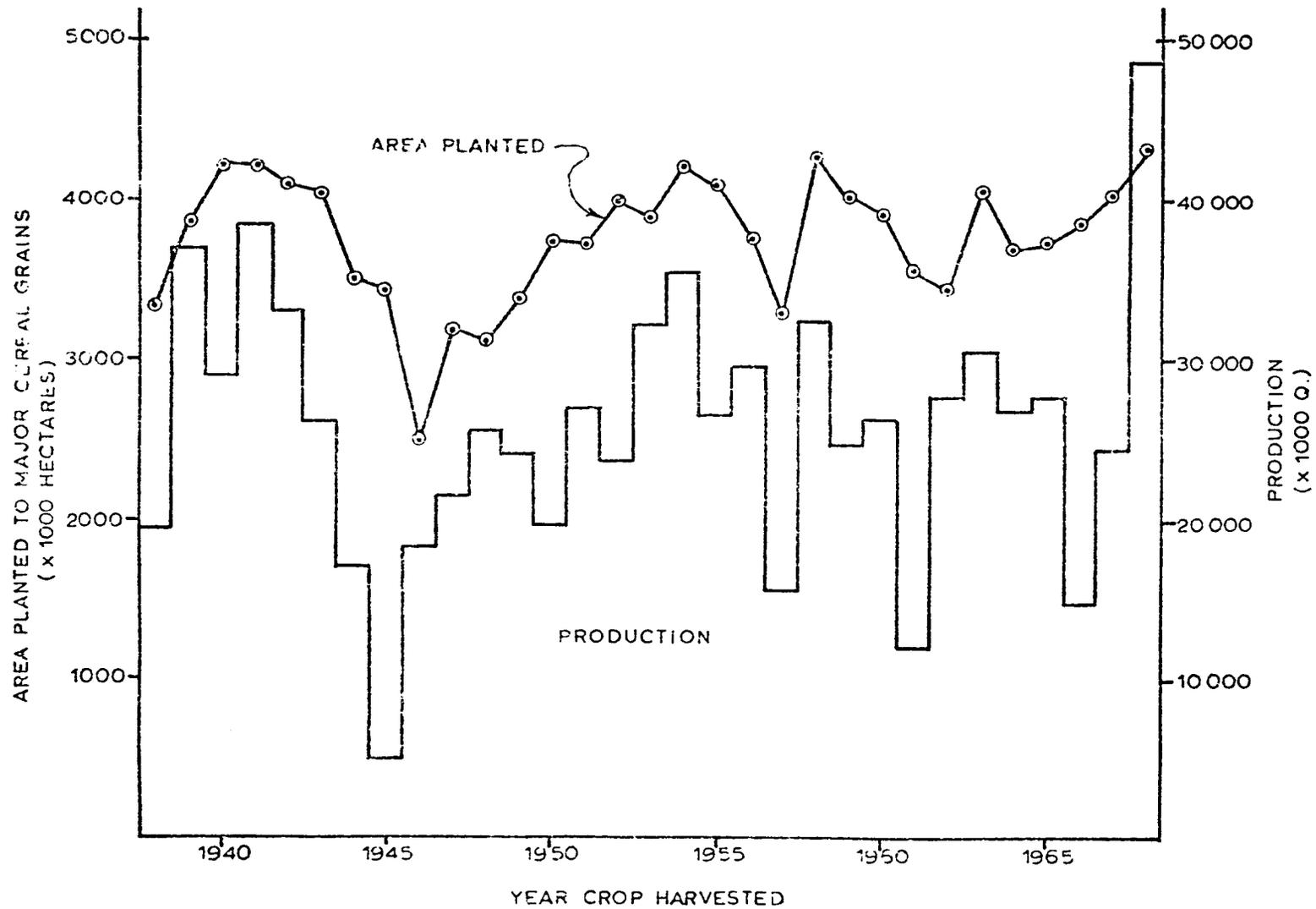
Source: Troin, J. F. and A. Menard (1968) Cultures Cerealieres. Atlas du Maroc.

FIGURE 2 Areas Planted to Four Major Cereal Grains



Source: Kebbaj, A. K. (1963) L'Economie Cerealiere au Maroc. Office Cherifien Interprofessionnel des Cereales. (1938 - 1962) O.C.I.C. Annual Reports (1963 - 1968).

FIGURE 3 Comparison of Area Planted and Total Production of Four Major Cereal Grains in Morocco



Source: Kebbaj, A.K. (1963) L'Economie Cerealiere au Maroc. Office Cherifien Interprofessionnel des Cereales. (1938 - 1962) OCIC Annual Reports (1963 - 1968).

TABLE 9

CEREAL GRAIN PRODUCTION FOR MOROCCO BY PROVINCE, 1962 - 1968*

Province	CROP YEAR													
	1961/62		1962/63		1963/64		1964/65		1965/66		1966/67		1967/68	
Cereal Grain	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
<u>Oujda</u>														
(Area = X1000 Hectares, Production = X1000 Quintals)														
Bread Wheat	8.5	41.6	10.5	72.0	5.0	34.0	3.5	37.1	2.5	-	5.0	16.0	7.0	72.0
Durum Wheat	50.0	168.2	60.5	403.0	50.0	370.0	45.0	432.0	25.0	-	60.0	140.0	90.0	770.0
Barley	66.4	228.6	75.0	640.0	60.0	370.0	54.0	387.0	30.0	-	70.0	180.0	70.0	690.0
Corn	0.1	0.3	-	-	-	-	-	-	-	-	0.7	2.5	-	-
Oats	3.9	16.2	5.4	36.4	5.0	39.0	5.8	48.3	4.5	-	2.5	19.5	4.5	50.5
<u>Nador</u>														
Bread Wheat	1.0	2.0	1.0	6.0	3.0	13.0	2.1	14.0	3.0	-	3.0	4.2	4.0	32.0
Durum Wheat	8.0	16.0	12.0	72.0	12.5	80.0	12.5	90.0	15.0	-	11.6	14.0	15.0	111.0
Barley	70.0	210.0	85.0	680.0	79.0	555.0	71.1	607.0	82.5	-	73.2	74.4	90.0	740.0
Corn	0.1	0.4	0.1	0.8	-	-	-	-	-	-	0.2	0.8	0.2	1.4
Oats	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.6
<u>Al Hoceima</u>														
Bread Wheat	-	-	-	-	0.9	2.7	0.6	3.8	0.4	0.8	0.5	2.0	0.5	3.5
Durum Wheat	1.5	3.0	1.8	9.0	3.0	17.0	3.0	20.0	4.0	12.0	2.5	16.0	6.0	43.0
Barley	21.5	64.5	23.0	138.0	25.0	176.0	25.0	201.0	25.0	75.0	26.0	158.0	29.0	236.0
Corn	0.1	0.3	-	-	-	-	-	-	-	-	0.2	0.5	-	-
Rye	-	-	-	-	-	-	-	-	-	-	0.7	5.6	0.7	5.6
<u>Taza</u>														
Bread Wheat	2.8	23.0	2.2	14.8	2.0	16.1	2.6	25.6	2.5	11.0	5.9	31.6	11.5	174.5
Durum Wheat	54.3	420.0	53.4	303.6	48.1	396.2	56.0	476.0	51.0	197.0	56.9	266.3	62.0	840.0
Barley	62.7	439.7	49.6	298.3	55.1	386.2	48.6	340.2	44.9	139.2	48.4	242.8	49.0	692.0
Corn	4.5	27.2	4.8	28.5	-	-	4.7	32.9	1.5	3.0	2.0	4.0	3.7	33.7
Oats	-	0.1	-	0.2	-	-	-	-	-	-	-	-	-	-
Rye	0.2	0.7	0.2	1.0	-	-	-	-	-	-	-	-	-	-
Sorghum	3.5	24.5	4.0	24.0	-	-	-	-	-	-	3.7	7.4	3.0	24.0

TABLE 9 CON'T	CROP YEAR													
	1961/62		1962/63		1963/64		1964/65		1965/66		1966/67		1967/68	
Province	Cereal Grain		Cereal Grain		Cereal Grain		Cereal Grain		Cereal Grain		Cereal Grain		Cereal Grain	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
	(X1000 Ha.; X1000 Q.)													
<u>Fez</u>														
Bread Wheat	13.0	198.0	22.0	160.0	20.0	188.0	22.0	231.0	25.0	128.0	29.0	143.0	50.0	815.0
Durum Wheat	90.0	795.0	138.0	780.0	121.0	571.0	131.0	840.5	135.0	350.0	160.0	960.0	166.0	1918.0
Barley	51.0	205.0	81.0	328.0	67.0	272.1	64.0	457.0	64.0	136.0	57.5	242.5	55.0	629.0
Corn	6.8	41.4	8.3	42.4	6.6	40.0	6.0	36.2	2.0	2.1	3.6	21.4	0.8	8.8
Oats	0.3	3.6	0.2	1.8	0.2	1.4	0.2	1.3	0.2	0.4	0.4	2.2	1.0	14.4
Canary Grass	0.2	1.0	0.2	1.4	-	-	-	-	0.1	0.1	0.1	0.3	0.2	1.1
Rye	0.4	2.3	0.2	0.9	0.2	1.2	0.1	0.6	0.1	0.2	0.1	0.4	0.1	0.7
Sorghum	25.5	154.0	30.4	182.8	20.3	122.4	15.0	105.0	3.0	3.0	3.9	19.0	5.0	35.0
Millet	0.1	0.3	-	-	-	-	-	-	-	-	-	-	-	-
<u>Meknes</u>														
Bread Wheat	35.0	514.0	40.0	520.0	34.5	423.0	35.0	615.0	33.0	265.0	36.5	277.5	48.0	876.0
Durum Wheat	120.0	1296.0	140.0	1460.0	122.0	1176.0	125.0	1064.0	115.0	580.0	122.5	1001.0	136.0	2032.0
Barley	45.0	616.5	46.5	375.0	59.5	613.5	38.5	400.0	34.0	107.0	49.5	357.0	45.0	609.0
Corn	10.0	47.7	9.5	67.5	12.0	90.0	11.0	70.0	10.0	42.0	10.1	62.4	0.8	8.8
Oats	0.3	2.8	0.8	6.2	0.8	5.6	-	-	0.6	3.7	1.3	12.0	1.0	14.4
Canary Grass	0.2	0.3	0.1	0.3	-	-	-	-	-	-	-	-	-	-
Rye	-	0.1	-	0.1	-	-	-	-	-	-	-	-	-	-
Sorghum	3.6	14.3	3.0	15.2	-	-	-	-	-	-	-	-	-	0.2
<u>Ksar Es Souk</u>														
Bread Wheat	-	-	1.0	8.2	1.0	8.2	2.0	10.0	0.8	3.8	0.8	4.2	6.5	45.5
Durum Wheat	-	-	11.6	115.5	11.6	115.5	20.0	120.0	10.0	50.0	8.2	33.0	36.0	252.0
Barley	-	-	8.6	68.4	8.6	68.4	11.5	103.5	4.5	27.0	16.0	112.0	16.0	144.0
Corn	7.3	36.4	7.0	35.0	-	-	-	-	-	-	-	-	-	-
Canary Grass	-	-	-	-	-	-	-	-	-	-	0.1	0.7	-	-

TABLE 9 CON'T	CROP YEAR													
	1961/62		1962/63		1963/64		1964/65		1965/66		1966/67		1967/68	
<u>Province</u>	Cereal Grain		Area	Prod										
	(X1000 Ha.; X1000 Q.)													
<u>Tanger</u>														
Bread Wheat	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Durum Wheat	1.3	6.5	2.0	12.2	2.0	16.0	2.5	20.0	1.5	9.0	3.5	21.0	3.8	29.8
Barley	1.3	5.4	1.3	9.2	0.7	4.4	0.7	5.8	0.2	1.4	1.0	8.4	0.9	9.7
Corn	0.3	2.3	0.3	2.3	0.2	1.6	0.1	0.8	-	0.3	-	-	-	0.2
Oats	0.6	2.6	0.4	3.2	0.4	3.1	0.6	4.5	-	-	-	-	-	-
Sorghum	4.3	43.6	4.8	38.7	3.6	36.3	3.0	24.3	4.0	12.0	3.0	18.0	2.5	18.5
Canary Grass	-	-	-	-	-	-	0.6	0.6	-	0.4	-	-	0.1	0.8
<u>Tetouan (Incl. Larache)</u>														
Bread Wheat	2.8	8.1	2.2	13.2	2.0	12.4	2.4	14.5	1.5	8.5	2.2	13.2	1.8	14.6
Durum Wheat	36.2	107.7	33.0	198.2	38.0	228.4	45.7	292.0	32.0	197.0	48.0	306.7	51.1	359.2
Barley	26.2	89.2	24.0	148.5	28.0	196.2	33.4	270.0	26.0	162.0	32.8	227.9	30.0	225.0
Corn	5.5	28.7	6.4	44.4	6.5	39.0	0.6	3.6	5.3	25.5	6.1	36.6	7.5	47.7
Oats	0.6	2.7	0.3	1.8	-	-	0.2	2.2	0.1	0.6	0.4	6.0	1.3	15.0
Rye	1.8	5.5	2.6	10.2	2.0	8.2	2.0	12.9	1.6	4.6	2.0	6.9	1.7	13.4
Sorghum	40.4	214.0	47.2	315.2	46.0	230.0	15.5	77.5	48.0	172.0	50.0	329.0	50.0	372.0
Millet	0.8	4.6	0.8	6.1	0.5	2.5	8.2	41.0	-	-	2.0	8.0	1.5	10.5
Canary Grass	0.1	0.4	0.2	0.8	1.0	6.0	1.3	5.2	-	0.4	1.0	8.0	1.2	12.0
Rice	-	-	-	-	-	-	-	-	-	-	-	0.8	-	0.6
<u>Kenitra (North and South)</u>														
Bread Wheat	64.5	686.0	45.0	321.0	65.5	681.0	65.0	601.0	58.9	474.0	77.0	546.0	88.0	1247.0
Durum Wheat	209.0	1913.0	169.4	1087.8	208.0	1801.0	221.0	1900.0	223.0	1490.4	267.0	1269.0	268.0	3336.0
Barley	122.2	1138.6	88.3	625.4	116.5	1029.8	110.0	939.0	113.5	444.0	129.0	837.0	125.5	1589.5
Corn	23.2	165.1	30.0	265.9	27.5	145.5	20.5	126.0	23.6	143.8	23.0	121.0	21.0	130.0
Oats	6.5	73.0	7.6	54.0	8.0	87.5	5.5	58.5	8.5	66.5	6.0	44.0	5.8	73.8
Canary Grass	26.4	206.2	28.5	227.9	29.0	240.0	31.0	231.0	25.8	184.0	23.2	148.4	23.5	207.4
Rye	0.2	1.2	0.2	1.0	0.3	2.0	8.0	32.0	-	-	-	-	0.1	0.9

TABLE 9 CON'T	CROP YEAR													
	1961/62		1962/63		1963/64		1964/65		1965/66		1966/67		1967/68	
Province	Cereal	Grain	Area	Prod										
	(X1000 Ha.; X1000 Q.)													
<u>Kenitra continued</u>														
Sorghum	33.2	232.3	65.2	342.8	39.6	249.8	29.4	185.2	27.6	112.0	20.0	121.	17.6	142.4
Millet	8.6	49.8	5.6	39.8	9.1	47.2	8.5	42.5	-	-	4.0	20.0	4.0	36.0
Rice (P)	2.8	155.0	3.4	195.0	4.2	207.0	3.6	180.0	4.3	205.0	4.4	265.0	7.3	438.0
<u>Casablanca*</u>														
Bread Wheat	58.0	613.0	57.5	438.5	55.0	366.0	55.0	380.0	51.0	310.0	51.0	333.0	61.0	853.0
Durum Wheat	188.0	2107.0	197.0	1405.0	197.0	1641.0	205.0	1953.0	210.0	1404.0	217.0	1487.0	225.0	3240.0
Barley	181.3	2001.3	190.0	1717.0	185.0	1335.0	180.0	1860.0	182.0	800.0	188.0	1558.0	182.0	2674.0
Corn	96.9	680.8	96.5	965.0	100.0	812.0	95.0	665.0	99.0	418.0	99.0	525.0	93.0	574.0
Oats	6.5	87.5	6.5	19.5	6.0	37.5	8.5	55.5	7.5	47.5	2.5	18.5	3.0	38.0
Canary Grass	6.2	62.0	3.6	18.0	-	-	6.0	31.0	7.0	38.0	8.0	51.0	9.0	88.5
Rye	0.1	1.2	0.1	0.7	-	-	-	-	0.2	1.4	0.3	1.5	-	-
Sorghum	-	-	0.5	2.0	-	-	1.0	5.2	1.5	6.3	1.2	8.6	1.5	14.0
Millet	-	-	0.1	0.4	-	-	-	-	-	-	-	-	-	-
<u>El Jadida</u>														
Bread Wheat	23.0	196.0	20.6	141.6	26.4	159.6	27.0	174.8	29.7	116.1	30.0	204.0	33.0	400.0
Durum Wheat	47.0	345.1	62.2	453.9	56.2	314.0	59.0	429.0	57.6	242.4	59.0	479.0	64.0	702.0
Barley	112.0	789.0	129.7	1045.7	126.0	654.0	134.7	1098.6	136.0	432.0	141.0	1140.0	141.0	1722.0
Corn	122.0	1224.0	133.5	1203.0	133.0	799.0	130.2	718.6	131.0	461.0	132.5	796.5	131.0	788.0
Oats	2.1	13.8	2.5	13.7	2.8	16.6	2.0	12.0	1.0	4.0	0.6	3.6	1.2	12.0
Canary Grass	0.8	3.9	2.9	20.9	0.7	2.9	1.5	10.5	1.2	4.8	1.5	10.5	1.8	14.4
Rye	0.4	1.9	-	-	-	-	-	-	-	-	-	-	-	-
Sorghum	0.2	0.8	-	-	0.3	0.6	0.6	3.6	-	-	-	-	-	-
Millet	5.0	20.1	2.1	12.7	1.4	5.6	0.6	3.6	0.6	2.4	0.6	3.0	0.8	6.4

* Including Settat Province

TABLE 9 CON'T	CROP YEAR															
	1961/62		1962/63		1963/64		1964/65		1965/66		1966/67		1967/68			
<u>Province</u>	Area		Prod		Area		Prod		Area		Prod		Area		Prod	
Cereal Grain	(X1000 Ha.; X1000 Q.)															
<u>Oued Zem*</u>																
Bread Wheat	52.0	526.0	68.5	465.4	44.0	420.0	68.5	422.5	58.0	316.0	53.0	251.0	56.0	721.0		
Durum Wheat	131.5	1347.0	165.2	1089.0	111.0	931.0	183.6	1517.4	175.0	1030.0	182.0	1584.0	187.0	2255.0		
Barley	196.0	2946.0	207.8	1462.5	121.0	848.0	204.4	2062.6	205.0	851.0	210.0	1295.0	214.0	3259.0		
Corn	1.9	15.4	2.1	17.0	2.1	25.0	3.0	30.0	3.7	18.5	4.0	32.0	3.5	45.5		
Oats	-	0.5	-	0.3	-	-	-	-	-	-	-	-	-	-		
Rye	0.4	4.1	-	-	-	-	-	-	-	-	-	-	-	-		
<u>Marrakech</u>																
Bread Wheat	57.5	237.0	70.0	440.0	60.0	320.0	55.0	240.0	63.0	168.0	57.0	186.0	45.0	425.0		
Durum Wheat	77.0	395.0	130.0	861.0	100.0	615.0	90.0	470.0	99.0	333.0	89.0	384.0	102.0	958.0		
Barley	227.5	1370.0	360.0	2901.0	280.0	1975.0	250.0	1020.0	280.0	640.0	255.0	1080.0	292.0	3022.0		
Corn	15.8	98.7	16.0	129.0	22.0	134.0	20.0	141.0	20.0	84.0	22.0	144.0	24.5	149.5		
Rye	0.7	2.1	0.8	2.7	-	-	-	-	-	-	-	-	-	-		
Oats	-	-	0.6	4.2	-	-	-	-	-	-	-	-	-	-		
<u>Quarzazate</u>																
Bread Wheat	-	-	0.1	0.8	0.2	2.4	-	-	1.5	7.5	1.7	10.2	2.5	17.5		
Durum Wheat	2.5	25.0	4.0	32.0	3.5	35.0	3.0	24.0	2.5	15.0	3.0	15.0	4.0	28.0		
Barley	25.0	225.0	30.0	300.0	25.0	325.0	22.5	225.0	24.0	168.0	23.5	235.0	24.0	192.0		
Corn	-	-	9.0	81.0	-	-	-	-	-	-	-	-	-	-		
Sorghum	-	-	0.2	1.4	-	-	-	-	-	-	-	-	-	-		

* Area covering Beni Mellal and Khouribga provinces.

TABLE 9 CON'T	CROP YEAR													
	1961/62		1962/63		1963/64		1964/65		1965/66		1966/67		1967/68	
<u>Province</u>	Cereal Grain		Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
	(X1000 Ha.; X1000 Q.)													
<u>Safi (Incl. Essaouira)</u>														
Bread Wheat	40.5	167.9	51.4	421.2	51.6	389.0	46.6	278.0	54.1	171.8	50.0	353.0	56.6	620.0
Durum Wheat	60.0	285.7	74.2	600.8	66.0	566.0	63.0	431.4	75.0	237.5	70.0	515.0	81.6	841.5
Barley	217.2	1191.0	335.5	2692.6	320.1	2075.9	287.2	1588.2	323.0	974.0	307.0	2172.0	332.6	4004.8
Corn	139.1	936.0	122.0	915.4	134.0	1110.0	126.0	748.0	125.0	227.0	138.0	643.0	145.5	492.0
Oats	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Agadir</u>														
Bread Wheat	2.7	13.6	3.5	28.0	4.0	28.0	3.2	12.6	6.0	6.0	5.0	25.0	6.0	42.0
Durum Wheat	2.2	11.2	3.0	21.0	3.5	21.0	1.5	5.9	3.0	3.0	2.5	12.5	5.0	35.0
Barley	110.2	330.4	200.0	1200.0	160.0	800.0	109.8	329.4	200.0	100.0	180.0	1080.0	200.0	1800.0
Corn	14.0	168.6	17.0	170.0	14.4	144.0	16.5	148.5	17.0	119.0	20.0	160.0	20.0	120.0

* This data is at significant variance with Ministry of Agriculture Data. Primary use - trend analysis only.

Source: OCIC (OCIC Annual Reports)

TABLE 10 PRODUCTION OF THE FOUR MAJOR
CEREAL CROPS IN MOROCCO, 1965 - 1968

Cereal Grain	CROP YEAR			
	1964/65	1965/66	1966/67	1967/68
	(X1000 M.T.)			
Durum Wheat	1550	1150	933	1903
Bread Wheat	1550	1150	335	653
Barley	1460	1195	1541	3215
Corn	280	157	236	382
TOTAL	3290	2502	3045	6153

Source: Ministry of Agriculture, DEAEJ

TABLE 11
 PRODUCTION OF THE FOUR MAJOR CEREAL CROPS
 IN MOROCCO BY PROVINCE, 1967-68 CROP YEAR

Provinces	Durum Wheat	Bread Wheat (X1000 Q.)	Barley	Corn	Total
Tanger-Tetouan	511.2	7.6	232.0	63.3	814.1
Al Hoceima	16.6	0.8	189.8	0.4	207.6
Nador	111.3	116.2	924.9	-	1152.4
Rabat-Kenitra	3471.0	1125.0	1802.0	209.4	6607.4
Meknes	437.0	50.8	605.8	75.2	1168.8
Fez	2245.5	745.4	755.0	140.8	3886.7
Taza	837.8	190.8	1137.5	212.4	1385.0
El Jadida	1569.0	1290.9	2352.9	-	4212.1
Knouribga	575.6	200.0	1871.2	-	2646.8
Settat	3595.3	670.0	3816.0	1185.0	8636.3
Beni Mellal	1743.0	4385.0	2351.0	22.6	8501.6
Marrakech	1614.3	1497.0	6924.5	233.3	10269.1
Safi	780.0	546.0	4717.0	672.2	6715.2
Other Provinces	<u>1535.6</u>	<u>747.0</u>	<u>1555.6</u>	<u>772.5</u>	<u>4610.7</u>
TOTAL	19032.0	6526.0	32146.4	3820.0	61526.4

Source: Ministry of Agriculture - DEAEJ

TABLE 12 COMPARISON OF PRODUCTION DATA FOR MAJOR CEREAL GRAINS FROM VARIOUS SOURCES

Cereal Grains	Source ¹ of Data	1960/61		1961/62		1962/63		1963/64		1964/65		1965/66		1966/67		1967/68	
		X1000 MT.	% of ² DEAEJ Data	X1000 MT.	% of DEAEJ Data												
Durum	DEAEJ	-	-	-	-	-	-	-	-	-	-	-	-	933.0	-	1,903.2	-
	TROIN	445.6	-	932.1	-	890.5	-	889.4	-	1,008.5	-	615.0	-	850.0	-	-	-
	OCIC	445.6	-	924.6	-	890.4	-	889.4	-	1,008.5	-	615.0	-	850.4	-	1,775.0	93.3
Bread	DEAEJ	-	-	-	-	-	-	-	-	-	-	-	-	335.0	-	652.6	-
	TROIN	161.8	-	323.7	-	305.0	-	306.4	-	305.9	-	198.6	-	240.0	-	-	97.4
	OCIC	161.8	-	322.8	-	305.1	-	306.4	-	306.0	-	198.7	-	240.0	-	635.9	-
TOTAL																	
Durum	DEAEJ	716	-	1,470	-	1,410	-	1,410	-	1,550	-	1,150	-	1,270	-	2,556	-
Bread	TROIN	607.4	84.8	1,255.8	85.4	1,195.5	84.8	1,195.8	84.8	1,314.4	84.8	813.6	70.7	1,090.0	85.8	-	-
Wheats	OCIC	607.4	84.8	1,247.4	84.8	1,195.5	84.8	1,195.8	84.8	1,314.5	84.8	813.7	70.7	1,090.4	85.8	2,410.9	94.3
Barley	DEAEJ	570	-	1,400	-	1,380	-	1,380	-	1,460	-	1,195	-	1,541	-	3,214.6	-
	TROIN	475.6	83.4	1,185.0	84.6	1,463.0	106.0	1,168.4	84.7	1,189.4	81.5	505.7	42.3	1,100.0	71.4	-	-
	OCIC	475.6	83.4	1,185.0	84.6	1,463.0	106.0	1,168.4	84.7	1,189.4	81.5	505.7	42.3	1,100.0	71.4	2,223.8	69.2
Corn	DEAEJ	130	-	410	-	470	-	395	-	280	-	157	-	236	-	382.0	-
	TROIN	106.5	81.9	329.1	80.3	396.7	84.4	319.7	80.9	272.1	97.2	154.4	98.3	254.9	108.0	-	-
	OCIC	106.5	81.9	347.6	84.8	396.7	84.4	334.0	84.6	272.0	97.2	154.4	98.3	255.0	108.0	240.0	62.8
TOTAL	DEAEJ	1,416	-	3,280	-	3,260	-	3,185	-	3,290	-	2,502	-	3,047	-	6,152.6	-
MAJOR	TROIN	1,189.5	84.0	2,769.9	84.4	3,055.2	93.7	2,683.9	84.3	2,775.9	84.4	1,473.7	58.9	2,444.7	80.2	-	-
CEREALS	OCIC	1,189.5	84.0	2,780.0	84.8	3,055.2	93.7	2,698.2	84.7	2,775.9	84.4	1,473.8	58.9	2,445.4	80.2	4,874.7	79.2

¹ Sources of Data:

DEAEJ - Ministry of Agriculture, Direction de Etudes et des Affaires, Economiques et Juridiques.

TROIN - Troin, J. F. and A. Memard (1968) Cultures Cerealiere: Atlas du Maroc, Section X - Geographie Economique, Planche 39a Agriculture.

OCIC - Office Cherifien Interprofessionnel des Cereales.

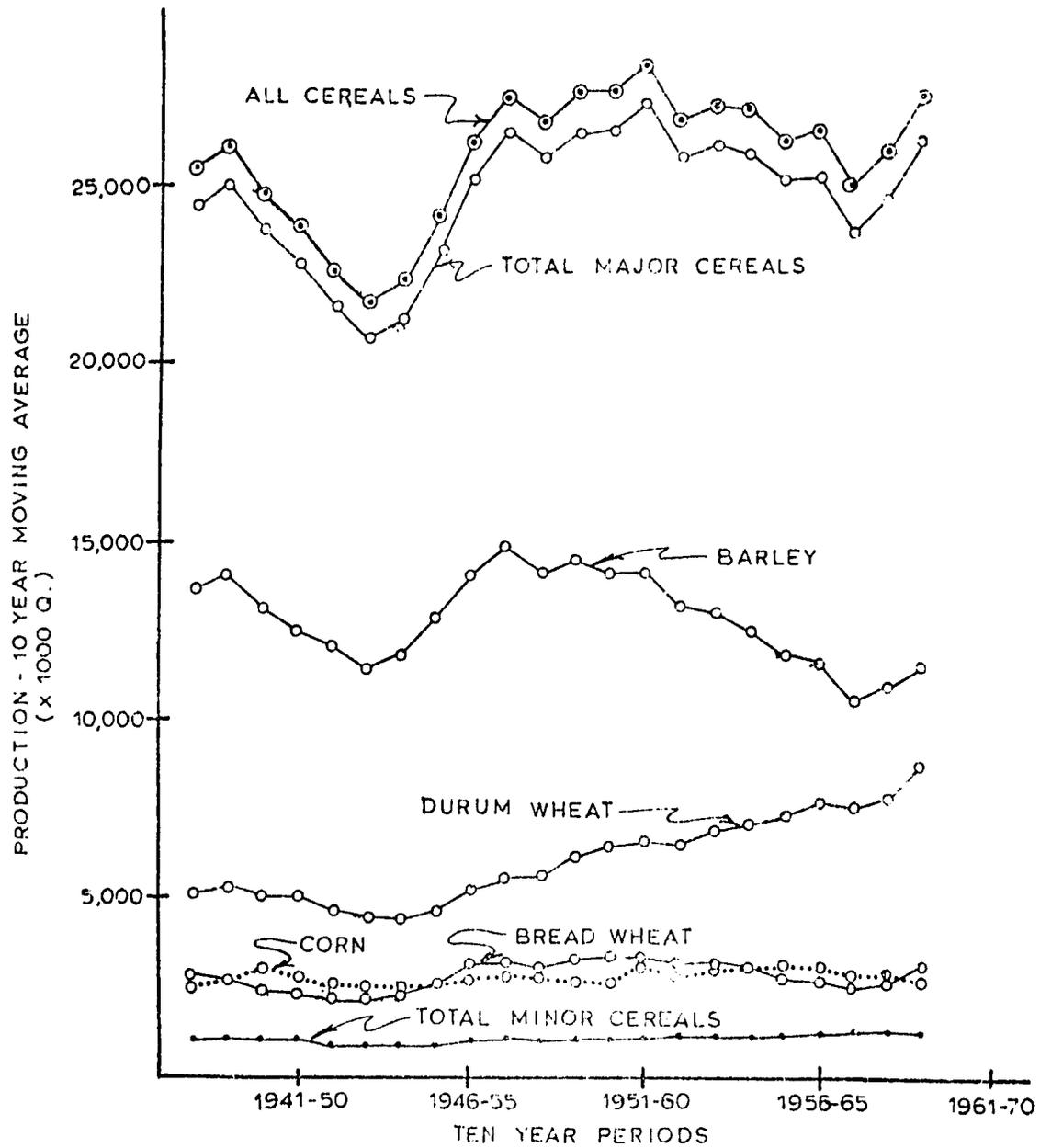
² Troin and OCIC data as a percentage of DEAEJ data.

TABLE 13 CEREAL PRODUCTION FOR MOROCCO--10 YEAR MOVING AVERAGES

Commodity	1938/47	1939/48	1940/49	1941/50	1942/51	1943/52	1944/53	1945/54	1946/55	1947/56	1948/57	1949/58	1950/59	1951/60	1952/61	1953/62	1954/63	1955/64	1956/65	1957/66	1958/67	1959/68
	(x 1,000,000 Q.)																					
Bread Wheat	2.9	2.8	2.5	2.4	2.2	2.2	2.4	2.8	3.1	3.1	3.1	3.2	3.3	3.4	3.2	3.2	3.1	2.8	2.8	26.4	2.7	3.0
Durum Wheat	5.2	5.3	5.0	5.0	4.8	4.5	4.5	4.8	5.3	5.6	5.7	6.2	6.4	6.6	6.5	6.9	7.2	7.3	7.7	7.6	8.0	8.8
Barley	13.7	14.0	13.2	12.6	12.0	11.5	11.9	12.9	14.1	14.9	14.3	14.4	14.2	14.3	13.2	13.0	12.7	11.8	11.6	10.5	11.0	11.6
Corn	2.6	2.8	3.0	2.8	2.6	2.6	2.5	2.6	2.8	2.9	2.8	2.7	2.7	3.0	2.9	3.0	3.1	3.0	3.0	2.9	3.0	2.8
Major Cereals	24.4	25.0	23.8	22.8	21.6	20.7	21.4	23.2	25.3	26.5	25.9	26.6	26.6	27.3	25.8	26.2	26.0	25.1	25.3	23.8	24.7	26.3
Minor Cereals	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.3	1.3
All Cereals	25.5	26.1	24.8	23.8	22.6	21.7	22.3	24.1	26.3	27.5	26.9	27.6	27.7	28.4	26.9	27.3	27.2	26.3	26.5	25.0	25.9	27.6

Source: Kebba, A. K. (1963) L'Economie Ceresaliere au Maroc. Office Cherifien Interprofessionnel des Cereales. (1938 - 1962). O.C.I.C. Annual Reports (1963 - 1968).

FIGURE 4 Cereal Production for Morocco -
Ten Year Moving Average



Source: Kebbaj, A. K. (1963) L'Economie Cerealiere au Maroc.
Office Cherifien Interprofessionnel des Cereales.
(1938 - 1962). O.C.I.C. Annual Reports (1963 - 1968).

TABLE 14 LAND TENURE BY SECTOR AND FARM SIZE - 1964

Sector	Farm Size (ha.)	Number of Farmers	Area (ha.)	Percent of Total
Traditional	0 - 4	885,525	1,178,176	24.5
	4 - 10	165,464	1,087,691	22.7
	Over 10	55,776	1,124,644	23.4
Sub-Total	-	1,106,765	3,390,511	70.6
Modern	0 - 50	1,500	50,000	1.0
	50 - 500	3,167	790,000	16.5
	Over 500	615	570,000	11.9
Sub-Total		5,282	1,410,000	29.4
TOTAL		1,112,047*	4,800,511	100.0

*Does not include 543,000 landless farmers who derive their living from agriculture primarily by work for farmers who control land.

Source: Kelso, T. M. (1967) Morocco - Role of Fertilizer in Agricultural Production. Tennessee Valley Authority, Muscle Shoals, Alabama, p. 69.

Imports and Exports of Cereals.

With present population and present production trends, Morocco will be a net importer of cereals on average. Rainfall tends to determine whether any grains must be imported or exported and how much.

Bread wheats are usually in short supply in recent years resulting in annual importation of that commodity. The deficit in bread wheats has been increasing due largely to population growth and urbanization of the population.

Serious effort is underway to reverse the trend toward increasing importation of bread wheats and flours by the following:

- 1) Introduction of improved varieties.
- 2) A chemical fertilizer program for all wheats (Operation Engrais)
- 3) Promotion of improved tillage practices.

Less, or no work of consequence is presently underway to improve productivity of the other cereals.

TABLE 15 IMPORTS OF CEREAL GRAINS TO MOROCCO, 1963 TO 1969

Cereal Grain	1963/64	1964/65	CROP YEAR			
			1965/66	1966/67	1967/68	1968/69 ¹
(Quintals)						
Bread Wheat	872,011	3,385,418	3,048,035	8,543,460	9,064,531	99,665
Durum Wheat	0	0	0	406,941	0	0
Barley	0	0	0	267,260	55,777	0
Corn	39,926	59,714	49,661	175,262	61,168	0
Total 4 Major Cereals	911,937	3,445,132	3,097,696	9,392,923	9,181,476	99,665
Oats	0	0	0	122,234	0	0
Canary-Grass	0	0	0	0	0	0
Sorghum	0	0	0	0	0	0
Millet	0	0	0	0	0	0
Rye	0	0	0	0	0	0
Rice	0	0	0	0	0	0
Total Other Cereals	0	0	0	122,234	0	0
Total All Cereals	911,937	3,445,132	3,097,696	9,515,157	9,181,476	99,665

¹ Partial figures, July 1, 1968, to March 31, 1969.

Source: Office Cherifian Interprofessionnel des Cereales

TABLE 16 IMPORTS OF FOUR MAJOR CEREAL GRAINS TO MOROCCO, (DEAEJ) 1964-1968

Cereal Grain	1964/65	CROP YEAR		
		1965/66	1966/67	1967/68
(x 1000 M.T.)				
Durum Wheat	228	579	855	0
Bread Wheat	228	579	855	592
Barley	-	27	46	-
Corn	10	13	13	3
Total	238	619	914	595

In addition the following grain products were imported:

	<u>Wheat Flour</u>	<u>Corn Meal</u>
	(x 1000 M.T.)	
1964	62	2
1965	70	2
1966	33	-
1967	27	18

Source: Ministry of Agriculture - DEAEJ

TABLE 17 COMPARISON OF IMPORT DATA - O.C.I.C. VS. DEAEJ

Commodity	1964/65		1965/66		1966/67		1967/68	
	OCIC	DEAEJ	OCIC	DEAEJ	OCIC	DEAEJ	OCIC	DEAEJ
	(x 1000 M.T.)							
Bread Wheat	338.5	228.0	304.8	579.0	854.3	855.0	906.4	592.0
Durum Wheat	0	228.0	0	579.0	40.7	855.0	0	0
Barley	0	0	0	27.0	26.7	46.0	5.6	0
Corn	6.0	10.0	5.0	13.0	17.5	13.0	6.1	3.0
Total Major	344.5	238.0	309.8	619.0	939.3	914.0	918.1	595.0
Oats	0	0	0	0	12.2	0	0	0
Canary Grass	0	0	0	0	0	0	0	0
Sorghum	0	0	0	0	0	0	0	0
Millet	0	0	0	0	0	0	0	0
Rye	0	0	0	0	0	0	0	0
Rice	0	0	0	0	0	0	0	0
Total Minor	0	0	0	0	12.2	0	0	0
Total All	344.5	238.0	309.8	619.0	951.5	914.0	918.1	595.0

Source: Data supplied at request of USAID by O.C.I.C. and DEAEJ (Division of Studies of Economic and Juridicial Affairs, Ministry of Agriculture).

TABLE 18 EXPORTS OF CEREAL GRAINS FROM MOROCCO, 1963 TO 1969

Cereal Grain	1963/64	1964/65	CROP YEAR			1968/69
			1965/66	1966/67	1967/68	
			(Quintals)			
Bread Wheat	0	5,050	5,002	0	0	4,000
Durum wheat	0	2,970	0	0	0	20,000
Barley	1,136,031	156,979	49,713	0	0	96,966
Corn	1,017,729	505,921	240,615	25,691	0	53,244
Total Major Cereals	2,153,760	670,920	295,330	25,691	0	174,210
Oats	31,465	493	39,446	0	0	47,206
Canary-Grass	247,794	276,308	314,495	152,802	287,165	348,749
Sorghum	265,655	33,354	11,487	7,550	5,397	50,310
Millet	35,217	26,421	15,689	7,781	21,232	15,681
Rye	0	0	0	0	0	0
Rice	23,129	47,754	13,951	9,900	107,500	97,466
Total Other Cereals	603,260	384,330	395,068	178,033	421,284	559,412
Total All Cereals	2,757,020	1,055,250	690,398	203,724	421,284	733,622

¹Partial figures, July 1, 1968, to March 31, 1969

Source: Office Cherifian Interprofessionnel des Cereales

TABLE 19 EXPORTS OF CEREAL GRAINS AND GRAIN PRODUCTS
FROM MOROCCO, 1964-1968 (DEAEJ)

Cereal Grain	CROP YEAR			
	1964/65	1965/66	1966/67	1967/68
	(x 1000 M.T.)			
Durum Wheat	1	-	-	2
Bread Wheat	1	-	-	-
Barley	7	-	-	10
Corn	37	16	-	-
Canary-Grass	31	21	27	-
Oats	4	-	15	4
Rice	4	-	4	7
Sorghum and Millet	5	2	2	3
Total	44	23	48	26

Cereal Grain	GRAIN PRODUCT EXPORTS			
	1964	1965	1966	1967
	(x 1000 M.T.)			
Wheat Flour	1	-	3	-
Wheat Bran	9	10	8	8
Barley Bran	5	2	2	3
Corn Flour	1	-	-	-
Corn Bran	1	1	1	-

Source: Ministry of Agriculture - DEAEJ

TABLE 20 COMPARISON OF EXPORT DATA - OCIC VS. DEAEJ

Commodity	1964/65		1965/66		1966/67		1967/68	
	OCIC	DEAEJ	OCIC	DEAEJ	OCIC	DEAEJ	OCIC	DEAEJ
	(x 1000 M.T.)							
Bread Wheat	0.5	1.0	0.5	0	0	0	0	0
Durum Wheat	0.3	1.0	0	0	0	0	0	2.0
Barley	15.7	7.0	5.0	0	0	0	0	10.0
Corn	50.6	37.0	24.1	16.0	2.6	0	0	0
Total Major	67.1	45.0	29.6	16.0	2.6	0	0	12.0
Oats	.1	4.0	3.9	0	0	15.0	0	4.0
Canary Grass	27.6	31.0	31.4	21.0	15.3	27.0	28.7	0
Sorghum	3.3	5.0	1.1	2.0	0.8	2.0	0.5	3.0
Millet	2.6	5.0	1.6	2.0	0.8	2.0	2.1	3.0
Rye	0	0	0	0	0	0	0	0
Rice	4.8	4.0	1.4	0	1.0	4.0	10.8	7.0
Total Minor	38.4	44.0	39.5	23.0	17.8	48.0	42.1	14.0
Total All	105.5	89.0	69.0	39.0	20.4	48.0	42.1	26.0

Source: Data supplied at request of USAID by OCIC and DEAEJ.

TABLE 21 ANNUAL AVERAGE IMPORTS AND EXPORTS OF CEREAL GRAINS-MOROCCO

SUMMARY: All Cereals	10-Year Annual Averages	
	1947/48-1956/57	1957/58-1966/67
	(x 1000 Q.)	
EXPORTS	5,137.0	1,814.0
IMPORTS	597.0	3,169.0

CEREALS	PERIODS	
	1947/48-1956/57	1957/58-1966/67
EXPORTS: 10-Year Annual Averages	(x 1000 Q.)	
Bread Wheat	437.0	6.0
Durum Wheat	436.0	498.0
TOTAL WHEAT	873.0	504.0
Barley	3,027.0	392.0
Corn	674.0	542.0
TOTAL MAJOR CEREALS	4,574.0	1,338.0
Oats	244.0	40.0
Canary Grass	153.0	236.0
Millet	83.0	43.0
Sorghum	83.0	157.0
TOTAL SECONDARY CEREALS	163.0	476.0
TOTAL ALL CEREALS	5,137.0	1,814.0
IMPORTS: 10-Year Annual Averages		
Bread Wheat	572.0	2,690.0
Durum Wheat	25.0	41.0
TOTAL WHEAT	597.0	2,731.0
Barley	0.0	407.0
Corn	0.0	31.0
TOTAL MAJOR CEREALS	597.0	3,169.0
TOTAL SECONDARY CEREALS	0.0	0.0
TOTAL ALL CEREALS	597.0	3,169.0

Source: O.C.I.C. (1968) Entrepotage des Cereales des Maroc, 12 Jan., 1968.

TABLE 22 COMPARISON OF ANNUAL AVERAGE
IMPORTS AND EXPORTS - MOROCCO
1939-1966

<u>Periods</u>	<u>Import</u>	<u>Export</u>	<u>Difference</u> <u>(Export-Import)</u>
		(X1000 Q.)	
1939/42	200	4,500	+ 4,300
1947/50	600	3,500	+ 2,900
1951/55	400	5,500	+ 5,100
1956/60	400	2,300	+ 1,900
1962/65	2,500	1,400	- 1,100
1965/66	3,050	290	- 2,760
1966/67	9,550	25	- 9,525

Source: OCIC (1968) Entreposage des Cereales des Maroc.
12 Jan 1968

TABLE 23 ANNUAL IMPORTS AND EXPORTS OF CEREAL GRAINS AT VARIOUS PORTS IN MOROCCO, 1958-1967

Crop Year		Tanger	Kenitra	Casa	Elja		Safi	Essaouira	Agadir	TOTAL
					Dida	(X1000 Q.)				
1957/58	Import	-	-	402	-	-	-	-	-	402
	Export	-	583	564	202	107	41	15		1,512
1958/59	Import	-	-	-	-	-	-	-	-	-
	Export	-	1,257	912	346	413	140	45		3,113
1959/60	Import	-	-	792	-	142	-	-	-	934
	Export	-	1,241	846	392	454	65	-		2,998
1960/61	Import	-	279	2,018	58	602	55	95		3,107
	Export	-	796	651	127	175	21	-		1,770
1961/62	Import	350	331	4,335	125	1,780	177	897		7,995
	Export	-	419	73	1	-	-	-		493
1962/63	Import	81	176	1,654	1	125	25	187		2,249
	Export	-	909	1,422	210	286	84	-		2,911
1963/64	Import	129	-	763	-	-	-	-		912
	Export	-	554	1,275	262	514	103	-		2,708
1964/65	Import	324	104	2,077	97	385	50	149		3,204
	Export	-	337	415	57	183	66	-		1,058
1965/66	Import	217	212	1,849	59	488	15	256		3,096
	Export	-	285	258	80	47	19	-		689
1966/67	Import	933	743	5,425	431	1,360	377	252		9,481
	Export	-	128	50	-	29	-	-		207

Source: OCIC (1968) Entrepasage des Cereales des Maroc, 12 Jan 1968.

TABLE 24

IMPORTS OF ALL GRAINS RECEIVED AT PORTS DURING 1966-67 CROP YEAR

Month	Tanger	Kenitra	Casablanca	El Jadida (Quintals)	Safi	Essaouira	Agadir	Total
July 66	111,867	61,976	428,890	58,456	202,850	50,122	93,793	1,007,954
August 66	139,052	74,422	290,658	27,000	21,875	30,250	-	583,257
September 66	16,476	-	435,453	23,750	123,091	-	27,000	625,770
October 66	47,500	-	448,140	-	97,000	-	28,800	621,440
November 66	-	107,594	430,000	34,030	205,908	34,700	-	812,863
December 66	103,068	85,780	610,440	118,204	151,580	62,960	-	1,132,032
January 67	40,600	28,646	548,657	-	-	-	60,800	678,703
February 67	85,021	59,659	384,006	15,995	149,258	32,000	42,129	768,068
March 67	14,150	79,023	358,927	44,486	68,715	26,000	-	591,301
April 67	115,450	79,828	282,076	33,000	80,063	28,950	-	619,367
May 67	107,750	95,709	281,060	31,600	113,105	40,450	-	669,674
June 67	152,100	70,800	925,830	45,250	147,000	32,250	-	1,373,230
TOTAL	933,034	743,437	5,424,768	431,771	1,360,445	337,682	252,522	9,483,659
Percentage	9.83%	1.84%	57.20%	4.55%	14.34%	3.56%	2.66%	100%

Source: OCIC (1968) Entrepotage Des Cereales Des Maroc, 12 Jan 1968.

Commercialization and Disappearance of Cereals

Commercialization of cereal production in Morocco varies markedly between the cereals and between years.

The size of the crops, largely determined by rainfall, has a large bearing on both the commercialized percentage and the absolute volume commercialized.

As population increases, there is a trend toward lower commercialization rates, increasing the problem of supplying the urban population. Particularly in the case of bread wheats the resultant is increased importation.

The commercialized portion of the crops representing the urban food supply, tends to bear the brunt of the highly fluctuating production rates controlled largely by rainfall.

Domestic consumption of cereals, represented by internal disappearance, tends to follow the size of the crop, as measured by the available supply.

There is evidence to indicate that the demand for cereals in Morocco has never been satisfied. The demand remains elastic and trend upward with available supply. "Ability to pay" appears to be a present controlling factor that does halt domestic consumption below the elastic limit.

There is evidence to indicate that the average primary producer does not use the volume of cereal grains that he could and would like to use, even when he produces and controls such an amount. His needs for other goods and services appear to outway his potential demand for cereals. He appears to treat a cereal supply, beyond his minimum needs, as discretionary income, and votes for other uses of such income.

Modernization of cereal production in Morocco would appear to have an unquestioned potential for meeting internal demand well into the future, in concert with development of the nation industrially. Success in development results in improvements in living standards, which should remove the "ability to pay" parameter from cereal consumption.

There is no data presently available which this team believes to be absolutely accurate with respect to consumption.

TABLE 25

AREA AND PRODUCTION OF CEREAL GRAINS IN MOROCCO, 1960 - 1967

COMMODITY	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
	Hectarage (X1000 Ha)							
Wheats (Durum and Bread)	1,700	1,640	1,500	1,600	1,570	1,700	1,720	1,650
Barley	1,754	1,670	1,590	1,990	1,770	1,690	1,773	1,774
Corn	500	410	450	480	460	450	542	471
TOTAL	3,954	3,670	3,540	4,070	3,800	3,840	4,035	3,895
Major Cereals								
Canary Grass	30	25	34					
Oats	27	27	20	23	31	40	29	35
Rye	4	3	4	3	23	23	30	22
Rice Paddy	5	5	5	4	2	11	2	3
Sorghum + Millet	128	108	125	164	5	5	6	5
TOTAL	194	168	188	219	120	81	90	132
Minor Cereals					181	160	157	197
TOTAL	4,148	3,838	3,728	4,289	3,981	4,000	4,192	4,092
All Cereals								
	Production (X1000 M.T.)							
Wheats (Durum and Bread)	1,100	716	1,470	1,410	1,410	1,550	1,150	1,270
Barley	1,500	570	1,400	1,380	1,380	1,460	1,195	1,541
Corn	470	130	410	470	395	280	157	236
TOTAL	3,070	1,416	3,280	3,260	3,185	3,290	2,502	3,047
Major Cereals								
Canary Grass	26	11	31	19	29	33	24	29
Oats	30	14	24	17	23	22	12.5	18.6
Rye	2.4	1.4	2.3	2	1.4	5.4	1	2
Paddy Rice	19	15	17	20	24.5	21	48.8	27.5
Sorghum + Millet	94	50	90	106	72	56	39	54
TOTAL	171	91	164	164	150	137	101	131
Minor Cereals								
TOTAL	3,241	1,507	3,444	3,424	3,335	3,427	2,603	3,178
All Cereals								

Source: Ministry of Agriculture, DEAFI.

TABLE 26 SUMMARY OF WHEAT (DURUM AND BREAD WHEAT) SUPPLY AND UTILIZATION IN MOROCCO, 1960-1967

<u>WHEAT</u> (Durum and Bread)	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
AREA (X1000 Ha.)	1,700	1,640	1,500	1,600	1,570	1,700	1,720	1,650
Yield (Q./Ha.)	6.5	4.4	9.8	8.8	9.0	9.2	6.7	7.7
	(X1000 M.T.)							
Production (X100 M.T.)	1,100	716	1,470	1,410	1,410	1,550	1,150	1,270
Imports	175	369	359	118	151	228	579	855
Carry Over	N.R.	N.R.	96	268	156	140	175	178
Supply	1,275	1,085	1,925	1,796	1,717	1,918	1,904	2,303
Carry to Next Year	N.R.	96	268	156	140	170	178	356
Exports	101	4	74	14	1	1	-	-
Animal Consumption	-	-	-	-	-	-	-	-
Seeds	164	150	160	157	170	172	165	164
Commercial Use	928	759	1,295	1,355	1,297	1,451	1,440	1,632
Loss	82	76	128	114	109	124	121	151
Human Consumption	-	-	-	-	-	-	-	-
Utilization	1,275	1,085	1,925	1,796	1,717	1,918	1,904	2,303

Source: Ministry of Agriculture, DEAEJ.

TABLE 27

SUMMARY OF WHEAT PRODUCTS SUPPLY AND UTILIZATION IN MOROCCO, 1960 - 1967

<u>WHEAT FLOUR</u>	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
	(X1000 M.T.)							
Input	928	759	1,295	1,355	1,297	1,451	1,440	1,632
Extraction	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Flour	742	607	1,036	1,084	1,038	1,161	1,152	1,306
Imports	27	17	25	57	51	62	70	33
Supply	769	624	1,061	1,141	1,089	1,223	1,222	1,339
Exports	4	4	2	2	1	1	-	3
Loss	7	7	11	10	11	12	12	13
Human Consumption	758	613	1,048	1,129	1,077	1,210	1,210	1,323
Animal Consumption	-	-	-	-	-	-	-	-
Commercial Use	-	-	-	-	-	-	-	-
Utilization	769	624	1,061	1,141	1,089	1,223	1,222	1,339
<u>WHEAT BRAN</u>	(X1000 M.T.)							
Input	928	759	1,295	1,355	1,297	1,451	1,440	1,632
Extraction	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Output	139	114	194	203	194	218	216	245
Imports	-	-	-	-	-	-	-	-
Supply	139	114	194	203	194	218	216	245
Exports	13	6	10	9	9	9	10	8
Loss	-	-	-	-	-	-	-	-
Human Consumption	-	-	-	-	-	-	-	-
Animal Consumption	126	108	184	194	185	209	206	237
Commercial Use	-	-	-	-	-	-	-	-
Utilization	139	114	194	203	194	218	216	245

Source: Ministry of Agriculture, DEAFJ.

TABLE 28

SUMMARY OF BARLEY SUPPLY AND UTILIZATION IN MOROCCO, 1960-1967

<u>BARLEY</u>	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
AREA (X1000 Ha.)	1,754	1,620	1,590	1,990	1,770	1,690	1,773	1,774
Yield (Q./Ha.)	8.6	3.5	8.8	6.9	7.8	8.6	6.7	8.7
	(X1000 M.T.)							
Production	1,500	570	1,400	1,380	1,380	1,460	1,195	1,541
(X1000 M.T.)								
Imports	-	197	84	1	2	-	27	46
Carry Over	N.R.	N.R.	N.R.	N.R.	N.R.	40	60	30
Supply	1,500	767	1,484	1,381	1,382	1,500	1,282	1,617
Carry to Next Year	N.R.	N.R.	N.R.	N.R.	40	60	30	-
Exports	29	-	-	148	74	7	-	-
Animal Consumption	390	202	381	439	359	453	348	443
Seeds	162	159	199	177	169	177	177	175
Commercial Use	814	352	800	520	643	698	641	888
Loss	105	54	104	97	97	105	86	111
Human Consumption	-	-	-	-	-	-	-	-
Utilization	1,500	767	1,484	1,381	1,382	1,500	1,282	1,617

Source: Ministry of Agriculture, DEAEJ.

TABLE 29

SUMMARY OF BARLEY PRODUCTS SUPPLY AND UTILIZATION IN MOROCCO, 1960-1967

<u>BARLEY FLOUR</u>	1959/60	1960/61	1961-62	1962/63	1963/64	1964/65	1965/66	1966/67
	(X1000 M.T.)							
Input	804	342	790	510	637	688	631	878
Extraction	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Output	643	274	632	408	506	550	505	702
Imports	-	-	-	-	-	-	-	-
Supply	643	274	632	408	506	550	505	702
Exports	-	-	-	-	-	-	-	-
Loss	6	3	6	4	5	6	6	7
Human Consumption	637	271	626	404	501	544	499	695
Animal Consumption	-	-	-	-	-	-	-	-
Commercial Use	-	-	-	-	-	-	-	-
Utilization	643	274	632	408	506	550	505	702
<u>BARLEY BRAN</u>	(X1000 M.T.)							
Input	804	342	790	510	633	688	631	878
Extraction	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Output	161	68	158	102	127	138	126	176
Imports	-	-	-	-	-	-	-	-
Supply	161	68	158	102	127	138	126	176
Exports	4	3	7	6	4	5	2	2
Loss	-	-	-	-	-	-	-	-
Human Consumption	-	-	-	-	-	-	-	-
Animal Consumption	157	65	151	96	123	133	124	174
Commercial Use	-	-	-	-	-	-	-	-
Utilization	161	68	158	102	127	138	126	176

Source: Ministry of Agriculture, DEAEJ.

TABLE 29 CON'T (CON'T) SUMMARY OF BARLEY PRODUCTS SUPPLY AND UTILIZATION, IN MOROCCO, 1960-1967

<u>MALTED BARLEY</u>	1959/60	1960/61	1961/62	1962/63 (x1000 M.T.)	1963/64	1964/65	1965/66	1966/67
Input	10	10	10	10	10	10	10	10
Extraction	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Output	8	8	8	8	8	8	8	8
Imports	-	-	-	-	-	-	-	-
Supply	8	8	8	8	8	8	8	8
Exports	-	2	2	1	1	-	-	-
Loss	-	-	-	-	-	-	-	-
Human Consumption	-	-	-	-	-	-	-	-
Animal Consumption	-	-	-	-	-	-	-	-
Commercial Use	8	6	6	7	7	8	8	8
Utilization	8	8	8	8	8	8	8	8
<u>BEVERAGE PRODUCTION</u>				(x1000 M.T.)				
Input	8	6	6	7	7	8	8	8
Extraction	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065
Output	5.2	3.9	3.9	4.5	4.5	5.2	5.2	5.2
Imports	-	.3	.2	.1	.1	.1	.1	-
Supply	5.2	4.2	4.1	4.6	4.6	5.3	5.3	5.2
Exports	-	-	-	-	-	-	-	-
Loss	-	-	-	-	-	-	-	-
Human Consumption	5.2	4.2	4.1	4.6	4.6	5.3	5.3	5.2
Animal Consumption	-	-	-	-	-	-	-	-
Commercial Use	-	-	-	-	-	-	-	-
Utilization	5.2	4.2	4.1	4.6	4.6	5.3	5.3	5.2

Source: Ministry of Agriculture, DSAEJ.

TABLE 30

SUMMARY OF CORN SUPPLY AND UTILIZATION IN MOROCCO, 1960-1967

<u>CORN</u>	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
Area (X1000 Ha)	500	410	450	480	460	450	542	471
Yield (Q./Ha)	9.4	3.1	9.1	9.7	8.5	6.2	2.9	5.0
	(X1000 M.T.)							
Production	470	130	410	470	395	280	157	236
Import	-	-	-	-	-	10	13	13
Carry Over	N.R.	N.R.	N.R.	N.R.	N.R.	20	19	0
Supply	470	130	410	470	395	310	180	249
Carry To Next Year	N.R.	N.R.	N.R.	N.R.	20	10	0	4
Exports	105	12	25	103	52	37	16	-
Animal Consumption	47	13	41	47	13	48	26	21
Seed	16	18	19	18	18	18	22	19
Commercial Use	269	78	296	264	267	175	103	188
Loss	33	9	29	33	25	22	13	17
Human Consumption	-	-	-	-	-	-	-	-
Utilization	470	130	410	470	395	310	180	249

Source: Ministry of Agriculture, DEAEJ.

TABLE 31

SUMMARY OF CORN PRODUCTS SUPPLY AND UTILIZATION IN MOROCCO, 1960-1967.

<u>CORN FLOUR</u>	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
				(X1000 M.T.)				
Input	269	78	296	264	267	175	103	188
Extract	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Output	242	70	266	238	240	158	93	169
Imports	-	-	-	-	-	2	2	-
SUPPLY	242	70	266	238	240	160	95	169
Exports	-	-	-	-	1	1	-	-
Loss	3	1	3	3	3	2	1	2
Human Consumption	239	69	262	235	236	157	94	167
Animal Consumption	-	-	-	-	-	-	-	-
Commercial Use	-	-	-	-	-	-	-	-
UTILIZATION	242	70	266	238	240	160	95	169
<u>CORN BRAN</u>				(X1000 M.T.)				
Input	269	78	296	264	267	175	103	188
Extraction	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Output	22	6	24	21	21	14	8	15
Imports	-	-	-	-	-	-	-	-
SUPPLY	22	6	24	21	21	14	8	15
Exports	1	-	1	1	1	1	1	1
Loss	-	-	-	-	-	-	-	-
Human Consumption	-	-	-	-	-	-	-	-
Animal Consumption	21	6	23	20	20	13	7	14
Commercial Use	-	-	-	-	-	-	-	-
UTILIZATION	22	6	24	21	21	14	8	15

Source: Ministry of Agriculture, DFAEJ.

TABLE 32

SUMMARY OF OAT SUPPLY AND UTILIZATION IN MOROCCO, 1960/1967

<u>OATS</u>	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
Area (X1000 Ha.)	27	27	20	25	23	23	30	21.6
Yield (Q./Ha.)	11.5	5.2	17.0	6.8	10.0	9.7	4.2	8.6
				(X1000 M. T.)				
Production	30	14	24	17	23	22	12.5	18.6
Imports	-	-	-	-	-	-	-	-
Carry Over	-	-	-	-	-	-	-	-
Supply	30	14	24	17	23	22	12.5	18.6
Carry to Next Year	-	-	-	-	-	-	-	-
Exports	4	-	7	9	1	4	-	-
Animal Consumption	22	11	13	5	18	14	9.60	15.34
Seed	2	2	2	2	2	2	2	2
Commercial Use	-	-	-	-	-	-	-	-
Loss	2	1	2	1	2	2	0.9	1.2
Human Consumption	-	-	-	-	-	-	-	-
Utilization	30	14	24	17	23	22	12.5	18.6

Source: Ministry of Agriculture, DEAMJ.

TABLE 33

SUMMARY OF SORGHUM AND MILLET SUPPLY AND UTILIZATION IN MOROCCO, 1960 - 1967

<u>SORGHUM + MILLET</u>	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	
Area (X1000 Ha.)	128	108	125	164	120	81	90	132	
Yield (Q./Ha)	7.3	4.5	7.2	8.5	8.0	6.2	4.3	4.1	
				(X1000 M.T.)					
Production	94	50	90	106	72	56	39	54	
Imports	-	-	-	-	-	-	-	-	
Carry Over	-	-	-	-	-	-	-	-	
Supply	94	50	90	106	72	56	39	54	
Carry to Next Year	-	-	-	-	-	-	-	-	
Exports	41	16	11	17	25	5	2	2	
Animal Consumption	19	10	18	21	19	10	8	24	
Seeds	5	5	7	8	3	4	5	4	
Commercial Use	22	15	48	55	24	33	21	20	
Loss	7	4	6	7	5	4	3	4	
Human Consumption	-	-	-	-	-	-	-	-	
Utilization	94	50	90	106	72	56	39	54	

Source: Ministry of Agriculture, DEAEJ.

TABLE 34 SUMMARY OF SORGHUM AND MILLET PRODUCTS SUPPLY AND UTILIZATION IN MOROCCO, 1960 - 1967

<u>SORGHUM AND MILLET FLOUR</u>	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
	(X1000 M.T.)							
Input	22	15	48	56	24	33	21	20
Extraction	.90	.90	.90	.90	.90	.90	.90	.90
Output	20	14	43	50	22	30	19	18
Imports	-	-	-	-	-	-	-	-
Supply	20	14	43	50	22	30	19	18
Exports	-	-	-	-	-	-	-	-
Loss	-	-	-	-	-	-	-	-
Human Consumption	20	14	43	50	22	30	19	18
Animal Consumption	-	-	-	-	-	-	-	-
Commercial Use	-	-	-	-	-	-	-	-
Utilization	20	14	43	50	22	30	19	18

Source: Ministry of Agriculture, DEAEI.

TABLE 35

SUMMARY OF RYE SUPPLY AND UTILIZATION IN MOROCCO, 1960 - 1967

<u>RYE</u>	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
Area (X1000 Ha)	4.00	3.00	4.00	3.00	2.00	11.00	2.00	3.00
Yield (Q./Ha.)	6.0	4.7	5.7	6.7	7.0	4.9	5.0	6.5
				(X1000 M.T.)				
Production (X1000 M.T.)	2.40	1.40	2.30	2.00	1.40	5.40	1.00	2.00
Imports	-	-	-	-	-	-	-	-
Carry Over	-	-	-	-	-	-	-	-
Supply	2.40	1.40	2.30	2.00	1.40	5.40	1.00	2.00
Carry to Next Year	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Animal Consumption	-	-	-	-	-	-	-	-
Seed	.30	0.40	0.30	0.20	1.00	0.20	0.30	0.30
Commercial Use	1.90	0.90	1.80	1.70	0.30	4.80	0.70	1.70
Loss	0.20	0.10	0.20	0.10	0.10	0.40	-	0.10
Human Consumption	-	-	-	-	-	-	-	-
Utilization	2.40	1.40	2.30	2.00	1.40	5.40	1.00	2.00

Source: Ministry of Agriculture, DEAEJ.

TABLE 36

SUMMARY OF RYE PRODUCTS SUPPLY AND UTILIZATION IN MOROCCO, 1960 - 1967

<u>RYE FLOUR</u>	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
	(X1000 M.T.)							
Input	1.90	0.90	1.80	1.70	0.30	4.80	0.70	1.60
Extraction	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Output	1.70	0.80	1.60	1.50	0.27	4.32	0.60	1.40
Imports	-	-	-	-	-	-	-	-
Supply	1.70	0.80	1.60	1.50	0.27	4.32	0.60	1.40
Exports	-	-	-	-	-	-	-	-
Loss	-	-	-	-	-	-	-	-
Human Consumption	1.70	0.80	1.60	1.50	0.27	4.32	0.60	1.40
Animal Consumption	-	-	-	-	-	-	-	-
Commercial Use	-	-	-	-	-	-	-	-
Utilization	1.70	0.80	1.60	1.50	0.27	4.32	0.60	1.40

Source: Ministry of Agriculture, DEAEJ.

TABLE 37

SUMMARY OF PADDY RICE SUPPLY AND UTILIZATION IN MOROCCO, 1960 - 1967

<u>PADDY RICE</u>	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	
Area (X1000 Ha.)	5.0	5.0	5.0	4.0	5.0	5.0	5.5	5.4	
Yield (Q./Ha.)	38	30	34	50	48	42	45	51	
				(X1000 M.T.)					
Production	19.0	15.0	17.0	20.0	24.5	21.0	24.8	27.5	
Imports	3 (Seed)	-	-	-	-	-	-	-	
Carry Over	-	-	-	-	-	-	-	-	
Supply	22.0	15.0	17.0	20.0	24.5	21.0	24.8	27.5	
Carry to Next Year	-	-	-	-	-	-	-	-	
Exports	6	2	2	1	5	4	1	4	
Animal Consumption	-	-	-	-	-	-	-	-	
Seed	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Commercial Use	14.5	11.5	12.5	17.5	17.0	15.5	21.3	21	
Loss	1.0	1.0	1.0	1.0	2.0	1.0	2.0	2.0	
Human Consumption	-	-	-	-	-	-	-	-	
Utilization	22.0	15.0	17.0	20.0	24.5	21.0	24.8	27.5	

Source: Ministry of Agriculture, DEAEJ.

TABLE 32

SUMMARY OF PADDY RICE PRODUCTS SUPPLY AND UTILIZATION IN MOROCCO, 1960 - 1967

<u>MILLED RICE</u>	1959/60	1960/61	1961/62	1962/63 (X1000 M.T.)	1963/64	1964/65	1965/66	1966/67
Input	14.5	11.5	13.5	17.5	17.0	15.5	21.3	21.0
Extraction	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Output	9.7	7.7	9.0	11.7	11.4	10.4	14.3	14.1
Imports	-	-	-	-	-	-	-	-
Supply	9.7	7.7	9.0	11.7	11.4	10.4	14.3	14.1
Exports	7.1	4.0	3.0	3.0	6.0	3.0	3.0	3.3
Loss	-	-	-	-	-	-	-	-
Human Consumption	2.6	3.7	6.0	8.7	5.4	7.4	11.3	10.8
Animal Consumption	-	-	-	-	-	-	-	-
Commercial Use	-	-	-	-	-	-	-	-
Utilization	9.7	7.7	9.0	11.7	11.4	10.4	14.3	14.1

Source: Ministry of Agriculture, DEARJ.

TABLE 38 (CON'T) SUMMARY PADDY RICE PRODUCTS SUPPLY AND UTILIZATION IN MOROCCO, 1960 -1967

<u>RICE BRAN</u>	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
	(x1000 M.T.)							
Input	14.5	11.5	13.5	17.5	17.0	15.5	21.3	21
Extraction	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Output	1.5	1.2	1.4	1.8	1.7	1.6	2.1	2.1
Imports	-	-	-	-	-	-	-	-
Supply	1.5	1.2	1.4	1.8	1.7	1.6	2.1	2.1
Exports	-	-	-	-	-	-	-	-
Loss	-	-	-	-	-	-	-	-
Human Consumption	-	-	-	-	-	-	-	-
Animal Consumption	1.5	1.2	1.4	1.8	1.7	1.6	2.1	2.1
Commercial Use	-	-	-	-	-	-	-	-
Utilization	1.5	1.2	1.4	1.8	1.7	1.6	2.1	2.1

Source: Ministry of Agriculture, DEAEJ.

TABLE 39 SUMMARY OF IMPORTS OF CEREAL GRAINS IN MOROCCO, 1960-1967

COMMODITY	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
IMPORTS (x 1000 M.T.)								
Wheats (Bread Wheat) (Durum Wheat)	175	369	359	118	151	228	579	855
Barley	-	197	84	1	2	-	27	46
Corn	-	-	-	-	-	10	13	13
TOTAL Major Cereals	175	566	443	119	153	238	619	914
Canary Grass	-	-	-	-	-	-	-	-
Oats	-	-	-	-	-	-	-	-
Rye	-	-	-	-	-	-	-	-
Paddy Rice	3	-	-	-	-	-	-	-
Sorghum & Millet	-	-	-	-	-	-	-	-
TOTAL Minor Cereals	3	-	-	-	-	-	-	-
TOTAL All Cereals	178	566	443	119	153	238	619	914

Source: Ministry of Agriculture, DEAEJ.

TABLE 40 SUMMARY OF EXPORTS OF CEREAL GRAINS IN MOROCCO, 1960-67.

COMMODITY	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
	EXPORTS (x 1000 M.T.)							
Wheats (Bread Wheat) (Durum wheat)	101	4	74	14	1	1	-	-
Barley	29	-	-	148	74	7	-	-
Corn	105	12	25	108	52	37	16	-
TOTAL								
Major Cereals	235	16	99	270	127	45	16	-
Canary Grass	24	24	22	16	30	31	21	27
Oats	4	-	7	9	1	4	-	15
Rye	-	-	-	-	-	-	-	-
Paddy Rice	6	2	2	1	5	4	1	4
Sorghum & Millet	41	16	11	17	25	5	2	2
TOTAL								
Minor Cereals	75	42	42	43	61	44	24	48
TOTAL								
All Cereals	310	58	141	313	188	89	40	48

Source: Ministry of Agriculture, DEAEJ.

TABLE 41

CONSUMPTION AND DISAPPEARANCE OF CEREAL GRAINS IN MOROCCO, 1960 - 1967

	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
	(X1000 M.T.)							
<u>HUMAN CONSUMPTION</u>								
Bread Wheat	928	759	1,295	1,355	1,297	1,451	1,440	1,632
Durum Wheat								
Barley								
(+ Malted)	814	352	800	520	643	698	641	888
Corn	269	78	269	264	267	175	103	188
Rye	1.9	0.9	1.8	1.7	0.3	4.8	0.7	1.6
Sorghum+Millet	22	15	48	56	24	33	21	20
Paddy Rice	<u>14.5</u>	<u>11.5</u>	<u>13.5</u>	<u>17.5</u>	<u>17.0</u>	<u>15.5</u>	<u>21.3</u>	<u>21</u>
TOTAL HUMAN CONSUMPTION	2,049.4	1,216.4	2,427.3	2,214.2	2,248.3	2,377.3	2,317.0	2750.6
<u>ANIMAL CONSUMPTION</u>								
	(X1000 M.T.)							
Bread Wheat	-	-	-	-	-	-	-	-
Durum Wheat	-	-	-	-	-	-	-	-
Barley	390	202	381	439	359	453	348	443
Corn	47	13	41	47	13	48	26	21
Oats	22	11	13	5	18	14	9.6	-
Rye	-	-	-	-	-	-	-	-
Sorghum+Millet	<u>19</u>	<u>10</u>	<u>18</u>	<u>21</u>	<u>15</u>	<u>10</u>	<u>8</u>	<u>24</u>
TOTAL ANIMAL CONSUMPTION	478	236	453	512	405	525	391.6	488

CONSUMPTION AND DISAPPEARANCE OF CEREAL GRAINS IN MOROCCO (Con't)

	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
	(X1000 M.T.)							
<u>SEEDS</u>								
Bread Wheat	164	150	160	157	170	172	165	164
Durum Wheat								
Barley	162	159	199	177	169	177	177	175
Corn	16	18	19	18	18	18	22	19
Oats	2	2	2	2	2	2	2	2
Rye	0.3	0.4	0.3	0.2	1.0	0.2	0.3	0.3
Sorghum+Millet	5	5	7	5	3	4	5	4
Paddy Rice	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>
TOTAL SEEDS	349.8	334.9	387.8	359.7	363.5	373.7	371.8	364.8
	(X1000 M.T.)							
<u>LOSSES*</u>								
Bread Wheat								
Durum Wheat	82	76	128	114	109	124	121	151
Barley	105	54	104	97	97	105	86	111
Corn	33	9	29	33	25	22	13	17
Oats	2	1	2	1	2	2	0.9	1.3
Rye	0.2	0.1	0.2	0.1	0.1	0.4	-	0.1
Sorghum+Millet	7	4	6	7	5	4	3	4
Paddy Rice	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>2</u>
TOTAL LOSS	230.2	145.1	270.2	253.1	240.1	258.4	225.9	286.4

* Unexplained Disappearance

CONSUMPTION AND DISAPPEARANCE OF CEREAL GRAINS IN MOROCCO (Con't)

	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67
	(X1000 M.T.)							
SUMMARY								
Human Consumption	2,049.4	1,216.4	2,427.3	2,214.2	2,248.3	2,377.3	2,317.0	2,750.6
Animal Consumption	478.0	236.0	453.0	512.0	405.0	525.0	391.6	488.0
Seeds	349.8	334.9	387.8	359.7	363.5	373.7	371.8	364.8
Loss (Unexplained Dis.)	<u>230.2</u>	<u>145.1</u>	<u>270.2</u>	<u>253.1</u>	<u>240.1</u>	<u>258.4</u>	<u>225.9</u>	<u>286.4</u>
TOTAL DOMESTIC DISAPPEARANCE	3,107.4	1,932.4	3,538.3	3,339.0	3,256.9	3,534.4	3,306.3	3,889.8

CEREALS CONSUMPTION FOR 1967 - 1968
Crop Year is Estimated as Follows:

Item	(Crop Harvested 1968)		
	Wheat (X1000 M.T.)	Barley	Corn
Available Supply	3,498	3,200	388
Quantity Utilized for Seeds	161	170	17
Human Consumption			
- Flour	1,789	634	257
- Beer	-	52	-
Animal Consumption (Bran)	326	154	21
Unaccounted	1,222	2,190	93

Source: Ministry of Agriculture - DEAEJ

TABLE 42 Approximate Domestic Per Capita

Disappearance of Cereals

Crop Year	Total Disappearance (X1000 Kg)	Population (X1000)	Per Capita Disappearance (in Kg)
1960	3,107,400	11,600	268
1961	1,932,400	11,900	162
1962	3,538,300	12,300	288
1963	3,339,000	12,700	263
1964	3,256,900	13,100	249
1965	3,534,400	13,500	262
1966	3,306,300	13,900	238
1967	<u>3,889,800</u>	<u>14,300</u>	<u>272</u>
	25,904,500	103,300	2002
		8 Year Average	250
		8 Year Weighted Average	251

Approximate Domestic Per Capita Disappearance
of Cereals in Order of Increasing Total Disappearance

Crop Year	Total Disappearance in MT	Kg. Per Capita Disappearance
1961	1,932,400	162
1960	3,107,400	268
1964	3,256,900	249
1966	3,306,300	238
1963	3,339,000	263
1965	3,534,400	262
1962	3,538,300	288
1967	3,889,800	272

Source: Disappearance Data - Ministry of Ag., DEAEJ
Population Data - Calculated at 1960 Census
of 11,600,000 Compounded at 3%/Annum.

FIGURE 5 Approximate Per Capita Disappearance Compared with Total Domestic Disappearance of Cereals

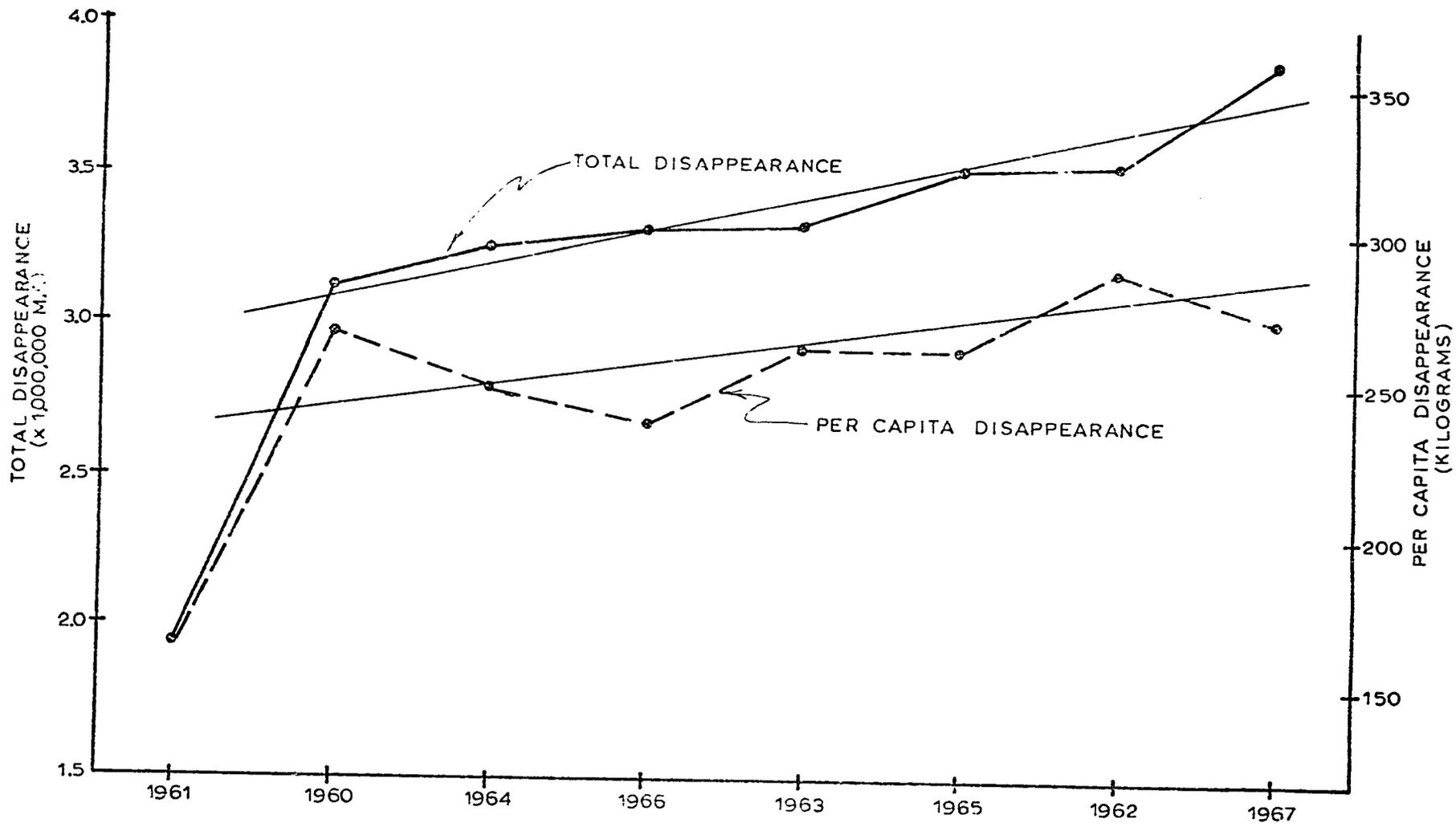


TABLE 43 THREE ADDITIONAL ESTIMATES OF PER CAPITA
DISAPPEARANCE OF CEREALS

Kg. Per Person Per Annum

	<u>Corty</u> ¹		<u>Troin</u> ²		<u>OCIC</u> ³ (4 Major Cereals Only)
Bread Wheat	40	Human	225	Human	164
Durum Wheat	70	Seed	29	Seed	20
All Cereals	232.5	Animal	29	Animal	36
		Unaccounted	11	Unaccounted	5
		All Uses	293	All Uses	224

Derived From Data in the Following Sources:

¹Corty, F. L. - Analysis of Public Law 480 Assistance to Morocco, March, 1966.

²Troin, J. F. - Cultures Cerealieres, 1968

³OCIC - Entreposage des Cereales Au Maroc
January 12, 1968

TABLE 44 CUMULATIVE MONTHLY COMMERCIALIZATION OF BREAD WHEAT IN MOROCCO, 1957-1967

(Produces supply to cooperatives and licensed dealers.)

Month	Marketing Year										Average
	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	
	Harvest Year										
	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	
(X1000 Q.)											
June	722	1,440	849	905	578	1,205	876	922	1,049	525	
July	1,108	2,090	1,578	1,506	622	1,879	1,596	1,412	1,566	626	
August	1,220	2,274	1,859	1,745	677	2,106	1,810	1,493	1,666	643	
September	1,296	2,337	1,976	1,807	680	2,195	1,880	1,506	1,692	650	1,601
% Commercialized											
June to September	93.3	89.3	96.2	97.09	98.7	95.4	96.7	98.1	98.1	96.7	95.4
October	1,317	2,413	2,009	1,829	682	2,237	1,916	1,524	1,707	658	
November	1,328	2,451	2,023	1,838	684	2,260	1,930	1,527	1,707	662	
December	1,337	2,488	2,033	1,856	687	2,273	1,936	1,528	1,711	668	
January	1,348	2,528	2,042	1,858	688	2,284	1,940	1,533	1,719	672	
February	1,362	2,566	2,046	1,858	688	2,290	1,942	1,533	1,721	672	
March	1,373	2,592	2,050	1,858	688	2,296	1,944	1,534	1,721	672	
April	1,387	2,616	2,052	1,858	688	2,298	1,945	1,535	1,723	672	
May: Commercialized	1,390	2,617	2,052	1,859	689	2,299	1,945	1,535	1,724	672	1,678
% Commercialized											
October to May	6.7	10.7	3.8	2.9	1.3	4.6	3.3	1.9	1.9	3.3	4.6
Production	1,627	3,145	2,365	3,218	1,618	3,236	3,050	3,063	3,059	1,986	2,636
% of Production											
Commercialized	85.3	83.2	86.7	57.7	42.5	71.04	63.7	50.1	56.3	33.8	63.6

Some: OCIC (1968) Entrepasage des Cereales des Maroc, 12 Jan 1968.

TABLE 45

CUMULATIVE MONTHLY COMMERCIALIZATION OF DURUM WHEAT IN MOROCCO, 1957-1967

(Producers supply to cooperatives and licensed dealers.)

Month	Marketing Year										
	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	
	Harvest Year										
	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	
	(x 1000 Q.)										
June	409	753	496	399	506	723	503	599	633	459	
July	1,096	2,093	1,802	1,411	783	1,793	1,221	1,275	1,695	872	
August	1,450	2,616	2,336	1,696	1,096	2,329	1,605	1,530	2,219	1,057	
September	1,639	2,824	2,620	2,055	1,147	2,620	1,879	1,652	2,461	1,138	2,003
% Commercialized											
June to September	80.9	81.4	88.6	85.3	92.6	82.4	83.4	88.8	82.6	92.1	84.9
October	1,748	3,013	2,776	2,182	1,185	2,808	2,021	1,747	2,641	1,178	
November	1,842	3,127	2,835	2,245	1,205	2,922	2,103	1,778	2,760	1,196	
December	1,932	3,228	2,881	2,305	1,222	2,992	2,144	1,805	2,822	1,210	
January	1,962	3,319	2,916	2,358	1,229	3,080	2,197	1,822	2,884	1,227	
February	1,985	3,361	2,943	2,393	1,231	3,121	2,219	1,828	2,916	1,231	
March	2,000	3,398	2,955	2,403	1,234	3,170	2,239	1,846	2,935	1,234	
April	2,007	3,441	2,968	2,409	1,235	3,180	2,253	1,855	2,980	1,235	
May: Commercialized	2,024	3,441	2,968	2,409	1,238	3,180	2,253	1,858	2,980	1,235	2,358
% Commercialized											
October to May	19.1	18.6	11.4	14.7	7.4	17.6	16.6	11.2	17.4	7.9	15.1
Production	5,058	9,663	7,188	7,447	4,456	9,321	8,904	8,894	10,085	6,150	7,716
% of Production											
Commercialized	40.0	35.6	41.2	32.3	27.7	34.1	25.3	20.9	29.5	2.08	30.5

Source: OCIC (1968) Entrepasage des Cereales des Maroc, 12 Jan., 1968.

TABLE 46

CUMULATIVE MONTHLY COMMERCIALIZATION OF BARLEY IN MOROCCO, 1957-67

(Producers supply to cooperatives and licensed dealers.)

Month	Marketing Year										Average
	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	
	1957	1958	1959	Harvest Year		1962	1963	1964	1965	1966	
			1960	1961							
June	94	299	167	204	59	302	314	216	252	138	
July	211	643	393	503	92	642	672	424	541	284	
August	321	781	575	737	111	918	937	635	661	311	
September	385	856	708	847	116	1,057	1,111	697	705	326	680
% Commercialized											
June to September	65.3	77.4	76.3	85.9	88.5	59.0	67.1	90.1	84.5	93.1	74.11
October	436	938	803	898	120	1,187	1,244	731	755	334	
November	475	997	833	919	126	1,286	1,332	741	788	338	
December	538	1,030	861	943	127	1,354	1,409	749	807	342	
January	557	1,061	882	953	128	1,461	1,510	754	821	345	
February	566	1,076	899	979	129	1,560	1,570	762	825	348	
March	568	1,084	912	982	129	1,713	1,614	766	828	349	
April	588	1,106	928	986	129	1,789	1,655	773	833	350	
May: Commercialized	589	1,106	928	986	131	1,789	1,655	773	834	350	914
% Commercialized											
October to May	34.7	22.6	23.7	14.1	11.5	41.0	32.9	9.9	15.5	6.9	26.6
Production	6,514	15,903	11,190	11,571	4,756	11,850	14,629	11,684	11,894	5,057	10,504
% of Production											
Commercialized	9.04	6.9	8.3	8.8	2.7	15.09	11.3	6.5	7.01	6.9	8.7

Source: OCIC (1968) Entrepasage des Cereales des Maroc, 12 Jan., 1968.

TABLE 47

CUMULATIVE MONTHLY COMMERCIALIZATION OF CORN IN MOROCCO, 1957-67

(Producers supply to cooperatives and licensed dealers.)

Month	Marketing Year										Average
	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	
	Harvest Year										
	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	Average
June	-	-	-	18	-	-	63	21	8	2	
July	12	-	-	32	2	4	76	35	32	5	
August	156	334	224	282	20	109	290	212	223	26	
September	299	551	443	515	43	274	603	394	357	34	351
% Commercialized											
June to September	50.6	55.7	39.3	63.8	58.1	41.7	52.5	65.2	67.6	66.6	54.9
October	391	701	602	629	59	360	797	471	414	40	
November	449	808	728	699	64	418	902	507	451	42	
December	506	890	836	769	70	470	961	530	486	49	
January	565	960	923	769	72	528	1,050	558	512	50	
February	581	975	1,013	804	73	570	1,097	580	523	50	
March	584	982	1,056	805	73	630	1,133	595	526	51	
April	587	982	1,129	806	74	656	1,147	604	528	51	
May:Commercialized	591	989	1,129	806	74	656	1,147	604	528	51	657
% Commercialized											
October to May	49.4	44.3	60.7	36.2	41.9	58.3	47.5	34.8	32.4	33.4	45.1
Production	2,157	3,687	3,947	3,042	1,065	3,291	3,967	3,341	2,720	1,544	2,876
% of Production											
Commercialized	27.4	26.8	28.6	26.5	6.9	19.8	28.9	18.2	19.4	3.3	22.8

Source: OCIC (1968) Entrepasage des Cereales des Maroc, 12 Jan., 1968.

TABLE 48

COMMERCIALIZATION OF THE 1967 CROP IN MOROCCO, 1967-68

Month	Bread Wheat	Durum Wheat	Barley	Corn	Total Principal Cereals	Total Secondary Cereals	Total All Cereals
	(X1000Q)						
May 67	24.2	34.9	51.7	0	110.8	4.0	114.8
June	414.6	308.4	275.9	.4	999.2	18.4	3,017.6
July	731.4	716.6	449.4	7.2	1,905.0	83.4	1,988.4
August	808.9	1,008.5	757.5	58.7	2,633.3	144.9	2,778.2
September	830.8	1,143.5	868.4	96.6	2,939.3	211.2	3,150.5
October	848.5	1,205.8	896.2	117.4	3,067.8	428.6	3,496.4
November	861.9	1,270.1	910.3	123.6	3,165.8	494.1	3,659.9
December	879.9	1,289.3	913.8	128.0	3,211.1	506.0	3,717.1
January 68	886.4	1,303.8	918.8	128.6	3,237.7	510.2	3,747.9
February	888.6	1,310.9	929.5	133.1	3,262.0	514.0	3,776.1
March	892.8	1,317.7	931.4	133.5	3,275.5	516.7	3,792.2
April	898.2	1,321.3	934.5	133.8	3,287.8	517.4	3,805.2
TOTAL	898.2	1,321.3	934.5	133.8	3,287.8	517.4	3,805.2

Source: Office Cherifien Interprofessionnel des Cereales

TABLE 48 CON'T. COMMERCIALIZATION OF THE 1967 CROP IN MOROCCO, 1967-68

Month	Oats	Canary Grass	Sorghum	Millet	Rye	Rice Sept. 1, 1967 to Aug. 31, 1968	Total Secondary Cereals
(X1000Q)							
May 67	.3	3.6	0	0	0	0	4.0
June	6.2	12.1	.1	0	0	0	18.4
July	20.6	56.3	6.3	.2	0	0	83.4
August	27.9	99.3	16.2	1.5	0	0	144.9
September	35.2	114.7	22.2	14.3	0	24.8	211.2
October	43.0	121.5	25.6	25.5	.8	212.1	428.6
November	44.6	127.0	28.0	30.5	.8	263.5	494.1
December	44.6	131.0	28.7	34.3	.8	266.5	506.0
January 68	44.8	134.0	29.0	34.9	.8	266.5	510.2
February	45.1	137.5	29.0	35.1	.8	266.5	514.0
March	45.3	139.9	35.1	29.1	.8	266.5	516.7
April	45.4	140.3	35.2	29.1	.8	266.5	517.4
TOTAL	45.4	140.3	35.2	29.1	.8	266.5	517.4

Source: Office Cherifien Interprofessionnel des Cereales

TABLE 49 REGIONAL COMMERCIALIZATION OF CEREALS FROM MAY 15, 1967
THROUGH APRIL 16, 1968 IN MOROCCO

Regions	Bread Wheat	Durum Wheat	Barley	Corn	Total Principal Cereals	Total Secondary Cereals	Total All Cereals
			(X1000 Q.)				
Oujda	1.2	78.3	67.6	0	147.1	9.3	156.4
Taza	5.9	26.2	19.3	.1	51.5	.2	51.7
Fes	110.7	109.8	52.8	1.1	274.3	4.7	279.0
Meknes	295.2	278.7	126.1	4.1	704.1	6.0	710.1
Gharb	41.9	140.2	51.5	4.0	237.6	442.7	680.3
Tetouan	.5	2.7	0	0	3.2	0	3.2
Rabat	58.4	113.4	46.6	4.0	222.5	9.0	231.5
Casablanca	103.7	207.6	216.5	53.0	580.8	35.4	616.2
Oued Zem	56.4	82.9	91.1	0	230.4	0	230.4
El Jadida	35.8	12.4	56.0	3.2	117.3	9.9	127.2
Safi	113.4	37.8	110.3	43.8	305.3	.2	305.5
Essaouira	30.5	.5	26.7	10.4	68.1	0	68.1
Marrakech	43.7	24.6	53.9	.2	122.4	0	122.4
Agadir	.8	.2	16.0	0	17.0	0	17.0
Total	898.2	1,115.2	934.5	133.8	3,081.7	517.4	3,599.1
Mills	0	206.1	0	0	206.1	0	206.1
Total	898.2	1,321.3	934.5	133.8	3,287.8	517.4	3,805.2

Source: Office Cherifien Interprofessionnel des Cereales.

TABLE 49 CON'T. REGIONAL COMMERCIALIZATION OF CEREALS FROM MAY 15, 1967
THROUGH APRIL 16, 1968 IN MOROCCO

Regions	Oats	Canary Grass	Sorghum (X1000 Q.)	Millet	Rye	Rice	Total Secondary Cereals
Oujda	9.3	0	0	0	0	0	9.3
Taza	0	0	.2	0	0	0	.2
Fes	2.6	0	2.1	0	0	0	4.7
Meknes	6.0	0	0	0	0	0	6.0
Gharb	3.7	115.1	29.3	28.0	0	266.5	442.7
Tetouan	0	0	0	0	0	0	0
Rabat	9.0	0	0	0	0	0	9.0
Casablanca	13.8	20.8	0	0	.8	0	35.4
Oued Zem	0	0	0	0	0	0	0
El Jadida	1.0	4.1	3.6	1.2	0	0	9.9
Safi	0	.2	0	0	0	0	.2
Essaouira	0	0	0	0	0	0	0
Marrakech	0	0	0	0	0	0	0
Agadir	0	0	0	0	0	0	0
Total Mills	45.4 0	140.3 0	35.2 0	29.2 0	.8 0	266.5 0	517.4 0
Total	45.4	140.3	35.2	29.2	.8	266.5	517.4

Source: Office Cherifien Interprofessionnel des Cereales.

TABLE 50 CUMULATIVE COMMERCIALIZATION OF THE 1968 CROP IN MOROCCO, 1968-69

Month	Bread Wheat	Durum Wheat	Barley	Corn	Total Principal Cereals	Total Secondary Cereals	Total All Cereals
	(X1000Q)						
April 68	0	1.1	.6	1.2	2.9	2.3	5.2
May	102.3	37.7	44.4	2.7	187.1	7.9	195.0
June	1,061.7	392.8	295.3	3.7	1,753.6	36.2	1,789.8
July	2,454.9	1,434.8	812.0	4.2	4,706.0	177.2	4,883.2
August	3,160.7	2,375.1	1,341.2	17.7	6,894.7	332.0	7,226.7
September	3,504.0	2,853.5	1,699.7	90.9	8,144.2	458.7	8,602.9
October	3,712.4	3,166.6	1,949.0	133.6	8,961.7	777.5	9,739.2
November	3,794.0	3,377.0	2,096.0	161.8	9,267.0	931.8	10,198.9
December	3,872.9	3,520.0	2,238.6	180.8	9,812.3	991.3	10,803.6
January 69	3,976.9	3,662.0	2,398.4	217.9	10,255.2	1,005.6	11,260.8
February	4,013.5	3,693.6	2,558.7	242.6	10,508.5	1,019.7	11,528.2
March	4,041.9	3,740.5	2,635.9	251.7	10,669.9	1,031.7	11,701.6
April	0	0	0	0	0	0	0
TOTAL	4,041.9	3,740.5	2,635.9	251.7	10,669.9	1,031.7	11,701.6

Source: Office Cherifien Interprofessionnel des Cereales

TABLE 50 CON'T. CUMULATIVE COMMERCIALIZATION OF THE 1968 CROP IN MOROCCO, 1968-69

Month	Oats	Canary Grass	Sorghum	Millet	Rye	Rice Sept. 1, 1967 to Aug. 31, 1968	Total Secondary Cereals
				(X1000Q)			
April 1968	.3	1.6	.4	0	0	0	2.3
May	.9	3.5	2.2	.9	.4	0	7.9
June	13.5	18.4	3.0	.9	.4	0	36.2
July	44.4	127.5	3.2	1.1	1.0	0	177.2
August	69.8	251.6	4.5	4.6	1.5	0	332.0
September	81.1	313.8	17.4	11.3	1.5	33.4	458.7
October	89.8	343.7	32.4	13.6	1.5	296.4	777.5
November	102.5	354.1	41.1	15.1	1.5	417.6	931.8
December	108.2	358.0	15.9	49.3	1.5	458.4	991.3
January 69	109.7	359.7	57.9	17.0	1.5	459.6	1,005.6
February	113.1	362.3	65.6	17.4	1.5	459.7	1,019.7
March	114.4	365.9	72.0	18.1	1.5	459.7	1,031.7
April	0	0	0	0	0	0	0
TOTAL	114.4	365.9	72.0	18.1	1.5	459.7	1,031.7

Source: Office Cherifien Interprofessionnel des Cereales

TABLE 51 COMMERCIABILIZATION OF CEREALS FROM APRIL 15, 1968 TO MARCH 31, 1969 (IN Q)

Regions	Bread Wheat	Durum Wheat	Barley	Corn	Total Principal Cereals	Total Secondary Cereals	Total All Cereals
				(X1000 Q.)			
Oujda	165.0	214.3	153.8	1.8	534.8	27.4	562.2
Taza	30.9	72.4	14.3	0	117.7	0	117.7
Fes	328.5	286.2	44.5	0	659.3	10.7	670.0
Meknes	503.7	371.8	96.5	2.2	974.2	10.0	984.2
Gharb	457.9	498.9	139.1	19.4	1,115.2	848.4	1,963.6
Tetouan	.4	0	0	0	.4	0	.4
Rabat	70.0	207.0	99.3	2.7	479.1	10.2	489.3
Casablanca	1.0	594.0	1,130.2	164.9	2,810.0	118.9	2,928.9
Oued Zem	355.1	145.6	254.9	0	755.5	0	755.5
El Jadida	141.0	26.2	128.2	19.8	315.2	5.8	321.1
Safi	478.4	53.9	202.6	33.4	768.3	.1	768.4
Essaouira	150.0	2.8	202.9	6.5	362.3	0	362.3
Marrakech	313.0	49.8	116.1	.7	479.6	.1	479.8
Agadir	27.0	1.4	53.5	.3	82.1	0	82.1
Total Mills	4,041.9	3,740.5 1,216.1	2,635.9	251.7	9,453.8 1,216.1	1,031.7	10,485.5 1,216.1
Total		4,956.6			10,669.9		11,701.6

Source: Office Cherifien Interprofessionnel des Cereales.

TABLE 51 CON'T COMMERCIALIZATION OF CEREALS FROM APRIL 15, 1968 TO MARCH 31, 1969 (IN Q)

Regions	Oats	Canary Grass	Sorghum (X1000 Q.)	Millet	Rye	Rice	Total Secondary Cereals
Oujda	26.8	0	0	.6	0	0	27.4
Taza	0	0	0	0	0	0	0
Fes	3.4	0	7.3	0	0	0	10.7
Meknes	8.9	0	1.1	0	0	0	10.0
Gharb	22.3	313.6	35.6	17.2	0	459.7	848.4
Tetouan	0	0	0	0	0	0	0
Rabat	10.2	0	0	0	0	0	10.2
Casablanca	42.7	46.6	27.9	.1	1.5	0	118.9
Oued Zem	0	0	0	0	0	0	0
El Jadida	0	5.6	0	.2	0	0	5.8
Safi	0	.1	0	0	0	0	.1
Essaouira	0	0	0	0	0	0	0
Marrakech	.1	0	0	0	0	0	.1
Agadir	0	0	0	0	0	0	0
Total Mills	114.4	365.9	72.0	18.1	1.5	459.7	1,031.7
Total							

Source: Office Cherifien Interprofessionnel des Cereales.

TABLE 52

MAXIMUM COMMERCIALIZATION OF CEREALS BY REGIONS

	Oujda	Taza	Fes	Meknes	Kenitra Gharb	Rabat blanca	Casa Zem	Oued Jadida	El Safi	Essa ouira	Marra kech	Agadir	
I. Year of maximum commercialization (during past 20 years)													
Harvest Year	1963	1958	1958	1954	1954	1962	1954	1954	1959	1956	1954	1954	1954
Quant. (X1000 Q)	289	114	783	1,210	1,750	485	3,971	1,102	667	1,048	930	471	309
II. Annual commercialization during past 10 years													
A. 10 year annual average (X1000 Q.)													
All Cereals	141	54	431	843	970	319	1,358	465	295	387	132	174	10
Bread & Durum													
Wheat	86	48	392	761	517	273	623	358	109	152	52	135	3
Other Cereals	56	6	39	82	453	46	735	107	86	235	80	49	7
B. Peak Harvest													
Year	1963	1958	1958	1962	1958	1962	1962	1960	1959	1963	1963	1958	1958
Total Quan.	258	144	783	1,198	1,624	485	2,315	1,079	687	814	294	388	27
Quantity by Cereal													
Bread Wheat	29	9	252	474	412	142	474	411	272	247	107	204	1
Durum Wheat	109	100	469	564	540	235	472	155	37	18	9	134	-
Barley	126	5	47	131	107	64	949	508	80	229	131	42	17
Corn	-	-	12	10	29	6	340	5	278	320	47	8	9
Oats	25	-	3	19	11	38	80	-	-	-	-	-	-
Canary Grass and Millet	-	-	-	-	225	-	-	-	20	-	-	-	-
Sorghum	-	-	-	-	300	-	-	-	-	-	-	-	-

Source: OCIC (1968) Entrepotage des Cereales des Maroc, 12 Jan 1968.

**TABLE 53 ANNUAL VARIATION IN PERCENTAGE OF FOUR
PRINCIPAL CEREALS COMMERCIALIZATION IN MOROCCO,
1957-1966**

Crop Year	Quantity Marketed (Quintals)	Percentage Marketed	Percent Deviation From 10 Year Average ¹	
			+	-
1957	4,593,650	81.8%		18.2
1958	8,154,916	145.3	45.3	
1959	7,078,646	126.1	26.1	
1960	6,061,452	108.03	8.03	
1961	2,134,064	38.04		61.96
1962	7,926,374	141.2	41.2	
1963	7,002,580	124.8	24.8	
1964	4,772,850	85.07		14.93
1965	6,069,061	108.1	8.1	
1966	2,310,629	41.18		58.82

¹ 10 Year Average = 5,607,000 qx.

**TABLE 54 COMPARISON OF ANNUAL PRODUCTION AND
MARKETING DEVIATION FROM 10 YEAR AVERAGE
1957-1966**

Crop Year	Percent Deviation from 10 Year Average			
	Production		Marketing	
	+	-	+	-
1957		35.3		18.2
1958	36.5		45.3	
1959	4		26.1	
1960	6.5		8.03	
1961		49.99		61.96
1962	16.7		41.2	
1963	29		24.8	
1964	13.6			14.93
1965	16.9		8.1	
1966		37.9		58.82

Source: OCIC (1968) Entrepotage des Cereales des Maroc,
12 Jan 1968.

TABLE 55 PERCENT OF PRODUCTION COMMERCIALIZED IN MOROCCO
1957-1966

Year of Harvest	Bread Wheat	Durum Wheat	Barley	Corn
1957	85.3	40	9.04	27.4
1958	83.2	35.6	6.9	26.8
1959	86.7	41.2	8.3	28.6
1960	57.7	32.3	8.8	26.5
1961	42.5	27.7	2.7	6.9
1962	71.04	34.1	15.09	19.8
1963	63.7	25.3	11.3	28.9
1964	50.1	20.9	6.5	18.2
1965	56.3	29.5	7.01	19.4
1966	<u>33.8</u>	<u>20.08</u>	<u>6.9</u>	<u>3.3</u>
Average	63.6	30.50	8.7	22.8

TABLE 56 TEN YEAR MOVING AVERAGE OF PRINCIPAL
CEREAL PRODUCTION COMMERCIALIZED IN MOROCCO
1947-1966

<u>Period</u>	<u>Quintals</u>
1947/56	8,535,000
1948/57	8,460,000
1949/58	8,541,000
1950/59	8,478,000
1951/60	8,517,000
1952/61	7,880,000
1953/62	8,030,000
1954/63	7,675,000
1955/64	6,848,000
1956/65	6,466,000
1957/66	5,607,000

Source: OCIC (1968) Entrepasage des Cereales des Maroc,
12 Jan 1968.

Marketing Year	Cooperatives		Commercial		Flour Mills ²		Total
	(X1000 Q.)	%	(X1000 Q.)	%	(X1000 Q.)	%	
1947/48	2,472.9	47	2,874.3	53	-	-	5,347.2
1948/49	2,942.7	40	4,404.0	60	-	-	7,346.7
1949/50	1,581.3	20	6,121.0	80	-	-	7,702.3
1950/51	1,578.5	28	4,087.5	72	-	-	5,666.0
1951/52	2,405.0	29	5,938.9	69	169.4	2	8,513.3
1952/53	2,219.7	34	4,025.2	63	176.8	3	6,421.7
1953/54	3,093.1	30	6,964.2	65	480.0	5	10,537.3
1954/55	3,887.7	29	8,663.6	66	510.1	5	13,061.4
1955/56	2,643.6	27	6,772.2	68	469.3	5	9,885.1
1956/57	3,021.0	28	7,308.6	67	542.1	5	10,871.7
1957/58	1,383.4	30	2,745.1	60	465.5	10	4,594.0
1958/59	2,534.8	32	5,035.2	61	584.9	7	8,154.9
1959/60	2,294.5	32	4,312.9	61	471.2	7	7,078.6
1960/61	1,934.6	32	3,368.6	56	758.2	12	6,061.4
1961/62	844.0	39	1,016.0	48	274.1	13	2,134.1
1962/63	3,021.3	38	4,355.4	55	549.7 ₃	7	7,926.4
1963/64	2,065.4	29	4,402.4	63	534.8 ₃	8	7,002.6
1964/65	1,842.2	39	2,591.7	54	338.0 ₄	7	4,771.9
1965/66	1,869.8	31	3,322.8	55	876.5	14	6,069.1
1966/67	712.2	31	1,138.6	50	447.8	20	2,298.6

¹ Bread Wheat, Durum Wheat, Barley and Corn

² Direct purchase of Durum Wheat

³ Includes 530.1 Durum Wheat and 4.7 Bread Wheat

⁴ Includes 335.8 Durum Wheat and 2.2 Bread Wheat

**TABLE 58 RELATIVE IMPORTANCE OF MARKETING (GATHERING) ORGANIZATIONS
1965-66 Crop Year
4 Major Cereals**

Cereal	180 Licensed Dealers 6,000,000 Quintals Space		Cooperatives 4,328,000 Quintals Space	
	Quantity (Q)	% of Commercial Quantity (Q)	Quantity (Q)	% of Commercial Quantity (Q)
Bread Wheat	916,000	53%	821,000	47%
Durum	1,350,000	45%	754,000	25%
Barley	569,000	68%	264,000	32%
Corn	468,000	92%	41,000	8%
TOTAL	3,303,000	54%	1,880,000	31%

(Unaccounted Balance of 15% equals approximately 902,000 Quintals of Durum purchased directly by the Commercial Mills--An unusually high year for such purchases).

Corrected as of 14 May, 1969, they were reported to be 169 "licensed dealers" licensed by OCIC to conduct a grain merchandising and storage business in Morocco.

**TABLE 59 COMMERCIAL VOLUME - % IN STORAGE BY SEPTEMBER 30
Average 10 yrs. 1957-66**

Bread Wheat	95%
Durum	85%
Barley	75%
Corn	75%

Notes: The modern sector markets rapidly at harvest.
The modern sector contributes to the more rapid marketing of wheats than other grains.
Marketing extends over a longer time in good years than in poor years.
Marketing may resume in Feb.-Mar. after the farmer assesses his new crop prospects.

Source: O.C.I.C. - Entrepotage des Cereales, 12 January, 1968.

Wheat stored by commercial mills shall be not less than 23/30 of the average monthly need during the preceeding four months. Flour stored by commercial mills shall be not less than 7/30 of the average quantity sold during the preceeding four months.

Allowable changes for commercial milling include:

- (1) Costs of moving wheat to the mills.
- (2) Distribution expense.
- (3) A storage allowance equivalent to Dh 0.30 per quintal of grain per month.
- (4) Total flour and semolina yields are based on a standard total yield of 98 Kg. per quintal of grain. Adjustments are made for higher grade products deviating from the "standard" product obtained at that yield.
- (5) OCIC establishes the credit to be taken into account for by-products.
- (6) A maximum milling charge of Dh 6.0, may be adjusted for volume.

Bakery flours shall be packed in 100 Kg. net weight bags. Flour for other uses shall be packed in 50 Kg. net weight bags. Durum products may be packed in 50 and 100 Kg. net weight bags. Each bag shall be clearly labeled.

Bread Wheats. The basic price to be paid to the producer for commercialized bread wheats is Dh 34.50 per quintal plus a bonus of Dh 5.50 (total Dh 40.00) to encourage production. The standard quality for which that price is paid is for wheat weighing 77 Kg. per hectoliter and containing not more than 3% of foreign matter. Adjustments for varying quality are made as follows:

Premiums:

- (1) For each Kg. per hectoliter above 77 to 81, Dh 0.33 per quintal.
- (2) For each 1% of foreign matter below 3%, Dh 0.33 per quintal.

Discounts:

- (1) For each Kg. per hectoliter below 77 to 70, Dh 0.33 per quintal.
- (2) For each Kg. per hectoliter below 70 to 68, Dh 0.36 per quintal.
- (3) Bread wheats under 68 Kg. per hectoliter are not guaranteed a market; however, if purchased, the discount shall be
 - (a) Below 68 to 66 Kg., Dh 0.38 per quintal.
 - (b) Below 68 to 64 Kg., Dh 0.40 per quintal.

- (4) For each 1% of foreign matter between 3% and 6%, Dh 0.33 per quintal.
- (5) Above 6% foreign matter, no market is guaranteed and price shall be at private treaty.
- (6) For each 1% of broken kernels between 3% and 5%, Dh 0.09 per quintal.
- (7) For each 1% of broken kernels between 5% and 6%, Dh 0.15 per quintal.
- (8) Above 6% broken kernels, no market is guaranteed, and price shall be at private treaty.
- (9) For fenugreek, between 1 g. and 10 g. per 100 Kg., Dh 0.33 per quintal.
- (10) For scurf peas, a maximum tolerance of 0.05% is allowed under the standard grade.
- (11) For clover, a maximum tolerance of 0.05% is allowed under the standard grade.
- (12) For rye grass, a maximum tolerance of 0.1% is allowed under the standard grade.
- (13) For decayed grain, a maximum tolerance of 0.125% is allowed under the standard grade.
- (14) For each 1% germ damaged grain (missing or mold damaged) between 1% and 3%, Dh 0.09 per quintal
- (15) For each 1% of punctured grain between 1% and 3%, Dh 0.09 per quintal.
- (16) For each 1% of heat damaged grain up to 2%, Dh 0.23 per quintal.
- (17) For each 1% of germinated wheat between 1% and 3%, Dh 0.09 per quintal.
- (18) For excessive foreign matter, damage, and other detrimental materials (such as garlic) not otherwise provided for above no market is guaranteed and price shall be at private treaty.

For purposes of grading, not otherwise specifically provided for above "foreign matter" shall be further defined:

- (1) Stones, dirt, dust, metallic particles, vegetable residues, animal residues, animal wastes, dead parasites, dead insects, damaged grains, more than 3% foreign grains (except durum, barley, and rye).
- (2) Two-thirds of the weight of barley and one-half of the weight of rye, up to 5%, and all barley and rye above 5% shall be treated as foreign matter.
- (3) Wheat split along the crease shall not be treated as broken kernels.

Bread wheats are considered non-marketable if:

- (1) 64-68 Kg. per hectoliter grain contains more than 5% of impurities (foreign matter and foreign grain).
- (2) When broken, damaged, or detrimental grains exceed the limits established in the standards above listed.
- (3) When wheat weighs less than 64 Kg. per hectoliter.
- (4) When insect damaged kernels exceed 0.5%.

Non-marketable grains may be beneficiated to marketable grains by cleaning or other appropriate processes. Non-marketable grain resulting from cleaning and conditioning and wheats weighing less than 64 Kg. per hectoliter may only be sold under conditions fixed by OCIC.

Adjustments to the price to be paid the producer are made for the following in addition to grading factors:

- (1) A tax of Dh 0.70 to support OCIC, including OCIC's transportation costs from storage to point of sale.
- (2) The cost of transportation from the point of producer delivery to the point of storage for the area. (Calculated to approximate Dh 0.018 per quintal per kilometer).

Durum Wheat. Durum wheat may be freely bought and processed. Licensed dealers and cooperatives may offer their supplies of durum to OCIC. The basic price OCIC will pay for durum is Dh 40.0 per quintal plus a production incentive payment of Dh 4.0 (total Dh 44.0). Offers to sell will be entertained by OCIC on the first of each month starting July 1 for quantities of not less than 100 quintals.

The standard grade shall be durum weighing 77 Kg per hectoliter and containing not more than 2% of impurities (foreign matter; foreign grains, except bread wheat and barley).

Premiums

- (1) For each Kg. per hectoliter above 77 to 81, Dh 0.39 per quintal.
- (2) For a "Nottin Index" (believed to mean moisture content) below 12:
 - (a) Of 12 to 11.01, Dh 0.05 per quintal.
 - (b) Of 11 to 10.01, Dh 0.10 per quintal.
 - (c) Of 10 to 9.01, Dh 0.15 per quintal.
 - (d) 9 and below, Dh 0.20 per quintal.

Discounts

- (1) For each Kg. per hectoliter below 77 to 75, Dh 0.39 per quintal.

- (2) For a "Nottin Index" above 13:
- (a) 13.01 to 14, Dh 0.05 per quintal.
 - (b) 14.01 to 15, Dh 0.10 per quintal.
 - (c) 15.01 to 16, Dh 0.15 per quintal.
 - (d) 16.01 to 17, Dh 0.20 per quintal.
 - (e) 17.01 to 18, Dh 0.25 per quintal.
 - (f) 18.01 to 19, Dh 0.30 per quintal.
 - (g) 19.01 to 20, Dh 0.35 per quintal.
 - (h) 20.01 to 21, Dh 0.40 per quintal.
 - (i) 21.01 to 22, Dh 0.45 per quintal.
 - (j) 22.01 to 23, Dh 0.50 per quintal.
 - (k) 23.01 to 24, Dh 0.55 per quintal.
 - (l) 24.01 to 25, Dh 0.61 per quintal.
 - (m) 25.01 to 26, Dh 0.68 per quintal.
 - (n) 26.01 to 27, Dh 0.75 per quintal.
 - (o) 27.01 to 28, Dh 0.85 per quintal.
 - (p) 28.01 to 29, Dh 0.95 per quintal.
 - (q) 29.01 to 30, Dh 1.05 per quintal.
 - (r) 30.01 to 31, Dh 1.15 per quintal.
 - (s) 31.01 to 32, Dh 1.30 per quintal.
 - (t) 32.01 to 33, Dh 1.50 per quintal.
- (3) Durum may have up to 5% bread wheats without penalty. For bread wheat content above 5% to 7%, Dh 0.64 per quintal.
- (4) For each 1% of foreign matter and foreign grains (except bread wheat and barley) above 2% to 4%, Dh 0.39 per quintal.
- (5) For each 1% of barley above 1% to 5%, Dh 0.26 per quintal.
- (6) Above 3% to 4% broken kernels (excluding grain split only along the crease), Dh 0.10 per quintal.
- (7) For each 1% of "red durum" above 3% to 8%, Dh 0.20 per quintal.
- (8) For each 1% of spotty, mold damaged grain (germ damage only, not counted) above 3%, Dh 0.20 per quintal.
- (9) For each 1% of mold damaged crease area above 2½%, Dh 0.30 per quintal.
- (10) For each 1% of kernels without a germ, or the germ darkened by mold, to 3%, Dh 0.10 per quintal.
- (11) For each 1% of punctured grain between 1% and 3%, Dh 0.10 per quintal.
- (12) For each 1% of heat damaged grain up to 2%, Dh 0.26 per quintal.
- (13) For each 1% of germinated grain above 1% to 3%, Dh 0.10 per quintal.
- (14) Discounts are not cumulative--the highest shall prevail.

Durum wheat shall be non-marketable through the channels of OCIC if:

- (1) Faults exceed those for which discounts are provided.
- (2) Grain containing noxious seeds or garlic bulbs; however, 0.05% of scurf peas is acceptable.
- (3) Grain containing more than 0.5% insect damage.

OCIC shall control the exportation of durum.

Wheat Storage Fees. Bread wheat and durum storage fees paid to licensed dealers and cooperatives by OCIC in addition to the support price are:

- (1) Dh 1.0 per quintal (Intended to be the profit payment).
- (2) Dh 0.275 per quintal semi-monthly, equivalent to Dh 0.55 per quintal per month to cover interest and operating expense. (Believed to start the first of the month following tender of the grain to OCIC).

Barley. The purchase and pricing of barley shall be uncontrolled. A minimum price shall be paid by coops, and licensed dealers as provided herein.

A base price of Dh 27 per quintal shall be paid the producer for standard barley at port locations and Oujda. A base price of Dh 25 per quintal shall be paid at all other locations;

The standard quality for which the base prices are to be paid is grain weighing 58 Kg. per hectoliter and not to exceed 3% of foreign matter of which not more than 2% may be materials other than foreign or damaged grain.

The other quality factors for barley should agree with the standards for "Common Barley No. 3" published by the Office of Commerce and Exportation (OCE).

Premiums

None

Discounts

For each 1%, or fraction thereof, by which the grain deviates below said standards, a deduction shall be made on the basis of DH 0.20 per quintal.

To enjoy the minimum price, cooperatives and licensed dealers must offer their barley to OCIC. Offers will be received by OCIC the first of each month, starting as of September 1.

A barley storage fee of Dh 0.0075 per quintal per day for storage, maintenance, and management starting the first of the month following the offering month.

Exports will be controlled by OCIC.

OCIC will issue regulatory letters amplifying this order to provide practical operating procedures.

Secondary Cereals. Oats, Corn, Rice, Rye, Canary Grass, Sorghum, and Millet. The purchase and sale of secondary cereals are uncontrolled and prices will be at private treaty.

OCIC may intervene in the marketing of these cereals.

The export of secondary cereals will be controlled by OCIC. OCIC shall license exports before they may be consummated.

Before payments for bread wheats are made in keeping with the amounts herein before discussed the dealers and cooperatives must ascertain whether the producer has outstanding loans due to the National Bank of Agricultural Credit; to regional, or local Agricultural Credit Unions.

If such indebtedness is found to exist, the amounts due must be deducted from the payments for bread wheat, and that amount remitted to the lending agency.

Cereal Storage Facilities

The present national covered storage resource used for commercialized grain appears to be:

(1) Vertical Silos	-	2,479,600	quintals
(2) Horizontal Bins	-	241,200	quintals
(3) Warehouses	-	<u>831,100</u>	quintals

TOTAL 12,551,900 quintals

That resource appears adequate to serve the national need for the next year or two.

Continued population growth plus success in agricultural development with respect to cereals should result in requirements for significantly more covered space in 1972.

The Ministry of Agriculture agencies list paved areas on which grains, totaling 3,839,400 quintals, may be stored under tarpaulin. We do not deem this to be suitable storage, except perhaps for the shortest possible time during a receiving tie up. We do not believe that such space should be considered as part of the storage resource.

There are many buildings under GOM control within Morocco that are suitable for emergency storage of grains under conditions such as the bumper crops of 1968. There is no present inventory of such space.

The present sound condition of the grain storage facility provides not less than one years time for refinement of statistics, preparation of a long range plan, and a start on implementation of that plan.

MOROCCO

GRAIN STORAGE FACILITIES

Location by city

Capacity by province

Capacity:

PROVINCE

S= SILO (x1,000 Q)

W= WAREHOUSE (x1,000 Q)

Location:

CITY (S=SILO, W=WAREHOUSE)

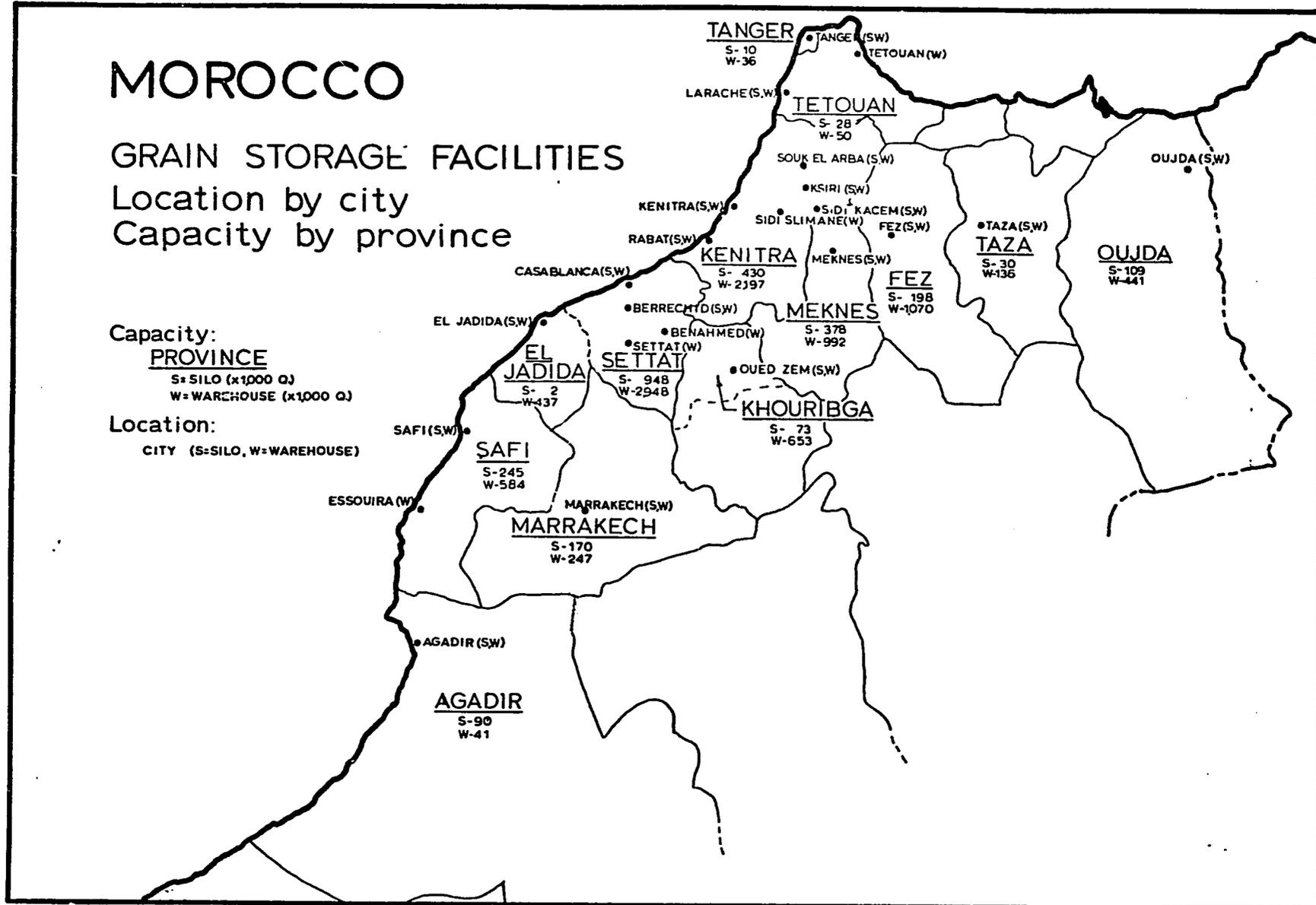


TABLE 60

CEREAL GRAIN STORAGE CAPACITIES BY TYPE AND LOCATION IN MOROCCO

LOCATION	Organization	Bulk Storage		Warehouse (X1000 Q.)	Total	Storage Under Tarpaulin	Fumigation Capacity	Chambers Number
		Silo	Flat					
<u>Oujda</u>	Cooperatives ¹	108.0	-	95.0	203.0	97.6	-	-
	Commercial	-	-	213.7	213.7	22.5	0.8	2
	Flour Mill	1.0	-	132.1	133.1	17.0	-	-
	TOTAL	109.0	-	440.8	549.8	137.1	0.8	2
<u>Taza</u>	Cooperatives ^{1,2}	-	30.0	83.0	113.0	23.5	2.1	4
	Commercial	-	-	29.7	29.7	-	-	-
	Flour Mill	-	-	23.4	23.4	-	-	-
	TOTAL	-	30.0	136.1	166.1	23.5	2.1	4
<u>Fez</u>	Cooperatives ^{1,2}	172.0	-	483.0	655.0	180.0	5.2	7
	Commercial	-	-	447.0	447.0	152.5	6.2	11
	Flour Mill	24.8	1.0	139.7	165.5	21.0	-	-
	TOTAL	196.8	1.0	1,069.7	1,267.5	353.5	11.4	18
<u>Meknes</u>	Cooperatives ¹	357.0	-	340.0	697.0	60.0	4.0	4
	Commercial	5.0	5.0	567.5	577.5	156.0	12.2	14
	Flour Mill	10.6	-	84.0	94.6	1.1	-	-
	TOTAL	372.6	5.0	991.5	1,369.1	217.1	16.2	18

CEREAL GRAIN STORAGE CAPACITIES BY TYPE AND LOCATION IN MOROCCO (Con't)

LOCATION	Organization	Bulk Storage		Warehouse	Total	Storage Under Tarpaulin	Fumigation Capacity	Chambers Number
		Silo	Flat					
<u>Tanger</u>	Commercial ¹	-	-	1.7	1.7	-	-	-
	Flour Mill	10.2	-	34.8	45.0	35.0	-	-
	TOTAL	10.2	-	36.5	46.7	35.0	-	-
<u>Tetouan</u>	Cooperatives ¹	-	-	42.0	42.0	7.0	-	-
	TOTAL	-	-	42.0	42.0	7.0	-	-
<u>Larache</u>	Flour Mill	28.25	-	8.0	36.25	8.0	-	-
	TOTAL	28.25	-	8.0	36.25	8.0	-	-
<u>Kenitra</u>	Cooperatives ^{1,3}	230.0	-	363.0	593.0	146.0	9.4	14
	Commercial	-	-	1,257.0	1,257.0	580.5	28.2	32
	Flour Mill	2.25	-	11.0	13.25	-	-	-
	Port Silo ⁴	60.0	-	-	60.0	-	-	-
	TOTAL	292.25	-	1,631.0	1,923.25	726.5	37.6	46
<u>Souk-El-Arba</u>	Cooperatives	(See <u>Kenitra</u>)						
	Commercial	-	-	22.0	22.0	32.0	0.7	1
	Flour Mill	4.0	-	22.0	26.0	3.0	-	-
	TOTAL	4.0	-	44.0	48.0	35.0	0.7	1

CEREAL GRAIN STORAGE CAPACITIES BY TYPE AND LOCATION IN MOROCCO (Con't)

LOCATION	Organization	Bulk Storage		Warehouse	Total	Storage Under Tarpaulin	Fumigation Capacity	Chambers Number
		Silo	Flat					
<u>Sidi Kacem</u>	Cooperatives	(See <u>Kenitra</u>)						
	Commercial	-	-	35.0	35.0	5.0	0.7	1
	TOTAL	-	-	35.0	35.0	5.0	0.7	1
<u>Ksiri</u>	Cooperatives	(See <u>Kenitra</u>)						
<u>Sidi Slimane</u>	Cooperatives	(See <u>Kenitra</u>)						
<u>Rabat</u>	Cooperatives ¹	100.0	-	290.0	390.0	60.0	7.2	8
	Commercial	-	-	151.0	151.0	61.0	2.4	4
	Flour Mill	44.0	-	46.0	90.0	-	-	-
	TOTAL	144.0	-	487.0	631.0	121.0	9.6	12
<u>Casablanca</u>	Cooperatives ^{1,5}	265.0	-	168.0	433.0	256.0	9.8	12
	Commercial	75.0	-	2,000.5	2,075.5	761.0	22.0	38
	Gen. Whses.	-	-	280.0	280.0	-	5.0	5
	Flour Mill	152.0	1.5	371.2	524.7	72.0	3.0	4
	Port Silo ⁴	300.0	100.0	-	400.0	-	2.0	2
	TOTAL	792.0	101.5	2,819.7	3,713.2	1,089.0	41.8	61

CEREAL GRAIN STORAGE CAPACITIES BY TYPE AND LOCATION IN MOROCCO (Con't)

LOCATION	Organization	Bulk Storage		Warehouse	Total	Storage Under Tarpaulin	Fumigation Capacity	Chambers Number
		Silo	Flat					
<u>Settat</u>	Cooperatives	(See <u>Casablanca</u>)						
<u>Benahmed</u>	Cooperatives	(See <u>Casablanca</u>)						
	Commercial	-	-	20.0	20.0	25.0	-	-
	TOTAL	-	-	20.0	20.0	25.0	-	-
<u>Berrechid</u>	Cooperatives	(See <u>Casablanca</u>)						
	Commercial	-	-	68.2	68.2	9.0	2.3	2
	Flour Mill	54.8	-	40.0	94.8	40.0	-	-
	TOTAL	54.8	-	108.2	163.0	49.0	2.3	2
<u>El Jadida</u>	Cooperatives ¹	-	-	206.0	206.0	46.3	5.6	4
	Commercial	-	-	188.9	188.9	74.0	4.2	8
	Flour Mill	-	1.7	42.3	44.0	-	-	-
	TOTAL	-	1.7	437.2	438.9	120.3	9.8	12
<u>Oued Zem</u>	Cooperatives ¹	-	72.0	266.0	338.0	197.5	4.2	6
	Commercial	-	-	359.0	359.0	236.5	2.8	7
	Flour Mill	1.1	-	27.9	29.0	3.0	-	-
	TOTAL	1.1	72.0	652.9	726.0	437.0	7.0	13

CEREAL GRAIN STORAGE CAPACITIES BY TYPE AND LOCATION IN MOROCCO (Con't)

LOCATION	Organization	Bulk Storage		Warehouse	Total	Storage Under Tarpaulin	Fumigation Capacity	Chambers Number
		Silo	Flat					
<u>Safi</u>	Cooperatives ¹	-	-	221.0	221.0	222.0	4.2	8
	Commercial	-	-	150.8	150.8	66.0	2.4	3
	Flour Mill	4.6	-	18.8	23.4	10.2	1.2	2
	Port Silo	240.0	-	-	240.0	-	-	-
	TOTAL	244.6	-	390.6	635.2	298.2	7.8	13
<u>Essouira</u>	Cooperatives ¹	-	-	81.0	81.0	25.0	1.5	3
	Commercial	-	-	109.4	109.4	49.0	3.6	6
	Flour Mill	-	-	2.5	2.5	-	-	-
	TOTAL	-	-	192.9	192.9	74.0	5.1	9
<u>Marrakech</u>	Cooperatives ¹	170.0	-	170.0	340.0	-	2.4	3
	Commercial	-	-	61.0	61.0	38.2	1.6	2
	Flour Mill	-	-	16.0	16.0	22.0	-	-
	TOTAL	170.0	-	247.0	417.0	60.2	4.0	5
<u>Agadir</u>	Cooperatives ¹	-	30.0	5.0	35.0	-	1.6	2
	Flour Mill	60.0	-	36.0	96.0	8.0	-	-
	TOTAL	60.0	30.0	41.0	131.0	8.0	1.6	2

Source: OCIC (1968) Entrepotage des Cereales des Maroc 12 Jan 1968.

¹Cooperatives includes SCAM, CMA and UDS Storage Facilities. Data have been updated to include theoretical storage capacities of warehouse and bulk storage facilities as of 31 Mar. 1969 by SCAM.

Footnotes continued

²SCAM data (31 Mar. 1969) Combine Taza and Fes capacities and show 5,000 qx. more bulk and 5,000 qx. less warehouse capacity than shown above.

³Figures presumably include storage in cities of Souk El Arba, Sidi Kacem, Ksiri, Sidi Slimane and Kenitra in Kenitra Province.

⁴Elevators used primarily for import-export of grain. Elevators at Kenitra and Casablanca operated by Ministry of Commerce; Elevator at Safi operated by OCIC.

⁵Figures presumably include storage in cities of Settat, Benahmed, Berrechid and Casablanca. However, SCAM data of 31 Mar. 1969 indicates 221,000 M.T. less silo storage and 125,000 M.T. less warehouse capacity than OCIC data of 1967.

TABLE 61 SUMMARY OF CEREAL GRAIN STORAGE CAPACITIES BY TYPE AND ORGANIZATION

Organization	Bulk Storage		Warehouse	Total	Storage Under Tarpaulin	Fumigation Capacity	Chambers Number
	Silo	Flat					
Cooperatives'	1,402.0	132.0	2,813.0	4,347.0	1,320.9	57.2	75
Commercial	80.0	5.0	5,682.4	5,767.4	2,268.2	90.1	131
General Warehouses	0.0	0.0	280.0	280.0	0.0	5.0	5
Flour Mill	397.6	4.2	1,055.7	1,457.5	240.3	4.2	6
Port Silos	600.0	100.0	0.0	700.0	0.0	2.0	2
TOTAL	2,479.6	241.2	9,831.1	12,551.9	3,829.4	158.5	219

Source: OCIC (1968) Entreposage des Cereales des Maroc, 12 Jan 1968.

TABLE 62

MAJOR CEREAL STOCKS IN STORAGE AS OF 15 APRIL, 1969

STORAGE CENTERS	1968 CROP BREAD WHEAT	1967 CROP BREAD WHEAT	IMPORTED BREAD WHEAT	MILLS BREAD WHEAT	FREE DURUM	OCIC DURUM	FREE BARLEY	OCIC BARLEY	CORN	TOTAL
				(X1000Q)						
OUJDA	116.9	1.0		.3	69.5	177.8	110.3	146.8	1.8	624.4
TAZA	27.0			5.2	75.3	6.6	18.3	2.0		134.4
FES	300.3			6.8	23.2	166.0	32.2	38.8	.1	567.4
MEKNES	280.9	7.7			90.6	298.3	88.9	51.6	3.1	821.1
GHARB	357.0	.2			70.7	416.8	43.4	125.0	4.5	1,017.6
RABAT	121.1	6.0			22.7	130.0	29.6	84.8	1.0	395.2
CASABLANCA	812.9	20.7	69.8	16.4	36.0	328.8	99.0	967.2	83.6	2,434.4
O.ZEM	327.9	3.6		5.7	15.7	117.8	45.0	218.5		734.2
EL JADIDA	125.0			9.6	1.6	17.5	37.6	127.9	.9	320.1
SAFI	463.0			22.3	20.1	50.9	77.5	198.2	33.8	865.8
ESSAOUIRA	94.9				.4	2.5	20.3	194.0	8.7	320.8
MARRAKECH	269.9				9.0	37.0	13.3	102.6	.7	432.5
AGADIR	26.8	.7		23.1	1.4		3.1	47.0	.2	102.3
TETOUAN	.4	0.4					3.0			3.8
	3,323.9	40.2	69.8	89.4	436.1	1,750.1	621.7	2,304.4	138.4	8,774.0

Source: Ministry of Agriculture - DEAEJ

TABLE 63

PRELIMINARY CALCULATIONS INDICATIVE OF NEW GRAIN STORAGE
REQUIRED IF (AND WHEN) DOMESTIC PRODUCTION REACHES
SUFFICIENCY FOR THE NATION

111

	<u>1969</u>	<u>1975</u>
1. Urban Population	4,860,000	6,625,600
2. Urban Population Per Capital Consumption in Kilograms	150	150
3. Urban Population Cereal Consumption in Quintals	7,290,000	9,938,400
4. Supply Insurance Carryover in Quintals	4,086,000	5,570,000
5. Approximate Total Covered Storage Needed in Quintals	11,376,000	15,508,400
6. Approximate Total Present Covered Storage Used	12,551,900	12,551,600
7. Net Deficit in Quintals	0	2,956,500

Line 1 - Source - 1969 - Estimate Ministry of Economic Affairs
(Supplied by DEAEJ)

1975 - 1969 Compounded at 5.3% (Rate from Same Source)

Line 2 - Troin, J. F. - Culture Cerealieres, 1968

Line 3 - Line 1 X Line 2 \div 100

Line 4 - 1969 - Average Imports 5 yrs. 1962-63 to 1966-67 (Probably
Understates the Desirable Volume)

1975 - $\frac{6,625.6}{4,860}$ X 4,086,000

Line 5 - Line 3 + Line 4

Line 6 - Source - OCIC Nov. 1967 Corrected

Line 7 - Line 5 - Line 6

This table does not take into account:

- (1) The time of receipt
- (2) Outbound movements (consumption) during the build up to peak storage quantities
- (3) Supply-demand differences between classes of cereals
- (4) Differences in specific gravity between classes of cereals
- (5) Space for exportable surpluses

These factors all have a bearing on storage space needs and should be taken into account in definitive long range planning.

When calculated as was the above chart annual requirements would be:

	<u>Total Covered Storage Needed In Quintals</u>	<u>New Construction Needed In Quintals</u>
1970	11,979,000	0
1971	12,614,000	62,000
1972	13,282,000	668,000
1973	13,986,000	704,000
1974	14,728,000	742,000
1975	15,508,000	<u>780,400</u>
		2,956,500

Cereal Grain Processing Facilities

The facilities for processing grains reported to be available in Morocco are:

	Number	Annual Capacity in Quintals of Grain
Artisan Mills	4500	6,000,000
Commercial Flour Mills	47	9,791,000
Feed Mills	2	Not Available
Breweries	2	Not Available
Rice Mills	8	Not Available
Dry Corn Meal Mills	2	Not Available

Artisan Mills typically grind cereals for the rural population. The activities of these mills are generally uncontrolled. Dependable statistics concerning their numbers and production were not found. Typically, they do not grind the commercialized grain with which this study is primarily concerned. We believe that they probably grind more than their stated capacity.

The commercial flour mills have a present annual demand largely from the urban population equivalent to a grind of about 7,500,000 to 8,000,000 quintals of wheat (OCIC Data quoted by Ferree, 8 Aug. 1968). At that demand level the quoted capacity of 9,791,000 quintals available is adequate for the present. With an urban population growth of 5.3% per annum, compounded into the future, demand will catch up with stated capacity in about 1972. Long range planning should take that need into account.

The future milling needs of a growing rural population deserves further investigation. Estimated to be growing at a compound rate of 2.6%, this population's requirements have had little or no study. It is not clear how their milling needs are currently being met in total. Their present needs would appear to exceed the 6,000,000 quintals reported capacity of the artisan mills. The total milling needs of the country at present would appear to exceed the 15,791,000 quintals reported above for artisan and commercial mills. Existing reported total capacity appears to be only about equal to total human consumption of wheats with no allowance for the large quantities of barley presumably milled on the artisan mills.

We infer thruout this report that artisan milling is essentially utilized to process grain for the rural population and commercial milling is essentially utilized to process grain for the urban population. We believe that to be correct, but we know it is not exclusively so. There are artisan mills in the cities serving urban people, and certainly some of the product from commercial mills finds its way into rural diets. We have no measure of this interchange, but we believe it to be small.

The study team obtained no significant information with respect to capacity and potential for feed mills, corn meal mills, breweries, and rice mills. Their present activities are not large factors in the total demand.

TABLE 64 Location, Name and Annual Capacities of
Industrial Flour Mills in Morocco, 1968/69 Crop Year

City	Company Name	Annual Grind Capacity (Quintals)
NADOR	Grands Moulins de Benir Ensar	180.000
OUJDA	Ste de Meunerie du Maroc Oriental	171.000
	Minoterie du Rif	105.000
	Grands Moulins d'Oujda	200.000
TAZA	Ste S.L.B. - Minoterie de Taza	150.000
FES	Moulins Zalagh	144.000
	Moulins Fejjaline	180.000
	Grands Moulins Fassis	135.000
	Grands Moulins Idrissia	330.000
	Minoterie Lahbabi	105.000
	Moulins Andalousia	150.000
MEKNES	Moulins du Maghreb	330.000
	Les Moulins de Meknes	216.000
TANGER	Minoterie El Fellah	45.000
	Moulins du Detroit	210.000
	Minoterie de Tanger	225.000
LARACHE	Cie Agricole du Loukos	150.000
KSAR EL KEBIR	Alkazar S.L.	150.000
TETOUAN	Moulin Sidi Mandri	150.000
	Moulin Saidia	150.000
SOUK EL ARBA DU GHARB	Moulin Andalousia	165.000
KENITRA	Moulins de Kenitra	180.000
RABAT	Moulins Baruk	555.000
	Moulins du Littoral	360.000
MOHAMMEDIA	Grands Moulins de Mohammedia	300.000
CASABLANCA	Moulins d'Ain Chok	120.000
	Minoterie Semoulerie Samuel LEVY	180.000
	Moulins du Maghreb	705.000
	Moulins Modernes	480.000
	Minoterie Algerienne	330.000
	Minoterie Marocaine (S.E.M.I.)	420.000
	Moulins du Maroc	150.000
	Minoterie Royale	54.000
	Les Minoteries de Casablanca	180.000
	Minoterie Afrikaia	90.000
	Minoterie El Fath	75.000
	Moulin Rachad	45.000

TABLE 64 CON'T.

City	Company Name	Annual Grind Capacity
		(Quintals)
BERRECHID	Moulins de Berrechid	285.000
EL JADIDA	Moulins d'El Jadida	225.000
OUED ZEM	Les Moulins d'Oued Zem	90.000
SAFI	Moulins du Maghreb	270.000
ESSAOUIRA	Minoterie Sandillon	36.000
MARRAKECH	Moulins Baruk	300.000
	Minoterie du Gueliz	120.000
	Minoterie El Abassia	135.000
AGADIR	Les Grands Moulins d'Agadir	255.000
INEZGANE	Minoterie El Atlas (Ait Melloul)	210.000
TOTAL MOROCCO	47 Mills	9,791.000

Source: Office Cherifien Interprofessionnel Des Cereales.

MOROCCO

MAJOR FLOUR MILLS Location and Capacities

Legend:

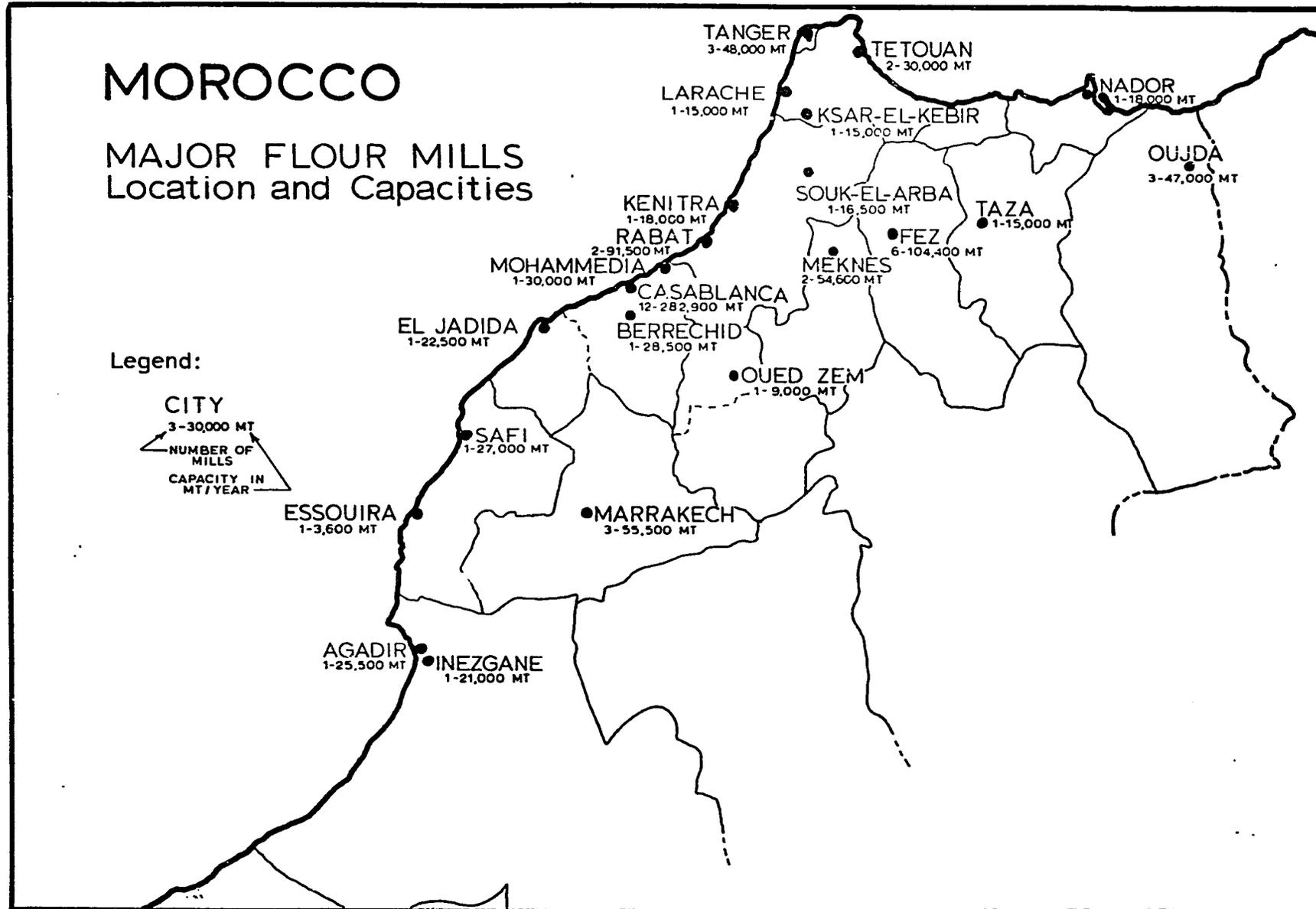
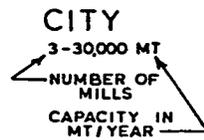


TABLE 65 Comparison of Urban Population, Consumption
and Commercial Wheat Milling Capacities of Provinces

in Morocco, 1968/69

Province	Urban Population	Mill Grind Distributed in Prop. To Urban Pop. (MT)	Annual Milling Capacity (M.T.)
AGADIR	85,190	14,227	46,500
AL HOCEIMA	7,748	2,964	---
BENI MELLAL	389	16,598	9,000
CASABLANCA	1,668,312	278,608	363,900
FES	366,792	61,254	104,000
KENITRA	709,920	118,557	126,000
KSAR ES SOUK	35,496	5,928	---
MARRAKECH	384,540	64,218	55,000
MEKNES	325,380	54,338	54,600
NADOR	24,847	4,149	18,000
OUARZAZATE	14,198	2,371	---
OIJDA	283,968	47,423	47,600
SAFI	159,732	26,675	30,600
TANGER	159,732	26,675	48,000
TARFAYA	4,733	790	---
TAZA	55,610	9,287	15,000
TETOUAN	254,388	42,483	60,000
TOTAL	4,649,975	776,545	979,100

Livestock Population

There is a growing livestock and poultry population in Morocco. Because of inability to purchase, the per capita consumption of meat, milk and poultry products are far below the potential demand. The average diet is deficient in proteins, and particularly in the more balanced proteins derived from animal sources.

Most of the livestock in the country are native strains, managed in traditional ways. They do not make economic use of available feed-stuffs, land, and labor.

Effort is underway to modernize and expand animal and poultry husbandry. Concurrently with success in these efforts, there should develop an increased market for feed grains and by-products, used to formulate balanced rations, to attain proper production from improved strains of livestock and poultry. No evaluation of that potential is currently available.

TABLE 67 POPULATION OF CATTLE, SHEEP, GOATS, SWINE, AND POULTRY IN MOROCCO, 1960-1967

Animals	1959/60				1960/61				1961/62				1962/63				1963/64				1964/65				1965/66				1966/67				1967/68			
	Total	Prod.	Imp.	Exp.	Total	Prod.	Imp.	Exp.	Total	Prod.	Imp.	Exp.	Total	Prod.	Imp.	Exp.	Total	Prod.	Imp.	Exp.																
Cattle	3,070	3,070	-	-	2,800	2,800	-	-	2,562	2,562	-	-	2,701	2,700	1	-	3,331	3,330	1	-	3,435	3,434	1	-	2,901	2,900	1	-	3,066	3,066	-	-				
Sheep	13,500	13,500	-	26	14,000	14,000	-	74	10,000	10,000	-	53	10,000	10,000	-	2	14,000	14,000	-	-	15,000	15,000	-	2	11,000	11,000	-	-	12,000	12,000	-	-				
Goats	8,000	8,000	-	13	7,000	7,000	-	7	6,000	6,000	-	3	6,500	6,500	-	-	7,100	7,100	-	-	7,800	7,800	-	-	6,400	6,400	-	-	6,600	6,600	-	-				
Swine	65	65	-	14	55	55	-	10	56	56	-	3	20	20	-	1	25	25	-	2	25	25	-	1	20	20	-	1	32	32	-	1				
Poultry	13,386	13,000	386	7	13,408	13,000	408	3	13,170	13,000	170	1	13,278	13,000	278	-	14,134	13,000	1,134	-	14,530	13,000	1,530	-	13,685	13,000	685	1	15,627	13,000	627	-				

Source: Statistiques Agricoles 1959 - 1967

Service des Statistiques et de la Documentation

Direction des Etudes, des Affaires Economiques et Juridiques
Ministere de l'Agriculture (le 5 Janvier 1967)

SECTION III

ANALYSIS OF THE GRAIN TRADE

The cereal grain economy of any producing country tends to include some measure of each of the following:

1. Farm Production
2. Farm Marketing or Rural Collection
3. Storage
4. Transport
5. Commercial Marketing
6. Industrial conversion to consumer goods and food intermediates
7. Retail Marketing
8. Consumption

Because each of these activities is related to the others in some degree, we shall discuss each subject to the extent that it appears to affect the intended results of this study.

Farm Production

The moving average chart of cereal production shown in the data section indicates that there has been no marked increase in volume in the recent past. Based upon the introduction of new varieties, the use of fertilizer, and improved practices on the land, production will certainly increase. Agronomists have not presently estimated the average annual rate of improvement in cereal production into the future. It is this unknown increase in volume of production for which we must suggest a plan of storage. To keep pace with the population, it will go up at least 2.74% annually.

While average annual production will go up, the volume produced in any given year will continue to be highly variable due to fluctuating rainfall.

As of this time, the emphasis on production improvement is on bread wheat, brought about by the availability of the new Mexican varieties, however, fertilization and improved tillage practices are expected to result in increased yields for the other grains also.

The high rate of population growth as shown on the charts will result in much of the increased quantities available remaining in the country and utilized by the rural people in the traditional ways. Such amounts will not place an immediate increased burden on the storage facilities available for the commercialized portion. We predict, however, that with each passing year there will be a higher percentage of the crops diverted to commercial channels on the average. This will be brought about by reason of increased urbanization of the population and success in increasing the productivity of the rural people. Such is the history of most, if not all, developing nations. Even the industrialized nations continue such a trend with increasing specialization in agriculture, as well as by industrial workers. Morocco should anticipate, and plan for, such a result from the efforts in development.

Farm Marketing or Rural Collection

The grains that are to enter commercial channels do so by two major routes:

- a. Delivery and sale to a cooperative, or
- b. Delivery and sale to an independent, entrepreneurial dealer at the local, weekly rural market known as a "souk".

On the price-controlled grains -- bread wheat, durum wheat, and barley -- the farmer is usually paid the support price less:

- a. Transportation costs to a designated storage center, estimated to equal DH 0.018 per quintal per kilometer from the point of delivery to the area storage center, used as a basing point by OCIC, the GOM agency charged with inspection, distribution, and general control of the price supported grains in commercial channels, and

- b. A tax of DH 0.70 per quintal, which is levied to help defray the operating expense of OCIC in moving grain from the designated provincial storage points to the processors, or export site.

Indirectly, the farmer thus pays the costs of transportation from the farm to the point of conversion or export.

Farmers typically repay their loans for seed and fertilizer by delivering grain to a cooperative.

The support pricing schedules contain discounts for low test weight and foreign material, thus the usually quoted support price is a nominal price for a standard quality. The average price paid will be lower.

The principal buyers of commercial grain in the souks, taking delivery at the souk are:

- a. The cooperatives, which are essentially government agencies operating to provide a market for cereals at the support prices. Their operation parallels the operation of the "licensed dealers", hereinafter discussed in some detail, except that the cooperatives do not typically engage in any merchandising outside of the price supporting system. They typically accept all price supported grain offered to them unless they are full and their sales to OCIC are shut off by OCIC.

- b. "Legitimate" Dealers, are typically small dealers with no storage space, technically limited to the purchase of 200 quintals per day. They are people with low capitalization. Most of them own trucks. When buying at controlled prices, and selling to "Licensed Dealers" at the designated basing price sites, at the support price, their source of income is limited to the transportation differential. When handling uncontrolled grains or in times of shortage when supported grains are selling at prices above the support level they may also earn a merchandising margin on their purchases of any grain except bread wheat. All commercialized

bread wheat must move through the marketing channels under OCIC control at the fixed, price support schedules. There are believed to be about 2000 to 3000 legitimate dealers.

c. "Licensed Dealers" are merchants and warehousemen with storage facilities. Typically they are well capitalized, responsible businessmen providing a parallel function to the cooperatives in the private sector of the grain economy for price controlled grains. They have an opportunity to earn a merchandising profit or loss on uncontrolled grains. They may earn a merchandising profit on all controlled grains, except bread wheats, if they can find a buyer at prices above the support level. All bread wheats must be tendered to OCIC at the fixed support prices. Other price-supported grains owned by this dealer classification may be tendered to OCIC at 15-day intervals at the support prices. OCIC accepts all tenders of bread wheat. OCIC typically accepts all tenders of other price-supported cereals at the support schedules, but it is not duty bound to do so. At least in some areas it has not been accepting tenders of durum and barley since the first of April this year. If the tender is rejected, the licensed dealer must find another buyer or hold until OCIC again becomes a buyer. When OCIC accepts a tender the licensed dealer begins to accrue income on that portion of his business. He is paid the support price plus:

(1) For handling in and out -- DH 1.0.

(2) For storage, semi-monthly DH 0.275, equal to DH 0.55 monthly per quintal for wheat. For barley, the rate is DH 0.225 per month per quintal.

The wheat storage payment is reported to be made up of an allowance of DH 0.25 for interest on the money invested in the commodity and DH 0.30 for operating expense, overhead costs, and profit. For comparison, the interest payment equals 7.5% annual simple interest, reported to be about the present prime rate in Mexico. The storage allowance equals about \$0.0163 per month per bushel for wheat, and about \$0.012 per month per bushel for barley. The in and out handling payment of DH 1.0 per quintal is about equal to \$0.0545 per bushel of wheat and about \$0.0436 per bushel of barley. Such rates would be quite adequate in the U. S. A. to provide incentive to the private grain merchants if they had any reasonable assurance of sufficient occupancy to amortize the investment. Using \$0.30 per bushel for a new large capacity steel bin annex, \$1.00 per bushel for a new, complete elevator, and \$0.02 per bushel handling expense (including overhead) in an annex and an interest cost on money of 7½%, an American operator might expect a return on his investment for full occupancy (which he would seldom attain) about as follows:

	<u>Annex to Existing Storage</u>	<u>New Storage Elevator</u>
Installed Cost	\$0.30/Bu.	\$1.00/Bu.
Expense - Operating	\$0.02	\$0.034
Interest	<u>0.0225</u>	<u>0.075</u>
Total Expense	\$0.0425	\$0.109
Income from Wheat	\$0.25	\$0.25
Margin before Income Tax	\$0.2075	\$0.141
Income Tax @ 48%	<u>\$0.0996</u>	<u>\$0.0677</u>
Net Profit	\$0.1079	\$0.0743
After Tax Return on Investment	36%	7.4%

Low cost annex construction would be highly attractive with even 50% occupancy with some assurance of continuity. An American would likely hesitate at an investment in complete new space without strong assurance of high occupancy over a long period, either for public use or a merchandising use.

Moroccans might logically be expected to respond to such arithmetic, with some assurance of occupancy. At least one business firm visited was building new space, probably without any promise of use.

As of May 14, 1969 OCIC reported 169 "licensed dealers".

d. Commercial grain processors can buy any grain, except bread wheat, in the souks. As a practical matter, when bread wheats are excluded, there is little incentive for processors to do so and they do not appear to do so in a significant way, except in some years when durum is purchased directly. Artisan millers do buy in the souks.

Storage

Storage of grain on the farm is accomplished in underground earthen pits. The team visited one farm represented to have a typical group of such pits. On that farm there were seven such pits each reported to hold 110 quintals or 770 quintals total. The pits were cylindrical in shape and about 4 meters deep. The entry holes to the pits were nominally about 0.5 meters in diameter through a hard soil structure. The entry holes were about 1/3 to 1/2 meter below grade. After filling, a flat stone is placed over the opening and the depression is covered with soil to a level above grade. We would expect severe deterioration problems due to ground water and insect infestations in such storage. However, we were assured by that farmer that he does not experience such difficulties -- that he has successfully stored grain without deterioration in his pits for as long as four years. The OCIC and SCAM men with whom we discussed the matter support those statements, with one exception. One SCAM man reported considerable "rot" in farm pits due to the unusually heavy rainfall of the past year.

We cannot explain the reason why ground water does not create a constant heavy loss in underground earthen pits.

We postulate that insects do not create a problem in such pits because:

a. The temperature remains low in them, probably about 18° C (65° F). While grain insects can reproduce at that temperature, activity is low.

b. The thick cover over the grain approximates a hermetic seal.

Respiration of the grain will result in a low oxygen - high carbon dioxide atmosphere which either kills or greatly inhibits insect activity.

We do not deem such farm storage to be good storage based upon all of our prior experience, but neither can we demonstrate any inadequacy from the limited observations we have made. The investigations and samples seen are not statistically adequate to form any firm conclusion as to the losses incurred and damage done to cereal grains held in such storage.

Large quantities entering commercial channels, after the harvest movement, are reported to come from these farm pits.

One consultant stated that he personally knew of a lot of wheat that had been stored for twenty years in such pits without deterioration.

We asked to see representative samples of the storage space used for commercial grain. As a result we visited ten grain storage properties -- four cooperative properties, two port elevators, three wheat flour mill storage structures, and one "licensed dealer" storage property. Every commercial property visited was an excellent property for the safe storage of grain. There appears to be an understanding of requirements for pest control for normal operations of handling one year's crop.

We visually examined many samples of grain in passing through these properties. We could observe some evidence of past or present insect activity in most of the samples, but in only one sample did we deem the level of activity to represent a severe infestation that would result in significant loss. That sample of wheat was reported to be from a lot carried over from the 1967 crop. We interpret that observation to constitute a warning that the insect control practices that produce reasonably good results for a current crop may well be quite inadequate to protect a sizable carryover, such as Morocco is faced with from the bumper 1968 crop.

There were no observations of rodent pellets within the grain samples inspected. Although an occasional rodent pellet and occasional rodent track was observed within the covered storage buildings we observed no serious evidence of rodent activity in covered space. We did observe much evidence in most of the horizontal warehouse space of cats and cat feces contaminating both grain and grain storage areas. Cat contamination of grain is as intolerable from a sanitation viewpoint as is rodent contamination. Cats should be eliminated from the interior of grain storage properties and dependence placed upon other, more acceptable methods of rodent control.

For practical purposes it can be said that all of the covered space normally used for grain storage, per se, is full of 1968 crop grain. There are large quantities of 1968 crop grain still on the ground. All of such piles observed were on paved surfaces and were canvas-tarpaulin-covered. All of such piles observed showed evidence of water damage on one or more of the lower tiers. An observation of two rodents was made in one pile that was being broken down to move it into covered storage. Significant losses are accruing, in our opinion, in grains stored in the open under tarpaulin cover.

The typical vertical silo storage is of concrete construction and very well equipped, including quite complete grain cleaning equipment. They are, on the whole, better elevators than are used in the U. S. A.

The horizontal storage is typically of concrete to the roof line topped by a metal or asbestos fibre (Transite) like tile roof. Some have concrete roofs. Storage within these structures is typically bulk, enclosed by a wall of bagged grain about three bags thick. Due to import duties charged, bags are very expensive at DH 3.00 to 3.5. It is more economical to dump and refill bags at a cost of about DH 0.14 per bag than it is to store in bags.

Income to the storage sector of the grain trade was discussed as part of the function of the "Licensed Dealer".

While we believe the normal grain storage facilities of Morocco to be substantially full of 1968 crop grain as the 1969 crop harvest is starting, we do not believe that the potential resources for storage are being adequately utilized. 1968 crop grain is still on the ground, with 1969 crop grain about to start to market while many potential storage structures are not being used, or are being used below their potential.

For example we believe there to be excellent covered space for many thousands of quintals in the hangars, fuel tanks, and miscellaneous buildings, including housing, located on the abandoned American air bases, such as Nouasser, Benguerir and Sidi Slimane. The Moroccan Army has idle air base facilities that would appear to have a large potential for good temporary storage. There may also be space at former French air bases at Marrakech and Meknes.

The port dock elevators were less than half full, with the empty space apparently held open to accommodate ocean movements that are not in sight. Of approximately 390,000 quintals empty storage space at Casablanca and Safi only 100,000 quintals of space were actually committed to an inbound shipment to Safi. The thinking behind such use is that these are "transit" houses and not storage houses. They can quite well become "storage" houses, with space for "transit" carefully planned for known shipments, when grain is rotting on the ground

A space emergency exists now. All Ministries of the government should be required to cooperate to solve it in much the same way that the General Services Administration of the United States Government would function to help solve a space problem in the U. S. A.

A price support program that performs its most useful function provides protection against disastrous price declines when producers succeed in producing crops in surplus of current needs. By the very nature of the operation, the support agency assumes the risk of loss when support prices operate to pay more for the grain than it is worth in the competitive markets open for the sale of it. Certainly a worthwhile function of a support program can be to carry over a surplus as insurance against crop failures in the succeeding year. When the surplus carryover exceeds the need for reasonable protection from Acts of God in the succeeding crop, then the costs mount for storage, interest, losses of grain increase, and the price support agency tends to become an unwilling commodity speculator (or gambler) on world markets. Even if prices do increase, the added costs and losses incurred by storage may well wipe out any real value from such improved prices. Burdensome surpluses also tend to force more storage construction than a well ordered marketing system needs. This, in the case of Morocco, will tend to result in greater dependence on foreign loans for capital needs, and postponement of much more profitable capital construction.

Amounts paid for commodities in burdensome surplus by a support agency are, in economic parlance, "sunk" costs. Typically there is little to gain and much to lose by delaying recognition of the fact that the loss exists whether accepted on the books of account or not. The obvious answer to that reasoning is, take the best action available to limit the loss.

The carryover of barley from the 1968 crop would certainly seem to exceed any reasonable need for supply insurance. The durum wheat carryover may be higher than insurance needs.

Transportation

Morocco is happily endowed with an excellent transportation system. Good roads are generally available to all of the important grain producing areas. Most of the transportation of grain from the rural souks all the way through storage and processing is by motor truck. The private sector provides a part of the motor fleet, the cooperatives a part, but the major portion is provided by the National Office of Transportation (ONT). Vehicles observed appear to be in good condition and adequate for the work.

A railroad system of some use to the grain trade stretches from Marrakech in the South to Tangier to the North.

The principal ports for grain imports and exports are Agadir, Safi, Casablanca, Kenitra and Tangier. Of these, only Safi and Casablanca have facilities for the discharge, storage, and loading of grain in bulk. Grain entering or exported from the other ports is handled in bags. Casablanca is the most important port, probably handling about 50% of the grain moving by water.

We were exposed to no problems of significance in grain transportation. We know of no reason to further consider that factor, other than a cautionary note to consider transport in the selection of sites for future construction.

Commercial Marketing

The principal marketing agency for commercial grain in Morocco is OCIC (Royal Interprofessional Office of Cereals), an agency chaired by the Minister of Agriculture and directed by a board selected from Government, industry and agriculture. This agency is charged with operating the price control system, and controlling the distribution of grains that enter that system. It is the buyer and the seller of cereals that enter the price support system. It therefore controls the movement of most of the commercialized wheat and barley. It is also the agency that imports and exports most of the price supported grains. It controls weights and grading in the primary markets, the souks.

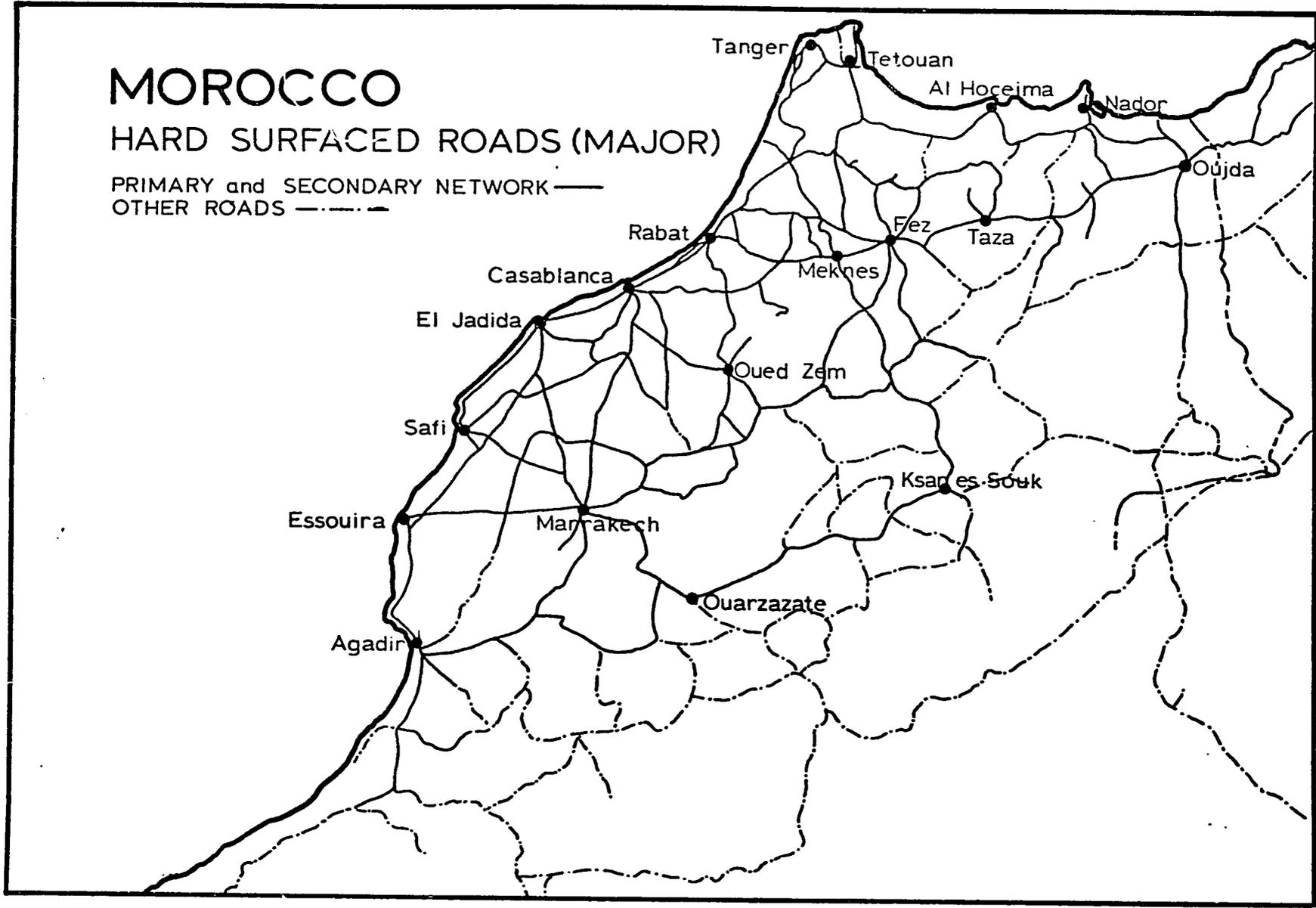
OCIC is financed primarily by the producer tax of DH 0.70 collected at the time of sale of controlled grains by the farmer; profits made on the importation of grain; and by deficit financing, if needed, from the general treasury.

With the exception of the Safi port elevator, OCIC generally does not directly own or control storage space. It provides for payments of storage costs to the "licensed dealers" and cooperatives for grain that it has contracted to buy.

MOROCCO

HARD SURFACED ROADS (MAJOR)

PRIMARY and SECONDARY NETWORK ———
OTHER ROADS - - - - -

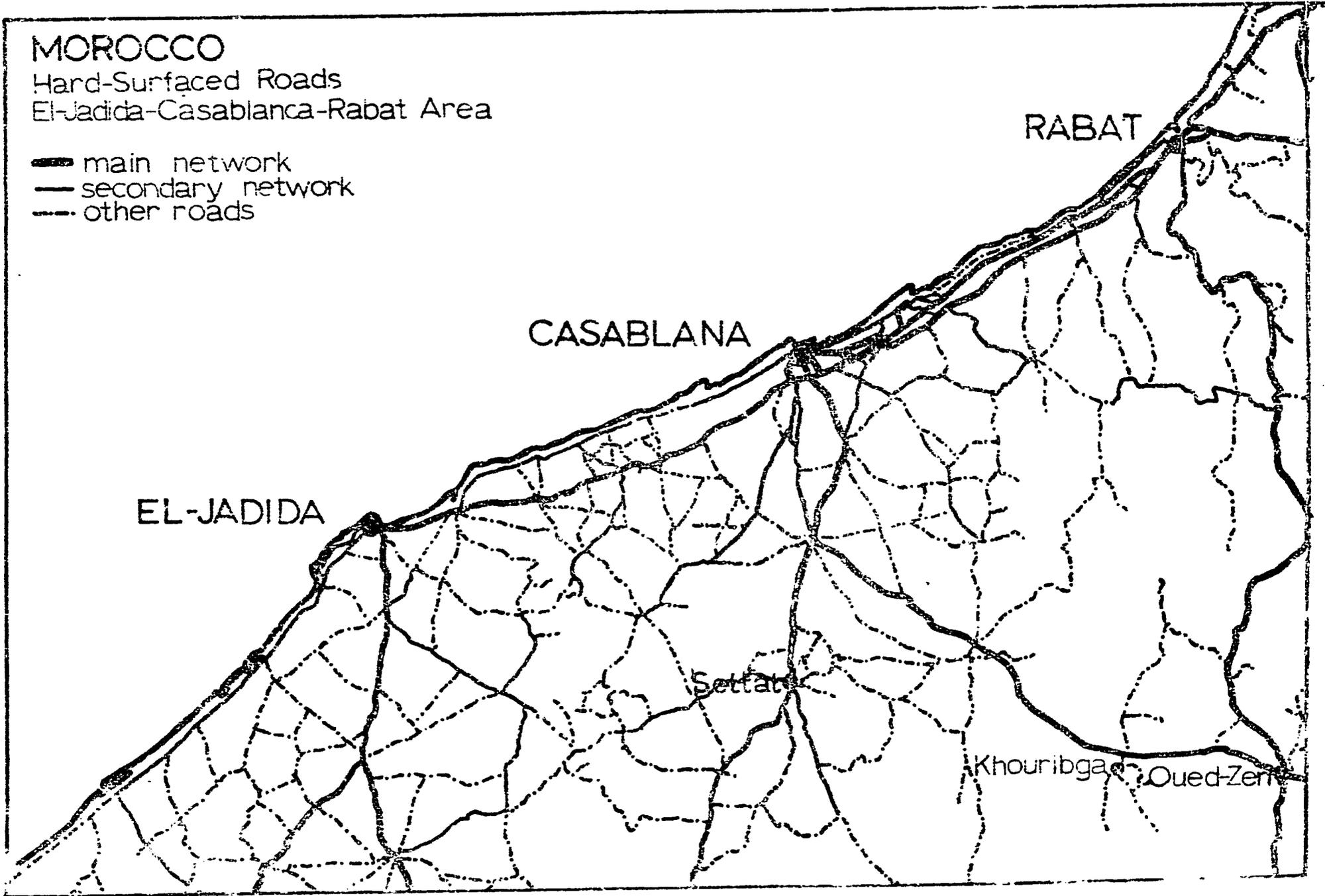


MOROCCO

Hard-Surfaced Roads

El-Jadida-Casablanca-Rabat Area

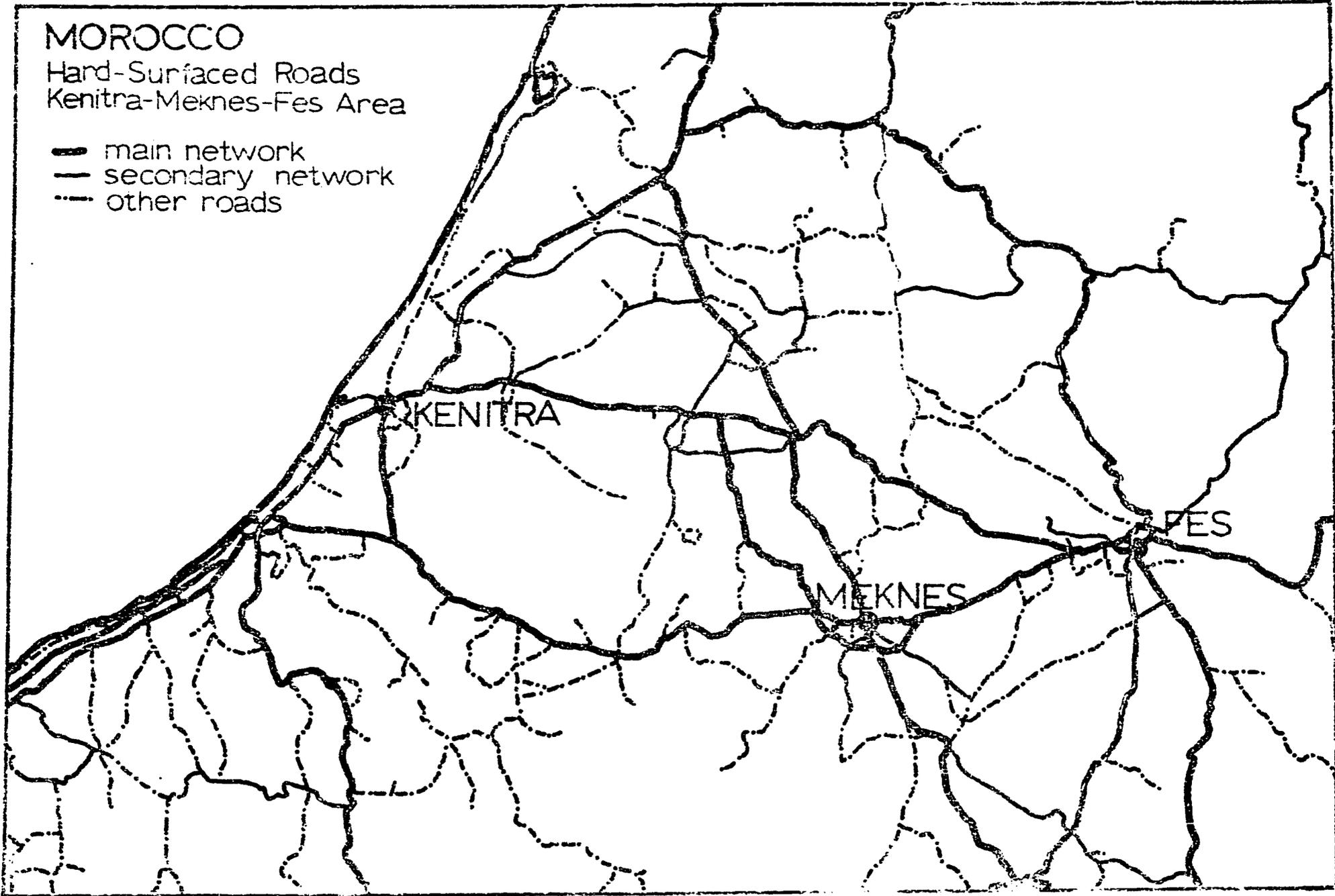
-  main network
-  secondary network
-  other roads



MOROCCO

Hard-Surfaced Roads
Kenitra-Meknes-Fes Area

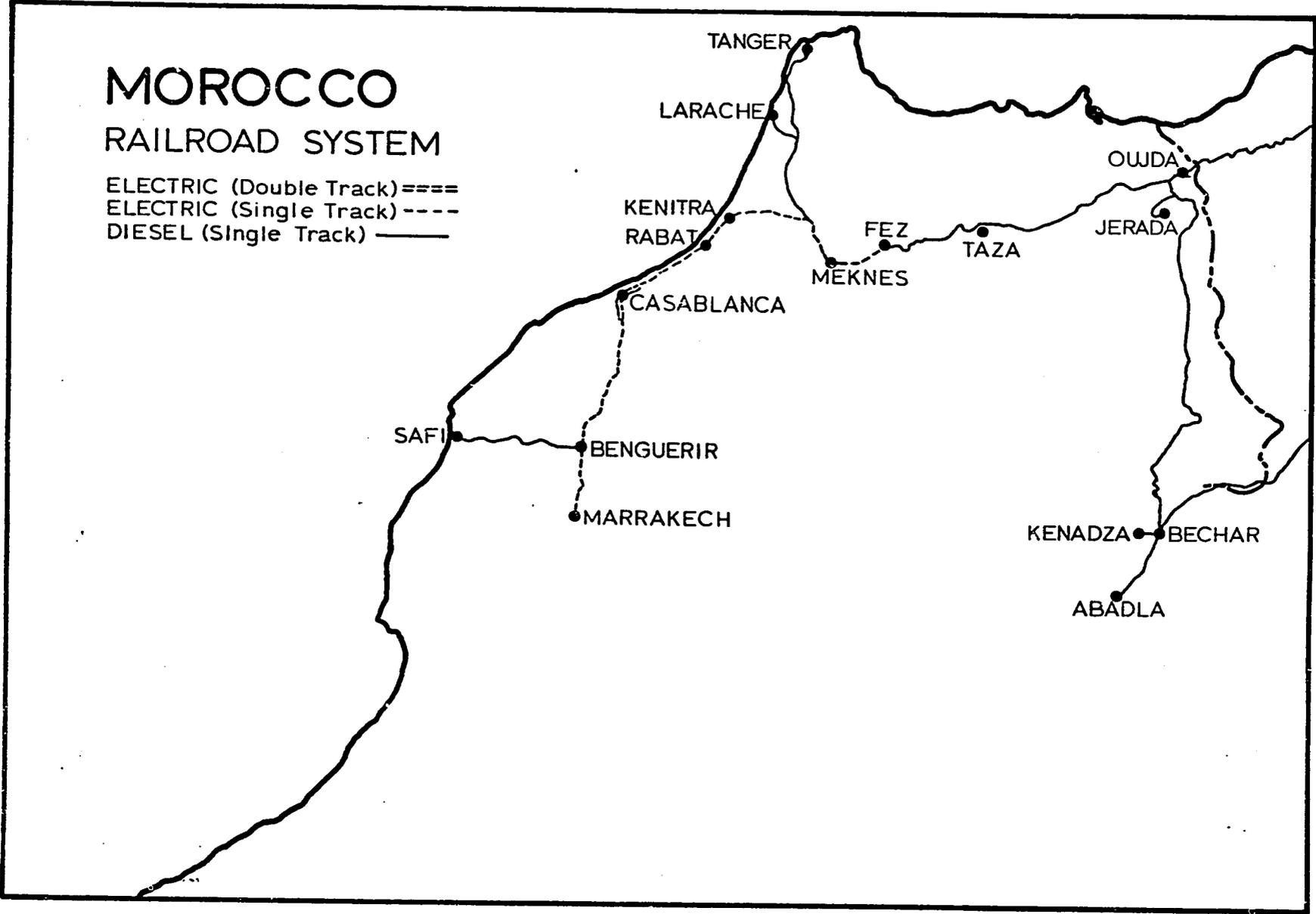
- main network
- secondary network
- other roads



MOROCCO

RAILROAD SYSTEM

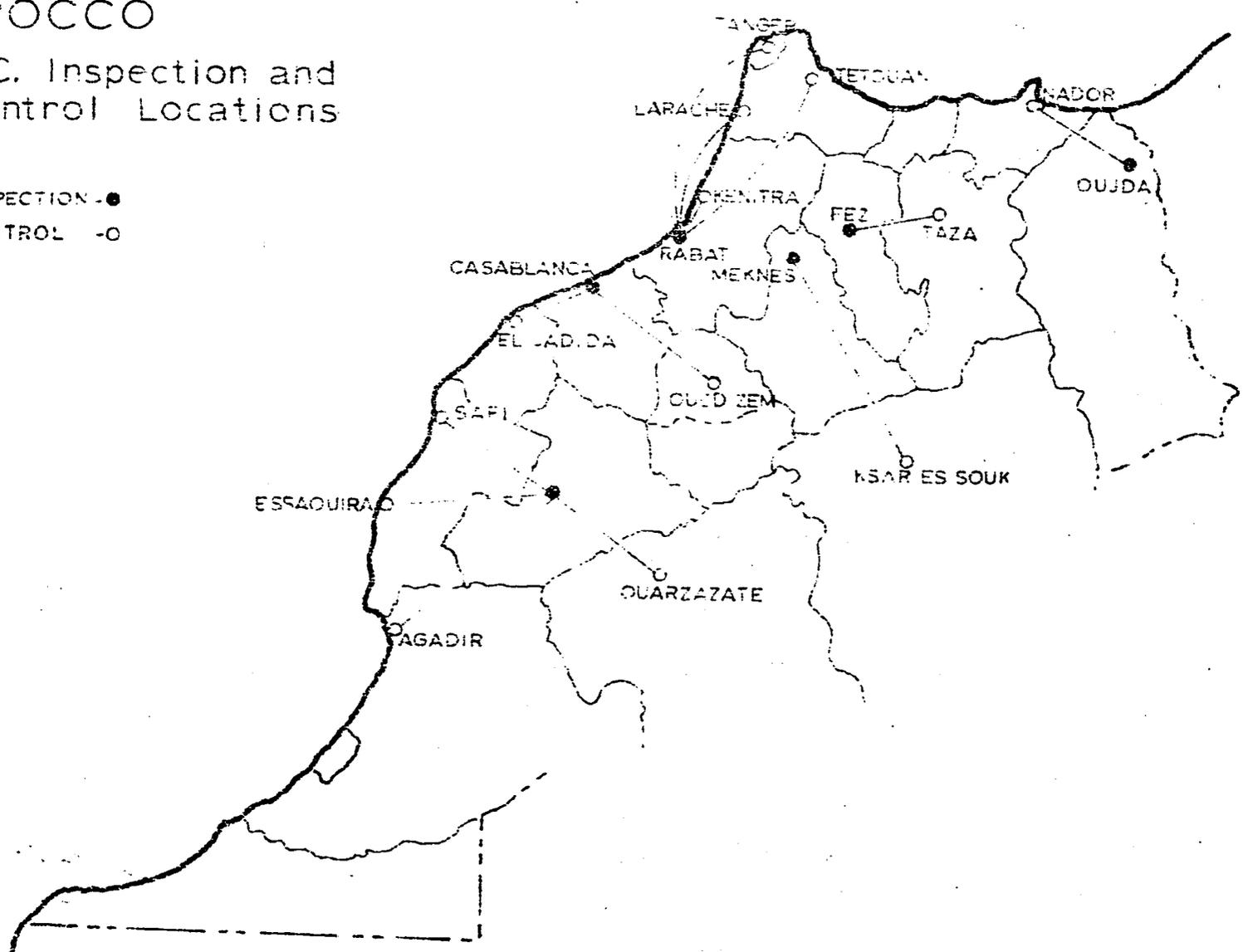
ELECTRIC (Double Track) =====
ELECTRIC (Single Track) - - - - -
DIESEL (Single Track) —————



MOROCCO

O.C.I.C. Inspection and Control Locations

INSPECTION - ●
CONTROL - ○



Source: Kebhaj, A. K. (1963) L'Economie Cerealiere au Maroc, Etude Statistique.
Office Cherifien Interprofessionnel des Cereales.

OCIC considers offers to sell from licensed dealers and the cooperatives twice monthly. In fulfilling its function of controlling producer - consumer prices and providing supply-demand control, it is a willing buyer of wheat and barley, most of the time. It can reject tenders as it has recently in the case of durum wheat and barley.

OCIC pays transportation costs from storage to the mill, port, or other point of delivery. It thus provides inter-provincial balance of supply vs demand without direct penalty to the processor or consumer.

Although industrial processors may bypass OCIC in satisfying their needs for grains, other than bread wheat, there is little incentive to do so; therefore, most of the volume of commercialized supported grains move to the processors through OCIC. The storage and handling fees paid by OCIC thus represent the principal income of the storage segment of the grain trade, with little opportunity for merchandising profits in the controlled grain. Merchandising profit from the controlled grains, other than bread wheat, can only be earned when buyers are willing to pay more than the support price on infrequent occurrence.

In fulfilling its supply function, OCIC is usually an importer of bread wheat. In recent years such imports have been largely under the U. S. PL 480 program. This grain usually has a landed cost below the support price for domestic bread wheats. By selling this grain at the support prices OCIC earns a profit with which to help support its domestic operations.

To the extent that increased production of bread wheats can satisfy internal needs, some improvement in the Government's financial problems should eventually accrue even though much, if not all, of the PL 480 grain enters under a title requiring payment in domestic currency or as a grant in aid.

The support prices for cereals are criticized by producers and their organizations as being below the costs of production, yet they are presently above world prices. OCIC cannot presently export burdensome surpluses without incurring substantial losses on such sales. If such losses are not taken, the costs of storage (both in capital for construction and in expense), plus storage losses may well exceed the present disturbing price differential.

To the extent that rye might be grown in considerable land areas presently devoted to barley without disturbing wheat volume, both the problems of a burdensome barley supply and the financial problem of importing bread wheats might be helped, during the period of development of an improved domestic supply of bread wheats.

White rye flour may be successfully used as a diluent in breads of the type Moroccans prefer. In Germany, 5 to 15% of the flour component of such breads is used by choice.

Industrial Conversion

Morocco is reported to have about 4500 "Artisan" mills providing uncontrolled milling of grains principally for rural people. They were reported in 1962 to have a capacity of about 6,000,000 quintals annually and perform about 50% of the cereal grain milling nationally at that time. While such mills provide much of the milling capacity for the total food supply they do not mill commercialized grain in the normal course of events and are outside the general scope of this study.

Morocco presently has 47 commercial flour mills that do mill the wheat of commerce. They are excellent, modern mills generally supplied by the European mill builders. They appear to be strategically located and appear to have adequate capacity to serve the present needs of the country. More capacity will be needed as the population increases.

Moroccan flour mills are required to maintain a grain inventory of 23 days supply and a flour inventory of 7 days supply. Some plants have capacity for more storage than the requirement, but little or no incentive to fill their houses. Consideration should be given to offering flour millers the standard storage fees for all grain they will store in wheat or flour form above the 30-day requirement for the duration of the storage emergency. Such grain should, of course, be grain they will eventually grind in their own plant.

There are reported to be two corn meal mills, two feed mills and two breweries in Morocco.

Certainly the greatest success in the development of a nation tends to come from the upgrading of its raw materials, to a form as nearly that in which it is consumed, as it is economically practical to attain. Morocco has abundant opportunities to accomplish this upgrading in its agricultural raw materials, including the cereals. It is beyond the scope of this study to delve into the possibilities very far, but we would be remiss if we did not at least mention obvious opportunities. Each one needs detailed feasibility studies to prove or disprove the opportunity:

a. Development work is progressing in modern livestock and poultry production. A valuable concurrent development could be formula feed production, including the specialized installations for fattening lots. We do not envision profitable use of formula feeds in the traditional livestock industry. In the team's limited exposure to Morocco we believe the following useful ingredients to be either available or capable of being made available in some volume in the foreseeable future:

- Grains - Barley, Corn, Sorghums, Oats.
- Wheat Mill Feeds.
- Grain Screenings.
- Citrus Pulp.
- Beet Pulp.
- Beet Molasses.
- Fish Meal.
- Meat Scraps (possibly).
- Salt.
- Calcium.
- Tankage (possibly).
- Alfalfa Meal.
- Cottonseed Meal.
- Brewer's dried grains.

We have seen or heard of no likelihood of the following important items being available internally:

Soya Bean Meal.
Micro Supplements, including vitamins, minerals and medicaments.
Linseed Meal.

Detailed study of opportunities for the formulation of balanced rations may develop many opportunities as well as many problem areas.

b. There may be an opportunity for the development of a wet corn refinery for the production of starch and corn sugar derivatives.

c. Morocco imports its grain distilled spirits. While there is a religious problem involved in the manufacture, distribution and consumption of alcoholic beverages, domestic wineries and breweries exist, and apparently do well. There is an internal demand for spirits now satisfied by imports. This is a drain on foreign exchange and affects the balance of payments. Grain distilleries may make good sense on the same basis that wineries and breweries operate. There may also be an opportunity for grain based industrial alcohols, although in most countries cane molasses based alcohols provide the most economic source.

Retail Marketing

Rural and some city retail marketing of grain and grain products involving the artisan milling of grains is uncontrolled and outside the scope of this study. Cereals move through the souks and from the farms to these mills and back to the farms or homes for consumption. Much of the wheat and most of the barley for human consumption moves through these uncontrolled channels.

Commercialized bread wheat flours are tightly controlled in price through the bakeries to the consumer. Semolina prices from commercial sources are also controlled through to retail.

We have observed nothing in our reading or visits with respect to the retail movement that are relevant to this study.

Consumption

Bread wheats typically are in short supply in Morocco. Bread and semolina are staples in the diet. Rural people typically retain their needs for cereals in the country and market only their surplus. This means that the rural cereal supply is more stable than the urban supply. With the existing system of marketing, practically all surpluses will end up in commercial channels and all shortages will likewise first be reflected in the commercial supply. If crop failures reduce the available supply below rural needs then, of course, that segment of the population also suffers a shortage. The point of importance to be made is that the commercialized supply and thus the urban consumers' supply takes the brunt of the large fluctuations in production due to variable rainfall. This means that storage space for the commercial supply and the urban population will and does experience highly fluctuating occupancy rates. This means that the bulk of the imports will tend to be to feed the urban population.

Per capita consumption of cereals is high in Morocco. With a rapidly growing population and urbanization of more of the population constantly the need for more grain in commercial channels will continue to increase for a long time into the future. It can be expected that eventually success in the development of the Moroccan economy will result in higher per capita income. With higher incomes and the availability of more food items through development, diets become more diversified. Per capita consumption of cereals then tends to decline. The point where that expectable result could affect the need for more grain storage space appears to be beyond the foreseeable future. The combination of population growth, urbanization, and increased land productivity almost insures a continually increased demand for storage space to feed the urban population and handle such surpluses as may accrue for supply assurance and export.

Troin, 1968, estimated real per capita consumption of cereals by the urban population to be 150 Kg. per annum, by the rural population to be 250 Kg., and the national average to be 225 Kg. He shows a national demand for cereals as of 1967 as follows:

	<u>Quintals</u>
Human Consumption	31,500,000
Seed	4,000,000
Animal Consumption	4,000,000
Losses and Unaccounted Uses	<u>1,500,000</u>
Total	41,000,000

Only in 1968 has the production reached that level in total. Deficits have been made up by imports. Of consequence to planning is the greater disparity between the supply-demand history of the specific major cereals. Bread wheats have been perennially in short supply. Troin's data reduces to a demand for all uses of 293 Kg. per person. The TVA report, 1967, quotes Corty data showing an eight-year average total disappearance per capita as follows:

	<u>Kg. per Person</u>
Soft wheat	40
Durum wheat	70
All cereals	232.5

Use and disappearance data are not well refined; therefore, this too provides a nebulous basis on which to predict needs for grain and storage space.

Using the annual consumption figure derived from Troin of 293 Kg. per capita consumption, we find a total demand in 1975 of 52,043,000 quintals. Using Corty's disappearance figure of 232.5 Kg. per capita, we find total demand in 1975 of 41,297,000 quintals. 1975 population of 17,762,100 was used for those derivations. By using Corty, we attain a 1975 figure almost exactly equal to what Troin says was needed in 1967.

When one plots total disappearance of cereals in order of ascending disappearance for the eight years 1959-60 to 1966-67 and then plots per capita disappearance on the same graph, nearly parallel ascending trend lines appear. The inference that may be taken, for further verification, is that through those eight years, actual potential demand was never satisfied. 1960-61, a year of crop failure, and apparently of famine, should probably be removed from the calculation. It will be revealing to see how the data for the 1967-68 crop, a bumper crop year, contributes to the trend lines so calculated. Surely that crop should be sufficient to satiate demand, if ability to pay does not limit consumer purchases. There is also reason to believe that the farmer himself typically consumes less than he and his family would like, because of his pressing need to convert as much of his crop as he can possibly spare, into other goods and services.

SECTION IV

RECOMMENDATIONS

Review of the grain storage and utilization situation in Morocco presents two clearly defined problems for solution:

1. The glut of grain filling most of the available space that has been used for grain storage in the past, resulting from the bumper 1968 crops, leaves very little covered space available for the 1969 crops. They are being harvested as this is written. The commercialized portion of the new crop must be stored largely in space that has not been used for grain storage heretofore, or on the ground.
2. Modernization of cereal production methods and improved varieties should yield a constantly increasing volume of grain to be handled by the commercial sector. Plans need to be laid and activated to provide for the economic storage and marketing of the increased quantities projected.

We shall discuss these two problems as separate entities and suggest the best solutions apparent to the team.

The Present Burdensome Surplus

The existing storage agencies, the cooperatives, and licenses dealers know how to store grain satisfactorily. They simply need to have a place to store it. Uncovered storage on the ground, or paved areas, is not satisfactory for longer-term use. Losses inevitably occur that cost more than suitable space if the time in the open extends for very long periods. Moisture, insects and rodents are the primary causes of loss. The safe time is largely dependent on the rainfall that occurs or may occur. Large storage space construction should not be undertaken simply to provide for the fortuitous circumstance of a bumper crop, such as 1968. Solution of that kind of a happy situation should be attacked by an all-out effort to find and use covered, temporary space. Almost any kind of a sound structure can be used to store some quantity of grain, in some way.

The following suggestions are made to provide adequate covered storage for the immediate situation:

1. Availability of Space in Other Government Agencies. We recommend that every agency of government be required to examine all of their building space and offer all idle space for the temporary storage of surplus grain. Of specific potential use is all of the idle space on abandoned foreign air bases including hangars, warehouses, fuel storage tanks, housing, and miscellaneous buildings. All Moroccan army and air base idle facilities should also be considered eligible for use as temporary storage. It is not necessary

to incur significant changes or damage to any structure for it to accommodate grain on a temporary basis. A cautionary note is essential with respect to idle fuel tanks. They must be thoroughly cleaned to remove all traces of petroleum odors. Grains absorb any trace of petroleum odors and can become unfit for use if exposed to it. Fuel tanks with floating roofs would have to be raised by jacks or cranes and anchored in place. Some such tanks are equipped with top anchoring means. Accomplishment of raising and anchoring these roofs should not present a significant engineering problem. Engineering consideration should be given to permissible floor loading in each structure to be used for temporary storage. This evaluation is well within the capabilities of engineering talent available within the government agencies. We believe that this storage emergency has a potential for serious financial loss to Morocco. For that reason, we recommend that the Prime Minister's support be sought to insure that all agencies, including the military, cooperate to help solve the temporary situation by finding and offering available space.

2. Port Elevators. We recommend that on a temporary basis, for certain, and probably for the foreseeable future, port elevators at Casablanca and Safi be fully utilized as storage houses whenever grain would otherwise be in the open. This simply requires careful planning of operations to make certain that minimum "transit" space is made available to accommodate specific known ocean shipments.

3. Flour Mills. We recommend that flour mills be induced to fill up their grain storage and their flour storage by extending to them the standard DH 0.55 per quintal per month for all storage of wheat and flour they accept over and above their required 30-day inventory. The grain put in mill storage should be grain they can and will mill because they are not well equipped to reship it.

4. Public Warehouses and Other Businesses. We recommend that the standard storage rate of DH 0.30 for wheat and DH 0.225 for barley (not including the interest component of DH 0.25) per quintal per month and the handling fee of DH 1.0 per quintal be extended to all public warehousemen and to all industrial or commercial businesses who may have idle space. Ownership of the grain would remain in the cooperatives and licensed dealers. Offers to rent space should be actively solicited by direct contacts, and possibly by advertising, to fill such needs. It would appear that OCIC would have to conduct such a search and control the movements in and out. Licensed dealers and the cooperatives would have to supervise the storage and handling, and own the grain. An additional payment in the magnitude of DH 1.0 per quintal, plus the interest payment of DH 0.25 per quintal, would probably have to be paid to the cooperatives and dealers to provide incentive for them to use the space. Because of cost, such space should probably be emptied first.

5. Improved Inspection and Fumigation. Longer-term storage of burdensome carryovers poses a new hazard of serious insect losses compared to prior experience. We recommend an improved inspection and fumigation system, as follows:

a. Initiate an inspection program to maintain a continuous check on the condition of grain being held in storage. It is particularly important that the grain being carried over from the 1967/68 crop be closely checked for the presence of insects, rodents, and mold development. The present practice of fumigating grain shortly after it is placed in storage and again nine months later appears generally to have maintained grain stocks, under the storage conditions in Morocco, in relatively good condition from the standpoint of insects. To reduce the risk of serious losses in the carryover stock due to insects, the following general plan of actions should be followed.

(1) Silo storage.

(a) If temperature monitoring equipment is available in the silo bins, records should be made of the grain temperatures in the bins at least every month. If localized temperature increases are noted in a bin of grain, the cause should be determined. Sharp localized temperature increases will occur under two conditions. First, if large numbers of insects are present, their respiration will result in a localized temperature increase. This condition can be corrected by fumigation of the grain. Secondly, the temperature increase may be the result of mold growth in pockets of damp (high moisture) grain. Fumigation will not correct this situation. Moving the grain from one bin to another during the cooler parts of the day will tend to break up the "hot spot" and redistribute the high moisture grain. This grain should be watched carefully and, if a tendency toward heating recurs, it should be utilized at the first opportunity.

(b) If temperature monitoring equipment is not available in silo bins, grain that has been in storage for more than one year should be moved from one bin to another at least once every three months after it was last fumigated. As the grain is "turned" from one bin to the other, a representative sample should be taken from the grain and examined for the presence of live insects. This can be done by having an elevator worker scoop small samples of grain from the belt or conveyor discharge periodically as the grain is turned. The grain samples should be sifted, using a screen with openings approximately 0.083 inch in diameter (screen with 10 wires per inch). Live weevils or grain borers in the sample are indicative of potential hidden infestation and the grain should be fumigated. Fumigate also if more than two other grain insects per kilo. The samples should also be checked for the presence of mold. If there is evidence of mold development, the grain should be disposed of as soon as possible.

(2) Bulk stored grain in warehouses.

(a) Grain which is stored in large bulk quantities using horizontal bins or bins formed by using sacked grain as bulkheads should be checked for the presence of insects and/or deterioration.

(b) The exterior of the sacks forming the bin for the bulk grain should be examined for the presence of live cereal-infesting insects monthly. Samples should be taken at random from the sacks forming the bin wall. Samples should also be taken from the surface of the bulk grain and examined for insects monthly. These two areas are the most susceptible to insect migration from other stores of grain that may be infested or from other sources.

(c) Grain from within the bulk portion should be checked for insects and/or deterioration due to mold every three months by taking samples from within the bulk of grain using "probes" or "triers". Samples can be taken from depths up to 18 feet (6 meters) using this type of equipment. Probe samples should be taken at about 9-13 feet (3-4 meter) intervals over the surface of the grain. If live insects are found, the grain should be fumigated.

(d) Temperature-measuring equipment may be used as an alternative to probe sampling of the grain. Portable temperature-sensing cables can be probed into the bulk grain and temperature readings taken. Individual cables can be placed in the grain and left in place while the grain is in storage or one cable can be moved from one sampling point to another. Temperatures should be measured at 5 foot (1.5 meter) intervals vertically and about 9-12 feet (3-4 meters) horizontally throughout the grain mass.

(e) If "hot spots" are detected, the cause of the heating should be determined by probe sampling. If insects are the cause, the grain should be fumigated. If damp grain is the cause, the grain should be moved before extensive deterioration occurs.

(3) Sack-stored grain in warehouses.

(a) Grain which is stored in sacks should be checked for the presence of insects and/or deterioration by visual examination of the exterior of the stack and by trier samples taken at random from bags over the surface of the stack monthly. If live insects are found, the grain should be fumigated.

(b) Samples from the interior of the stack of sacks cannot be taken practically; however, if temperature cables are available, they can be laid in the stack as it is formed.

(c) Every attempt should be made to move stack-stored grain into consumption channels as soon as possible.

(4) Grain with higher than usual moisture content.

(a) During years of high rainfall levels, grain may be harvested and stored with higher moisture content than is normal under average Moroccan climatic conditions. Grain of moisture contents in the range from 13.0 to 18.0% moisture content should be inspected more frequently than indicated in the preceding paragraphs.

(b) The frequency of inspection will be dependent somewhat on the relative moisture content of the grain. For instance, at 18.0% moisture content, the monthly inspections should be increased to weekly intervals. At moisture levels in the 14 to 15% range, the frequency should be increased to two times per month.

(c) The above recommendations apply also to grains which may be imported at moisture levels higher than is normally experienced in locally-produced grains.

b. Fumigation of grain.

(1) Grain should be fumigated on the basis of need determined by the inspection program outlined above.

(2) Fumigation as an insurance practice as is now performed (fumigation at nine-month intervals) is a good practice but should not be relied on at the expense of an inspection program.

(3) Phostoxin has proven to be an excellent grain fumigant and its use in the Moroccan grain storage program is recommended. This material:

(a) Has excellent penetrating and killing characteristics.

(b) Is easily applied to grain as it is moved in silo storage and can be used effectively in fumigating horizontally stored bulks of grain and sacked grain under gas-tight polyethylene tarpaulins.

(c) Is generally less hazardous to use than other fumigants, both from the standpoint of personal safety and of maintenance of grain quality. Unlike some other fumigants, Phostoxin does not affect germination of seeds.

Dosage rates for Phostoxin under normal conditions are as follows:

<u>Type of Storage</u>	<u>Grain Temp.</u>	<u>Dosage/MT</u>
Concrete elevators or steel tanks with turning facilities	54-59°F	5 Tablets
	60-68°F	3 Tablets
	over 68°F	2 Tablets
Flat stores in relatively tight buildings or under polyethylene tarpaulins	54-59°F	6 Tablets
	60-68°F	4 Tablets
	over 68°F	3 Tablets

The manufacturer or his representative can supply literature and/or technical assistance regarding the use of Phostoxin. The distributor in Morocco is:

Société d'Applications Industrielles au Maroc
8 rue de Lisle
Casablanca

The cost is \$0.042 per tablet (DH 0.26).

(4) Carbon disulfide (sulfure de carbone) presently being used to fumigate sacked grain in fumigation chambers is a highly inflammable and explosive material. In addition to the hazard, there is an added cost of moving sacked grain into and out of the fumigation chamber when this method is used. It was indicated in a previous paragraph that Phostoxin can be used to fumigate sacked grains under gas-tight tarpaulins. Phostoxin can also be used to fumigate grain or sacks in the fumigation chambers. It would penetrate the grain and/or sacks better than carbon disulfide, but does have one drawback in that it requires a 3 to 5 day exposure period depending on temperature.

6. Surplus Disposal. We recommend that surpluses above those necessary to provide assurance against crop failure be promptly sold in the best market available to the GOM. The crudest sort of estimating indicates that, if average major cereal production were exactly equal to the five-year average for 1962-66 and the average imports represented the demand deficit, then, if production equaled demand, a carryover of about 4,086,000 quintals at present and about 5,344,000 in 1975 would be necessary to provide average supply assurance. Information is not available to make a proper estimate in which one could have confidence. We submit that the exact quantities to be carried over may not be quite so important as firm recognition of the fact that an effective price support system may provide desirable social benefits but it also has an assured deficit cost at the time it is most needed to protect the producer. The role of the GOM as a speculator or gambler on world commodity prices is not an appropriate one. On average, we would expect the GOM to increase its losses by adherence to that role.

Long-term Needs and Programs

The GOM, with and without foreign aid, is embarked on several programs that we believe will insure increased grain production. The principal ones are:

- Improved varieties
- Use of fertilizers
- Improved tillage methods
- Improved education in total, and in agriculture in particular
- Irrigation projects

It is too early in the development program for growth in cereal production for anyone to be willing to predict improvements to be attained. No serious effort is yet being made on grains other than bread wheat. Disease problems with the Mexican wheat varieties this year cause the agronomists to retrench from estimates that would have been confidently given two months ago for bread wheats. The only thing we believe we know with some assurance is that on average, still buffeted by rainfall variance, cereal crops will increase by some unknown amount. The very crudely calculated space-needed chart, inadequate for definitive planning, indicates that present covered storage is about equal to the food needs of the present urban population, including a carryover sufficient to bridge average crop deficits. The same chart indicates that between now and 1975 approximately 2,000,000 quintals of new covered storage will be needed simply to assure safe storage of the domestic food supply. These calculations allow no space for accumulation of surpluses to be held for speculation. That space will be needed progressively over the intervening years. We do not recommend that the GOM undertake routine construction of the space needed to store such added quantities of grain.

We do recommend for the:

1. Private Sector:

a. Incentives. Incentives be offered to "Licensed Dealers," existing or new, to construct needed new facilities of specific capacities in the specific cities and towns where the space is needed. We believe the present storage and handling rates to be adequate to provide incentive for the private merchants to construct space if, in addition, a guarantee of occupancy of sufficient duration and sufficient volume of stored grain is added to insure reasonable amortization of the investment in construction. It is beyond the scope of this study to prove that the rates are adequate and to calculate guarantee terms that would be needed to provide incentive for such construction by the private sector.

b. Private Bulk Storage. Because we believe strongly in the eventual success of the Moroccan development efforts, we would urge that every reasonable pressure be made to encourage the private sector to build bulk silo space instead of flat warehouse space. At some time in the future, when success is basically attained in raising the income of the Moroccan worker, the handling of bagged grain will be too expensive to sustain. We believe the nominal amounts of new storage needed, routinely into the future, can best be bulk to insure the best long-term return on the investment funds. Because that result is well into the future, we would not make an issue of it. We recommend that the construction of new silo space be limited generally to high capacity--25,000 quintals to 100,000 quintals capacity--vertical, flat-bottomed bin annexes to existing storage properties.

c. Construction Materials. We hold no brief for any specific material of construction. Properly engineered and built concrete storage space provides the best storage conditions and requires less maintenance expenditures over the useful life of the structures. Steel bins, the usual alternative, are entirely satisfactory if properly engineered and constructed. They require more attention to grain condition due to more rapid heat transfer through the thin walls and more maintenance expenditures for paint to prevent rust deterioration.

The decision as to the best material of construction should be based on an engineering economy study which takes into account the constructed cost, using either material. We would pay a small premium only for the advantages of concrete over steel. Such an engineering economy study is beyond the scope of this work. We believe that at least some, and perhaps all, of the talent necessary to make such an evaluation of the alternatives is available within SCAM. However, to be useful, such evaluations must be made without bias to either of the alternatives.

d. Capitalization. We recommend maximum, practical use of available capital from the internal private sector to reduce the demand for deficit financing of capital needs, which are usually dependent upon foreign loans for funding. Repayment of the foreign loans places an eventual burden on the balance of payments and foreign exchange. We would not forego sound projects because of that factor, because judicious use of foreign loans can promote more rapid attainment of economic growth and improved living standards on a sound basis, than would occur if sole dependence were placed upon internally generated funds.

2. Government Sector.

To the extent that the private sector does not respond to reasonable incentives and build the storage needed, then the GOM should.

a. Annexes to Existing Storage. We recommend that this be accomplished primarily by large bulk bin annexes to the existing SCAM storage elevators of the same types and sizes as discussed in "a." above. SCAM silo elevators are excellent structures, generally well-located, and they lend themselves very well to the addition of low-cost, large-volume bins. Through the existence of handling equipment in the fine SCAM properties, maximum protection of the grain can be attained at minimum investment cost. Said another way, a given amount of investment money will protect more of the crop. A general rule, that is usually valid, is to provide storage at a site the very closest to the gathering point that the quantities available will permit of economic storage. In the case of Morocco, this would mean at the secondary regional storage sites. The advantages are usually:

(1) Greater transport economy to more points of use on the outbound shipments.

(2) Greater economic activity in the rural areas and smaller cities tends to slow down undesirable urbanization of the population in some small degree.

In Morocco, those advantages have to be weighed against the investment cost advantage of low-cost bin annexes to existing complete silos in the central cities, if silos do not exist at the secondary centers.

b. Long-range Storage Plan. Accurate definition of the exact amount of new storage that is needed, where it should be located, when it should be built, and the cost of providing it, is beyond the scope of this study. The GOM needs a long-range plan to permit intelligent activation of efforts, both with respect to engineering and finance. Such a long-range plan could not be fully accomplished at this point in time. Sufficient information is not available presently, from any source, to plan actual storage needs in the future. The only cereal grain on which actual serious development work has been undertaken and projections of production made into the future is bread wheat. It is only about 10-15% of the storage problem, and knowledgeable people do not deem these estimates to be safe projections for present investment decisions. The fact that such a plan could not be a definitive document at present does not mean that it should not be started. It is quite useful even to define the unavailable data and thereby establish procedures to obtain it. Such a plan should not be a static document. It should be updated annually in the light of developments in farming and population trends.

We recommend that such a master plan for the cereal grain sector of the economy be started. While there probably are individual talents within the Ministry of Agriculture and other GOM agencies which could effectively develop such a dynamic plan, we doubt that they could be marshalled for the effort. We estimate that a team composed of engineers, economists, and an experienced executive leader capable of directing and evaluating the work would require six to nine man-months of work to complete an initial plan and provide the system for annual updating. Full logistic support from the Ministry of Agriculture, typists, perhaps interpreters, and other like services would be needed in addition. If truly wanted, such a plan might logically be considered for an AID development loan or a grant in aid.

About the best that can presently be done, in the absence of intelligent projections, is one year lagging, after the fact plans to solve problems that already exist. Such an approach does not permit intelligent financial planning nor assure the best use of the available resources. It tends to simply project one from crisis to crisis. That is neither good industrial nor governmental management.

c. Bulk versus Warehouse Storage. The Minister of Agriculture has requested this study team to consider the desirability of designing any new grain storage space in the form of general-purpose warehouses so that they could be used for many other purposes in the event of changed farm production patterns. His concern is a logical one. It is at odds, however, with the premise heretofore stated that the long-term success in development of the Moroccan economy will surely make the laborious filling, handling, and emptying of bags too costly. That may even be so today when the high cost of bags at DH 3.0 to 3.5 each, plus the cost of emptying and refilling them at DH 0.14, is added to the cost of the warehouse structure.

The present national commercial, covered storage capacity used for cereals is about 12,550,000 quintals. Of that capacity about 9,800,000 quintals, or 78%, is in the form of warehouses. Most of that warehouse space is readily usable for commodities other than grain. We recommend that generally the new construction should be in large bin, bulk form. We believe the Minister's concern for multi-use structures can be generally satisfied by management of the available space. Under good management multi-use warehouse space would usually be emptied first, freeing it for other uses. With so much of the total present available space amenable to multi-use, drastic reductions in cereal production would have to occur in any given area before any vertical bin space existing, or that may be built, would become idled. Since new space would only tend to be built in regions where cereal production increases, the likelihood of building orphaned bin space is even more remote.

d. Farm Storage. The Minister of Agriculture requested that this team give consideration to farm grain storage. The work required to provide definitive answers to that question are beyond the scope of this study; however, from the work done we can provide comments and a suggested course of action to provide positive answers.

As mentioned in the analysis section of this report, the underground pits (called "Matmoras") used by the Moroccan farmers were reported, by all but one consultant, to provide excellent protection for grain in storage. That one consultant reported extensive "rot" this year, by reason of the heavy rainfall, of grain from "Matmoras." The true out-turn condition of grain from Matmoras needs to be determined to arrive at intelligent recommendations. The most important elements to determine are the volume of grain lost to insects and to damage brought about by ground water. With that information one can then proceed to determine the best action with respect to farm storage. The following apparant facts may help to guide additional study and action on the subject:

(1) If, and it is a big if, the farmer will care for grain in storage on the farm in such a manner that it enters commercial channels in good condition, when needed, there is probably no better place for Moroccan grain to be stored, than on the farm.

(2) Some, but certainly not all, Moroccan farmers could probably be induced to provide more farm storage by extending the standard OCIC storage and interest rates to the farmer from harvest time (perhaps 1 July) to the time of need for the grain in commercial channels. Grain could be induced out of storage at the time of need by stopping storage and interest payments.

(3) If the study of "Matmora" stored grain proves conclusively that this method does in fact provide sound storage conditions then by all means encourage "Matmora" construction by the storage fee incentive. The obvious advantages of "Matmora" construction are:

- (a) The GOM incurs no capital costs.
- (b) The GOM sustains no direct financial loss due to deterioration or pest consumption, although the society does.
- (c) The farmer has no cost for the storage space other than values placed on the labor of digging.
- (d) The rural population is grossly under employed, so there is no better place to employ labor.
- (e) Storage fees and interest money would be distributed to the farmers at the time of sale. At least 50% of the GOM cereal operation is designed to help the producer improve his income and his operations. Such construction and payments would further that goal by moving money out of the urban, into the rural sector.

(4) If the study of "Matmoras" determines that losses in such storage are untenable then farm storage structures become more of a problem. In general, in countries having steel manufacture, or low cost access to it, the cheapest solution to on-farm storage is prefabricated steel bins. In Morocco the capital cost of such farm bins would present a problem. Most farmers would not have the resources with which to buy them. The GOM would either have to make loans or guarantee loans to provide them. Storage and interest fees could be expected to eventually repay such loans but the incentive for the farmer to incur such debt would probably be so low that no substantial acceptance would result.

For Morocco conditions, a satisfactory alternative to steel bins may exist, that is more attractive. We believe that entirely satisfactory storage space could be built out of the stone and clay materials which the farmer uses to build his home and other out-buildings. Grain storage needs to be water tight, rodent proof, and insect proof. We believe that the materials he has available can qualify with perhaps modest money outlays for roofing material. If a nominal study by agricultural engineers proves this premise, then the financial advantages quoted above for "Matmoras" would apply to above ground farm storage as well.

(5) There is no question about the need to protect above ground stored grain from heating, insect infestation, and rodent depredation. We have no confidence that the traditional farmer would properly use insecticides, rodenticides, or do the checking necessary to protect grain from heat induced deterioration. Those who know the traditional farmer better than we do can judge that problem. We doubt that many illiterates can or will do such work properly, unless they are given on the spot supervision of the work by competent people. That kind of supervision would be a burdensome, costly task.

e. Formula Feed Production. Morocco is starting to move rapidly in the development of its livestock and poultry industries. There will almost certainly be an opportunity to develop profitable formula feed production, to keep pace with modern meat production. In fact, the production of economical balanced rations, by one means or another, is a concurrent requirement for the profitable production of livestock and poultry, under modern competitive conditions. There are available in Morocco many, but probably not all, of the ingredients needed to produce balanced economical livestock and poultry feeds.

With respect to feeds, we recommend:

(1) Feed production and distribution should parallel the development of modern dairy, meat animal, and poultry production. Feed production facilities are not likely to contribute to the traditional livestock and poultry activity.

(2) The most efficient facilities for Morocco are likely to be the low cost, specialized mills producing for a specific segment of the livestock industry. For example, a poultry feed mill for the poultry industry, or a dairy feed mill for the dairy industry.

(3) Locate these specialized mills in the centers of the feed consuming area. Feed ingredients tend to come from all directions to the milling point, therefore, the lowest transportation costs are incurred by locating the mill in the center of the consuming area. For example, if large enough to support it, the very best location for a cattle fattening feed mill is right at the feed lot.

(4) Avoid like the plague any thoughts of a central city, large multi-purpose feed mill. They are not likely to prove to be efficient.

(5) We understand that there are presently two French feed milling firms with mills in Morocco. We have no detailed knowledge of their operations but we believe them to be primarily poultry feed producers in the Casablanca area. Their operations should be taken into account in any assessment of feed potential.

(6) Because there is rapid development activity in modern poultry, dairy, and beef production, we recommend that a detailed study of the feed industry potential be accomplished to define that potential, prepare a dynamic long-range plan to satisfy the needs and capitalize on the opportunities, and define the scope of work for any detailed feasibility studies for construction that might result from the study. We would expect that study to require a feed nutritionist, an economist, an engineer, and an experienced feed executive group leader from 6 to 9 man/months to prepare such a study. In addition, they would of course require the usual logistic support from the Ministry and the Mission.

(7) We believe that the feed industry potential is also a most logical investment opportunity for private capital. For GOM financial reasons, as discussed elsewhere, we recommend that private industry be urged to undertake such ventures. The next most attractive avenue of finance would appear to be Cooley Loans. Government deficit financing would appear to be the least attractive, but still within the realm of attractive development.

f. Corn Production and Utilization. Corn production is presently used for food largely in the form of meal, for animal feed, and for export. More corn could be grown, according to the Mission Agronomist, if there was a good market for it.

There are reported to be two corn meal mills in Morocco, of which this team has no details. There are no wet corn milling starch and sugar plants. Morocco has an internal demand for starches and sugars, now largely satisfied by imports. There is a possible opportunity for the development of a wet corn refining industry with significant benefit to the nation. This team has no details with which to prove the opportunity. There may also be export opportunities. We recommend:

(1) Accumulation of facts regarding imports of starches and sugars for which starches and dextrose from local corn could be substituted, including canning, baking, brewing, paper, textile, and laundry uses.

(2) Discussions between the Ministry and the AID Mission as to whether the facts so derived appear to warrant further study in detail.

(3) If the Mission and the Ministry determine that a potential does exist, then mount a detailed study to define that potential. In addition, the study team would be required to prepare a plan for accomplishment, and define the scope of work for any loan application feasibility studies that might result from their recommendations.

(4) As in the other sectors of the grain economy the best over-all financial result would appear to accrue to the nation through encouragement of private capital to enter this field. This is a highly technical field of food manufacture. It may be necessary to encourage a foreign partner to join with local capital in order to acquire the needed technical skills.

(5) We believe that a skilled study team composed of an engineer, an economist, a corn products food technician, and an executive leader competent to organize and evaluate the work could provide such a study in adequate depth in 5 to 7 man/months, if provided with logistic support in addition.

g. Industrial Utilization of Cereal Products. Beverage and industrial alcohol products from grain appear to offer an opportunity for profitable development in Morocco. This team has no details with which to evaluate the extent of that opportunity. We recommend:

(1) That the Ministry develop information on imports of beverage and industrial alcohol products.

(2) That discussions be held between the Ministry and Mission people to determine whether the findings of the preliminary internal investigation seem to warrant study in detail.

(3) It is reported that there is some internal production of alcohol from beet molasses. This must be taken into account.

(4) If it is determined that a worth while potential does exist, then organize a study to define the potential, suggest a plan for action and define the scope of work required for any feasibility studies needed to support loan applications.

(5) As in other opportunities, the best financial result would accrue to the nation by the investment of private capital in grain distilling. Here too, a foreign partner may be needed to provide technical skills.

(6) A study team consisting of an engineer, an economist, a distillery technician, and an experienced executive might be expected to complete a definitive study in 5 to 7 man/months, if properly supported.

h. Other Long-Range Potential For Human Consumption. There are many other long-range potentials for conversion of grains and grain products to consumer goods, such as breakfast foods, snack foods, convenience mixes, and miscellaneous food intermediates such as breading mixes, food thickeners, etc. We think that most such products can become valuable additions only as the people's income increases through the development effort. We do not recommend that effort be expended on them now.

i. Rye Production and Utilization. Rye is grown in very small quantities in Morocco. Barley is presently in burdensome surplus, and is the cereal most likely to be in surplus. We believe, and the Mission Agronomist agrees, that significantly increased quantities of rye could be grown on land now devoted to barley.

Bread wheat is usually in short supply and the balance needed is imported. Although presently much of imported wheat comes in under PL 480 at very attractive terms or as outright grants, that is a program that will likely end. Economically it can be said that the perennial shortage of bread wheats represents a drain on foreign exchange and a serious contributor to a negative balance of payments. Disposition of burdensome barley surpluses represents a loss to the GOM.

White rye flour is extensively used in Europe as a diluent of bread wheat flour when making rolls and breads of types somewhat similar to those preferred in Morocco. The Europeans use this mixture by choice because they like the moisture absorption and retention properties contributed by the white rye. (Durum wheat flour was also found to be

used in a similar manner, but much less frequently). The Germanic peoples are the principle users of the rye blend. They were found to be using blends ranging from 5 to 15% white rye flour and 85 to 95% wheat flour. Most reporters stated that there was a preference for the lower end of the range of dilution, with most bakers tending to use 5%. At the lower levels there was no discernable rye flavor contribution to the bread. At the 15% level a discerning consumer and the laboratory people could detect slight flavor contributions to the bread. At the higher diluent levels, stronger protein level wheat flours had to be used to retain normal crust, grain, and texture characteristics in the bread.

We recommend:

(1) That baking tests be conducted, sponsored by the GOM, using white rye flour as a diluent, in a range of 5 to 15% of the flour component. Water adjustments will be found to be necessary, particularly at the higher diluent levels. Experienced bakers should judge the baked breads for flavor, eating quality, and appearance by the standards Morocco consumers would apply to the products. With enough experimental work accomplished to adjust the baking procedure for optimum results we would expect to make breads, within that range, that would fully satisfy the consumer.

(2) If the baking tests confirm our expectations, then promote the growth of increased quantities of rye grain, on barley land only. Consider the advisability of offering a support price for rye higher than a farmer could earn from his land by planting barley, but lower than he can earn on wheat land by planting wheat. We do not recommend diversion of wheat land to rye production.

(3) White rye flour can be produced on a bread wheat flour mill, but it is attended with milling troubles unless changes are made in the milling system. Considerably lower grain feed to the mill reduces the milling capacity. Adjustments in compensation to the miller will be necessary during a period of use of bread wheat milling capacity for white rye production. When success is attained, both in rye production, and in consumer acceptance, then some bread wheat milling capacity should be altered to do a good job of rye milling, or rye milling capacity added to the national resource. These are not serious problems. Rye milling technology is less difficult than wheat flour milling and is different.

(4) If the development opportunity discussed above for grain alcohol production should become feasible, increased rye production on barley land would have favorable profit potentials for use in the manufacture of grain alcohol products.

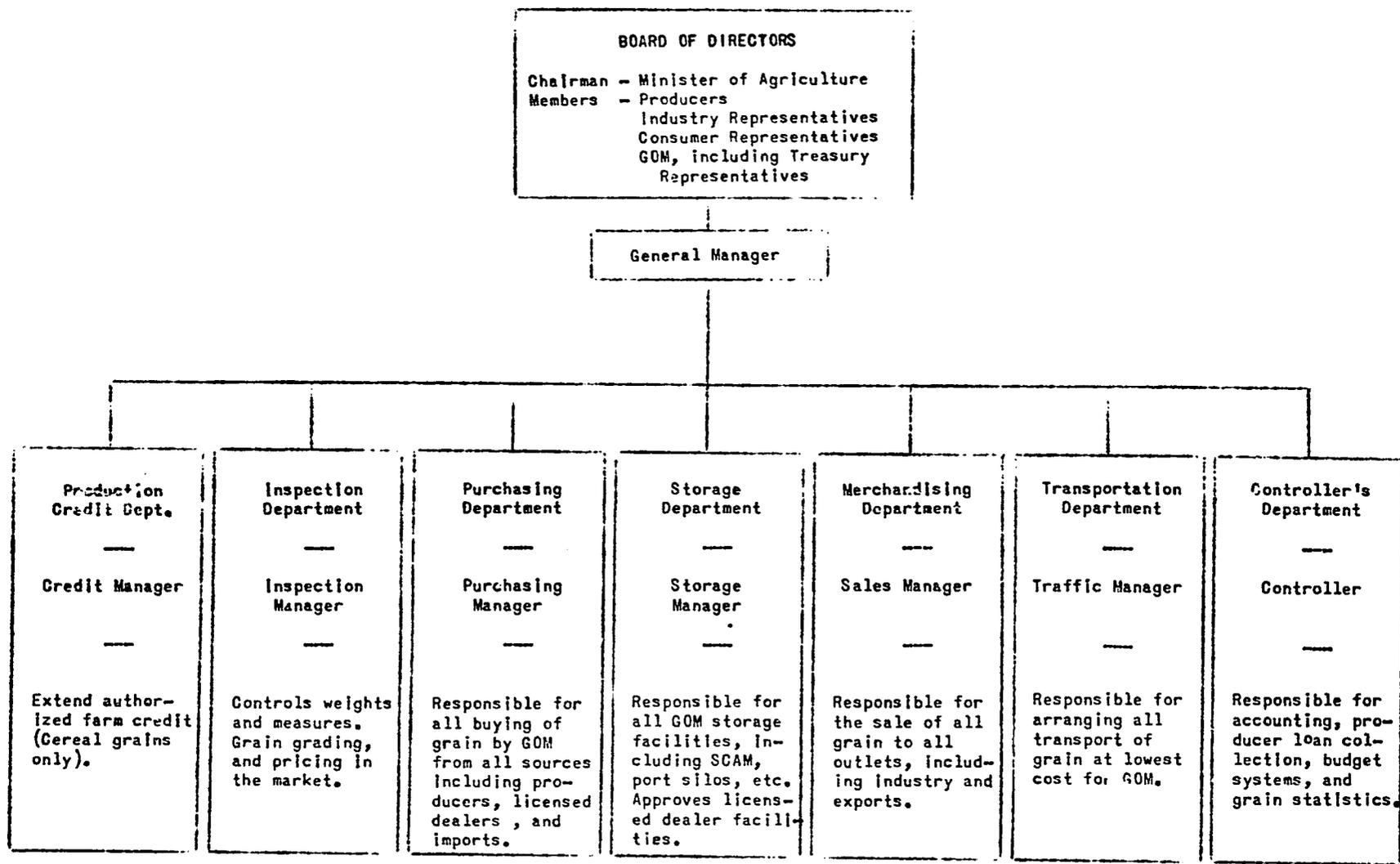
j. Government Agencies Involved in Grain Marketing. There are apparently many overlapping, and often times conflicting, GOM agencies involved in the farm to market movement of grains. We believe these to be both costly and sometimes quite ineffective. We believe that serious consideration should be given to reorganization of all of these agencies of Government, directly concerned with the farm to market movement of grain, into one single agency under unified management. We suggest for starting discussion that such an agency might logically be organized like a business organization, but retain direct control within the responsibility of the Minister of Agriculture.

This study team has not, of course, had an opportunity to study this subject in depth. The following organization chart is offered only as a suggestion to stimulate thinking and discussion. We believe that such an organization could result in reduction in duplicated effort, duplicated facilities, and duplicated personnel. When well organized and well managed it could result in a more responsive flow of product, money, and information to satisfy the needs of producers, consumers, industry, and the GOM. (Chart, see next page).

k. Statistics, Future Studies and Implementation of Recommendations. In conclusion, this study team is well impressed with the potential growth and profitability of the grain economy of Morocco. We are equally well impressed with the sincere interest of the management people, with whom we have come in contact, to attain the benefits of that potential. In order to attain that potential in the most profitable manner at the earliest time, we recommend the following general courses of action:

(1) Immediately develop good statistics for the farm to market grain economy and up-date them annually. Publish them annually. Include population data, rural and urban; rates of gain in population, rural and urban; land use data; yields; cost data; storage data; end use data; industrial plant data; consumption data; commercialization rates, time of commercialization, etc. Good decisions can only be made when based on good data, except by luck. This team did not find good data available. Much of it was inconsistent between sources, or unavailable at all.

(2) Use expert study teams to investigate opportunities in sufficient depth to be definitive. Avoid fractionated approaches to parts and parcels of each subject. They seldom get coordinated. Sometimes it may be necessary to have an outside expert to define the opportunity and outline the scope of work necessary for proper staffing and time allotment for the study team to reach definitive answers. Try to have as much of the information the study team will need, accurately prepared, as is possible, before the team starts the assignments, to minimize the fruitless use of the experts time in collecting and correcting data that could have been ready for their analysis. Fully support the team with stenographic and other offices services, interpretation, transport, etc. Studies by qualified people are expensive but if they result in definitive



answers at the lowest practical cost they can be highly attractive in the promotion of Moroccan development. Use engineering economy methods (cost-benefit ratio analysis) to measure desirability.

(3) If the results of the studies make sense to the GOM, activate the recommendations in an orderly fashion. Do not let the report simply become a shelf item for later consideration. At no time in the future will the cost of activation be likely to be lower, or the total profit higher.

Cereals Marketing In Morocco

Because marketing per se was beyond the scope of the study undertaken by Kansas State University, this study team did not delve far into the marketing problems of cereals in terms of the actual selling transactions. In essence, all of the activities that occur after grains leave the farm are part of the marketing process. In order to understand the storage and utilization activities, we, therefore, had to become acquainted with the entire marketing cycle. As a result, we at least formed some opinions with respect to marketing in the narrower sense of buying and selling activities.

In a work session with respect to our recommendations, there was some concern expressed that we had not further explored the buying and selling activities. We offer, herewith, our general opinions and observations with respect to these activities.

Most, but not all, of the countries of the world, industrialized and developing, have applied some form of price and supply controls to their basic food commodities which usually include one or more cereals. None of these control systems to which this writer has been exposed, including those of the United States, functions satisfactorily. There are, however, varying degrees of dissatisfaction. We were exposed to no information that leads us to believe that Morocco has more than its fair share of such problems. Morocco's system seems to be functioning about as well as any other observed. Even international trade has been severely taxed by this problem, as exemplified by the "International Wheat Agreement".

In every instance that this writer has observed, the problems are of sufficient concern to cause the countries to seek a better formula. It almost amounts to a search for a "magic" formula to make burdensome surpluses disappear profitably or high-priced markets appear. There is no such magic formula. In over thirty years of effort, almost countless schemes have been tried or examined by the United States. The terms under which Morocco obtains PL 480 wheat are a reflection of continuing U.S. problems in one commodity.

What, then, do the successful countries and successful commodities have in common?

1. Highly efficient production which is translated to mean low-cost production.
2. High quality--for example, Manitoba Hard Spring Wheat is the bread wheat quality standard for much of the international market.
3. A commodity for which there is a good human food demand, i.e., rice or wheat. Moroccan barley is not likely to fill such a demand in the foreseeable future but it can certainly be profitably converted into products that will--meat, poultry, eggs, and dairy products. Some barley land can be diverted to other crops that may be salable as "closer to the consumer" items.

What, then, about Morocco in particular?

1. Morocco is most fortunately situated next to the very best major international market for foodstuffs -- Western Europe. Europe knows, demands, and pays for quality better than any other major market. Morocco should exploit that advantage.
2. There is indication that Morocco's own people, due to income reasons, do not eat the volume of cereals that they would like to consume. Satisfaction of that want should come first, but it probably will only come with growing success in the national development effort. That effort, in essence, is all designed to raise the standard of living of the Moroccan people.
3. Continue, and multiply, the effort to improve productivity on the farm. Get unit costs down so that the urbanite can buy all he wants with a lower and, hopefully, eliminated subsidy to the farmer, and still leave the farmer solvent. Expand the development effort into crops other than wheat as rapidly as possible.
4. Develop the "upgrading" activities as rapidly as possible.
 - a. Livestock, poultry, eggs, dairy, etc.
 - b. Feeds, wet corn milling, alcohol, etc.
5. With the population fed, divert as much areas as possible to higher valued crops (particularly on irrigated land) such as vegetables, fruits, etc.
6. Above all, educate your people so that they can effectively use available technology in agriculture and industry.
7. Face up to the financial burden of the support activities while they are needed and sell excess supplies in the best markets available.

Our limited observations of the buying and selling activities in Morocco have disclosed no magic formula for significant improvements. We believe that we can see outstanding success down the long, hard development road if Morocco and its people continue, and accelerate, their efforts toward attainment. The dynamic long-range plan recommended should take into account both the grand strategy and the details by which present, as well as future, results are to be attained.

Priority of Recommendations.

1. Present Burdensome Surplus.
 - a. Get space matter settled for oncoming crop including GOM-controlled idle space, port elevators, mills, and rentable space.
 - b. Get policy settled at once regarding export sale of burdensome surplus, particularly barley.
 - c. Establish inspection and fumigation procedure for grain carryover.

2. Long Range.
 - a. Develop a long-range plan in depth. It should be a dynamic plan updated annually. Use an expert team to develop the plan. Start by establishing dependable statistics.
 - b. Determine "matmora" losses.
 - c. From plan, plus matmora study, determine when, where, and how storage needs will be satisfied and activate that part of the plan.
 - d. Study grain upgrading opportunities; first, only in sufficient depth to determine whether opportunity appears to exist and then, if indicated, full feasibility studies for each project. At the start, consider feed milling, wet corn milling (starch and sugar), alcohol production, and substitution of white rye for wheat flour in breads.
 - e. Continue to promote agriculture and technical education to the greatest extent possible. Literate, qualified people are the most essential ingredient to any industrial effort, including agriculture.

BIBLIOGRAPHY

- American University (1965) Area Handbook for Morocco, Foreign Areas Studies Division, Amer. Univ., DA Pam No. 550-49, 459 p., Nov. 1965.
- Bank Marocaine du Commerce Exterieur (1967) Facts and Figures on Morocco. Casablanca: Bank Marocaine du Commerce Exterieur, 42 p. 3rd Edition, Oct. 1968.
- Bouquerel, Mme. J., F. Joly and A. Andre (1955) Chemins de Fer. Comite National de Geographie du Maroc. Atlas du Maroc, Section X - Geographie Economique, voies de Communications, Planche No. 44a., 38 p.
- Brown, R. C. and N. T. Houston (1966) Planning for Agricultural Development in Morocco. Stanford Research Institute. Menlo Park, Calif., 158 p.
- Chemical Bank New York Trust Company (1968) International Economic Survey - Morocco. New York: Chemical Bank New York Trust Company, 24 p. Dec. 1968.
- Clendenen, C. M. (1968) Morocco: Grain and Feeds (Including Pulses). Agr-52, Code 27A, 11, CERP-D, American Embassy, Rabat, 4 p. Sept. 24, 1968.
- Corty, F. L. (1963) Pricing of Wheat in Morocco. USAID/Morocco. 30 p. July 1963.
- Corty, F. L. (1966) Analysis of Public Law 480 Assistance to Morocco. USAID/Morocco. 105 p. March 1966.
- Corty, F. L. (1967) Cereal Production and Marketing Procedures in Morocco. USAID/Morocco, 104 p., April 1967.
- Dept. of State (1967) Background Notes - Morocco. U. S. Dept. of State Publ. 7954, 4 p., Revised Dec. 1967.
- Edwards, R. J. (1967) Seed Requirements for Morocco. Mimeo. USAID/Morocco. 7 p.
- F.A.O. (1959) Projet FAO de Developpement Mediterranee, MAROC - Rapport national. Organisation des Nations Unies pour L'Alimentation et L'Agriculture. Rome., 295 p.
- Ferree, P. (1968) Morocco: Grains and Feed - Current Situation. AGR-48, Code 11A American Embassy, Rabat, 6 p. Aug. 8, 1968.
- Ferree, P. (1969) Morocco: Grain and Feed - Current Situation and Outlook. MO 9000, Code 11, CERP-D, American Embassy, Rabat, 4 p., Feb. 7, 1969.
- Gausson, H., J. Debrach and F. Joly (1958) Precipitations Annuelles. Comite National de Geographie du Maroc, Atlas du Maroc, Section II Physique du Globe et Meteorologie, Pluviometrie Planche No 4a, 36 p.
- Holmgreen, E. N., C. J. Tyson, Jr. and D. W. Williams (1962) Morocco - Evaluation of Agricultural Development. USAID/Morocco, 64 p., June 1962.
- International Bank for Reconstruction and Development (1966) The Economic Development of Morocco. Baltimore: Johns Hopkins Press, 356 p.

- Kebbaj, A. L. K. (1963) L'Economie Cerealiere au Maroc - etude statistique. (Cereal Economy of Morocco - Statistical Study). Office Cherifien Interprofessionnel des Cereales. 167 p. 30 Janvier 1963.
- Kelso, T. M., R. E. McKnight, J. L. Nevins and D. A. Russel (1967) Morocco - Role of Fertilizer in Agricultural Development. (with special emphasis on wheat). Tennessee Valley Authority, 185 p.
- Metcalf, J. E. (1967) Morocco, An Economic Study. New York: First National City Bank, 39 p. Oct. 1967.
- Michelin, P. (1968) Carte Michelin - Maroc (map). Pneu Michelin, Services de Tourisme, 97 Bd. Pereire, Paris 17.
- Noin, D. (1963) Population (1960). Comite National de Geographie du Maroc, Atlas du Maroc, Section IX - Geographie Humaine, Planches 31^a et 31^b Demographie, 51 p.
- Royaume du Maroc (1966) A Resume of Population and Health Statistics for Morocco. Ministry of Public Health. Central Health Statistical Office, 7 p., May 1967.
- Royaume du Maroc (1967) La Situation Economique du Maroc en 1966. (The Economic Situation of Morocco in 1966). Ministere du Developpement Charge de la Promotion Nationale et du Plan Division du Plan et des Statistique, Rabat, Mai 1967. 198 p.
- Royaume du Maroc (1967?) Population Marocaine Musulmane Estimee en 1968 et 1973. Cabinet Royal, Haut Commissariat au Plan et 'a la Promotion Nationale., 6 p.
- Royaume du Maroc (1968) Entreposage des Cereales au Maroc. (Warehousing of Cereals in Morocco.) Office Cherifien Interprofessionnel des Cereales Etude demandee par le Groupe des Cereales de la F.A.O., 11^o Session, Rome, Juliette 1967. (cf. document GR. 67/4 point VII de l'ordre du jour provisoire) 90 p. 12 Jan. 1968.
- Royaume du Maroc (1968) Mimeo - Population Estimee. Division du Plan et des Statistique, Bureau de la Demographie, 1 p. Mar. 1968.
- Royaume du Maroc (1968) Plan Quinquennal 1968-1972, Volume III Le Developpement Economique Regional, Titre II, 1^{eme} Partie, 2^{eme} Parte, 3^{eme} Partie. Premier Ministre, Secretariat d'etat au Plan et a la Formation des Cadres, Division du Plan et des Statistiques, Mars 1968.
- Royaume du Maroc (1968) Textes Reglementant le Marche des Bles et des Cereales Secondaires. Rabat: Office Cherifien Interprofessionnel des Cereales. 29 p.
- Royaume du Maroc (1969) Statistiques Agricoles etude statistiques par Produit 1959-1967. Ministere de L'Agriculture et de la Reforme Agraire, Direction de Etudes et des Affaires, Economiques et Juridiques. 192 p. 5 Janvier, 1969.

- Stechschulte, R. F. (1966) Basic Data on the Economy of Morocco. Overseas Business Reports, OBR 66-48, U. S. Dept. of Commerce, 21 p.
- Stewart, C. E. (1964) The Economy of Morocco, 1912-1962. Harvard Middle Eastern Monographs XII. Cambridge: Harvard Univ. Press., 234 p.
- Troin, J. F. and A. Menard (1968) Cultures Cerealieres. Comite National de Geographie du Maroc, Atlas du Maroc, Section X - Geographie Economique, Planche 39a Agriculture. 140 p.

Prepared by

**Alden A. Ackels
John R. Pedersen**

**for the
AGENCY FOR INTERNATIONAL DEVELOPMENT**

**AID/csd-1588
Technical Assistance in
Food Grain Drying, Storage, Handling and Transportation**

**at the
FOOD AND FEED GRAIN INSTITUTE
KANSAS STATE UNIVERSITY
MANHATTAN, KANSAS 66502**

**Dr. William J. Hoover, Director
John R. Pedersen, Entomologist**