

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY

Batch 62

1. SUBJECT
CLASSI-
FICATION

A. PRIMARY

Food production and nutrition

AF00-0180-G831

B. SECONDARY

Plant production-Cereals-Wheat--Turkey

2. TITLE AND SUBTITLE

Wheat in Turkey

3. AUTHOR(S)

(101) AID/NE/USAID/Turkey

4. DOCUMENT DATE

1969

5. NUMBER OF PAGES

125p.

6. ARC NUMBER

ARC

7. REFERENCE ORGANIZATION NAME AND ADDRESS

AID/PPC/EMS

8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publishers, Availability)

(In AID Spring Review of the New Cereal Varieties, 1969. Country crop papers:
Turkey)

9. ABSTRACT

10. CONTROL NUMBER

PN-AAE-006

11. PRICE OF DOCUMENT

12. DESCRIPTORS

Turkey
Varieties
Wheat
Yield

13. PROJECT NUMBER

14. CONTRACT NUMBER

AID/PPC/EMS

15. TYPE OF DOCUMENT

**THIS DOCUMENT HAS BEEN EVALUATED AS SUBSTANDARD COPY FOR
ROUTINE REPRODUCTION. EFFORTS IN AID/W TO OBTAIN A MORE
ACCEPTABLE COPY OF THE DOCUMENT HAVE NOT BEEN SUCCESSFUL.
DESPITE THIS DISADVANTAGE, WE HAVE CHOSEN TO REPRODUCE THE
DOCUMENT BECAUSE OF THE SUBJECT TREATED AND TO MAKE THE
DISCERNIBLE INFORMATION AVAILABLE.**



Spring Review

New Cereal Varieties

WHEAT
in
TURKEY

March 1969

USAID - TURKEY

draft

Note:

This package includes four documents:

- (1) USAID/Turkey Country Crop Paper (80 pages)
- (2) AID/W Cable soliciting additional information
(3 pages)
- (3) USAID airgram response to cable (14 pages)
- (4) Harvey P. H. Johnson's End of Tour Report
(27 pages)

AIRGRAM

DEPARTMENT OF STATE

~~SECRET~~

UNCLASSIFIED
CLASSIFICATION

For each address check one ACTION INFO DATE REC'D.

TO - AID/Washington TOAID A-141 X

1969 MAR 26 PM 12 59

FROM - ANKARA

AID
C & A -

DATE SENT
March 21, 1969

SUBJECT - The Introduction of Mexican Wheat into Turkish Agriculture.

REFERENCE - (A) AIDTO CIRCULAR A-29; (B) AIDTO CIRCULAR A-564; (C) STATE 030045;
(D) Other References given In Bibliography, Pages 63-64.

1. The introduction of the wheat varieties from Mexico, rice varieties from the Philippines, and maize and sorghum from the United States, Africa and India constitutes a modern agricultural miracle which probably has never been equalled before. Turkey's part in this breakthrough is outstanding, especially when one considers the rapidity with which the necessary decisions were made, the necessary resources marshalled, and the acceptance and use of the new technology by farmers.

2. The Mission of course recognizes that conducting a program of this kind is not without some risk and that some of the consequences may not be to our liking. The chance of bad weather giving adverse yields, the risk of serious region-wide insect and disease attacks, the possibility that the new variety may not taste right, the risk of over-production, and many other factors must be considered. But, when a country is faced with a food situation such as faced Turkey in 1966 and 1967, with the means of solution apparently at hand, the steps taken seem reasonable and sound.

3. Now we are looking forward to improving wheat production on the Anatolian Plateau, producing more vegetables and fruits in the coastal areas, introducing corn and sorghum as major crops, and eventually helping Turkey introduce cereals with improved protein content. We hope our recent experience will be helpful in these efforts.

KOMER *[Signature]*

- ATTACHMENTS: 25 copies each of the following:
- Map No. 1 - Mexican Wheat Seed Available for 1968-69 Planting.
 - Map No. 2 - Fertilizer Sales of T. C. Donatim.
 - Map No. 3 - Average Rainfall in Turkey.
 - Map No. 4 - Areas Receiving Less than 400 mm of Rain Per Yr.

PAGE 1 OF 80

DRAFTED BY <i>[Signature]</i> J. M. [Signature]	OFFICE F&A NESA/ID	PHONE NO	DATE 3/20/69	APPROVED BY <i>[Signature]</i> BHarvey, Acting Director
---	--------------------------	----------	-----------------	---

AID AND OTHER CLEARANCES
KMcuffran/ADEP (In Draft)
ACLong/EVAL (In Draft)
WSPolk/POD (In Draft)

TASerner/CD (In Draft)
RWWiley/CID (In Draft)

UNCLASSIFIED
CLASSIFICATION

DISTRIBUTION
ACTION
AWOH
INFO.

AID
EXSEC
AARC
N-10
WOF
PRR
HH

AGRIC
STATE
TVA

75W

THE INTRODUCTION OF MEXICAN WHEATS INTO TURKISH AGRICULTURE

<u>TABLE OF CONTENTS</u>	<u>PAGE</u>
<u>I. RECORD TO DATE</u>	4
1. Summary of New Grain Variety Program	4
2. Wheat Production	7
3. Input Utilization	10
A. Seeds	10
B. Land	15
C. Fertilizer	17
D. Irrigation	20
E. Pesticides and Plant Protection	22
F. Mechanization and Equipment	24
4. Profit Calculation	28
5. Policies	30
A. Promotional and Educational Campaign	31
B. Price Policy	33
C. Fiscal Policies	35
D. Fertilizer and Other Input Policies	36
E. Markets	36
F. Discrimination	36
6. Institutions	37
A. Research	38
B. Agricultural Extension	40
C. Input Distribution	41
D. Credit	42
E. Marketing and Storage	45
F. Cooperatives	45
7. Weather	45
<u>II. ASSESSMENT OF CAUSES</u>	48

TABLE OF CONTENTS (Continued)PAGEIII. U. S. AID ROLE

52

1. Policy Influence

52

2. Capital Inputs

53

3. Technical Assistance Inputs

53

4. Overall Effectiveness and Lessons

54

5. Operational Problems

55

IV. SOCIAL, POLITICAL AND ECONOMIC CONSIDERATIONS

57

1. Differential Adoption of the New Program

57

2. Differential Availability of Inputs

57

3. Employment Effects

58

4. Income Effects

58

5. Social Effects

59

6. Political Effects

59

7. Economic Costs

59

A. Substitution Effects

59

B. Foreign Exchange Costs

59

C. Program Budget Costs

60

D. Urban Income Effects

61

8. Taste Factors

61

V. PROJECTIONS

62

Bibliography

63

APPENDIX I

65

APPENDIX II

78

██████████

██

THE INTRODUCTION OF MEXICAN WHEATS INTO TURKISH AGRICULTUREI. RECORD TO DATE1. Summary of New Grain Variety Program

The history of this project antedates its approval as a project by AID and the Government of Turkey. During the period from January 1967 until it was approved late in FY 1968, the project was carried under Technical Support. However, in the discussion following, no differentiation has been made between pre-project and post project activities.

In 1965, a USAID technician obtained about 40 kilograms of Sonora 64 and Lerma Rojo wheat seed from India. This seed was planted by a very progressive farmer in the Çukurova region, and performed so well that 106 of his neighbors obtained permission to import 60 tons of Sonora 64 seed from Mexico for planting in the fall of 1966. The results of this planting were so spectacular that they aroused the interest of the Minister of Agriculture when he visited the area during the growing season. In January 1967, the Minister approached the Mission for assistance, and the project as such - even though not then an official project - got under way.

The Minister asked USAID to have a team of wheat experts appraise Turkey's potential for improving wheat production. This was done, and upon the recommendation of the team wheat specialist, Dr. O. A. Vogel, the Minister decided to proceed with the import of Mexican seed. Negotiations with USAID finally led to the approval of a loan of \$3.45 million to offset the cost of purchase and shipment of 20,000 tons of Mexican seed and 400 tons of U. S. seed. USAID

also provided help in selecting the seed (the Chief of the Agriculture Division, Ralph Gleason, went to Mexico with a team of Turkish officials for the purpose.) USAID also sent 15 participants for a four-week study tour of wheat production in Washington, Oregon and Mexico. During the negotiations and discussions with the Government of Turkey, USAID officials helped plan the grand strategy for the program including the start of work on the Anatolian plateau. GCT asked USAID to supply a team of 12 extension specialists to help the Turkish extension service explain the program to the farmers and to teach them how to raise Mexican wheat.

The first shipload of 13,000 tons of Mexican wheat seed reached Izmir in July 1967, and the second arrived in August. Both ships were partially off-loaded at Izmir and the balance was set ashore at Iskenderun and Mersin. The American extension team - under a contract with Oregon State University - arrived in August and the members were immediately assigned to their provincial posts. The massive cooperative extension effort by Turkish and American extension agents involved more than 60,000 farmers, and insured that instructions on how to grow the new wheat were received by every participant in the program. This extension effort was supported by a large amount of jointly prepared educational materials. These were printed by USAID and included brochures, flip charts, slide sets, record cards, etc.

Approximately 17 thousand tons of the seed were planted on about 170,000 hectares (420,000 acres), and in spite of adverse weather, an earthquake, and leftist opposition, the program was highly successful, producing at least 340,000 tons of extra wheat.

During the second season beginning in the fall of 1968, there was a large expansion of the program. The number of farmers involved increased from 60,000 to more than 200,000, and the area planted in Mexican wheat increased to more than 650,000 hectares (1,605,500 acres). Three new provinces in Southeast Anatolia, Urfa, Diyarbakir, and Mardin were brought into the Mexican wheat program with substantial plantings in the fall of 1968. Also added were 25 provinces in the Anatolian region where small plantings under irrigation will be made in the spring. The entire 1968-69 campaign, including the preparation of educational materials, work schedules, and record cards, was carried out by the Government of Turkey. A limited (but very important) amount of help from USAID, consisting of (1) helping with preparation of brochures and other training materials and (2) locating and identifying "trouble spots" in the program and helping GOT officials find appropriate solutions, was supplied.

The Anatolian program began more modestly. The 400 tons of U. S. seeds (which arrived late) were planted in the fall of 1967 on about 4,800 hectares (11,900 acres) of State Farm land with deep furrow drills imported from the John Deere Company in the United States by the Government of Turkey, using its own funds. The State Farm Directorate built an additional 100 deep furrow drill units and planted 38,000 hectares (90,000 acres) of the U. S. varieties in the fall of 1968, 10,000 (24,700 acres) of which had been chisel plowed for moisture conservation. Prototypes of new land preparation and planting equipment for the Anatolia are now being built in cooperation with TOFRAKSU. It is anticipated that large numbers of these machines will be manufactured by the private sector during the next few years.

2. Wheat Production

The total area of land planted in wheat has increased very slowly in recent years. The rate of increase between 1963 and 1968 was at the rate of only about 1.0% per year, compared with an increase of about 3.5% per year in the previous five years (Table I). The national production of wheat, however, has increased more rapidly than the acreage, reaching an average of 8,006,000 metric tons in the period of 1964-8, an increase of about 20% above the average of the previous five years (Table I). New land for wheat has been taken largely from grazing lands, although existing pastures are seriously inadequate to meet the needs of the grazing animals in the country. A significant part of the old wheat land also has deteriorated seriously as a result of erosion, so that some of it should be returned to pasture use.

Recent increases in wheat production therefore have resulted largely from the increased use of improved practices on the native varieties. The harvesting of Mexican and other varieties on a significant scale began only in 1968, while these varieties were planted on only 2.0% of the wheat land, they caused an increase of about 4.0% in total national production. Thus, the rate of increase in production has been more rapid than the increase in the population, even without the new high yielding varieties (HYV). This is evidenced by the 10% increase in per capita production of wheat in the five years between 1959-63 and 1964-68, i.e. from 498 lbs. to 548 lbs. It is estimated, however, that only about 75% of the wheat supply is consumed by people, the remainder being used largely for seed, with some used as feed and some waste (see Attachment). Even so, the utilization

TABLE I

Wheat Acreage, Production and Surpluses - 1954-1968And Projections for 1969, 1972 and 1975

Year of Harvest	Acreage (1000)		Production (1000 MT)		Production Per Capita (pounds)	Net Surplus (1000 MT)
	Total	HYV	Total	HYV		
1953	15839		8000		773	949
1954	15826		4900		352	-(341)
1955	17445		6900		632	158
1956	18125		5800		516	-(674)
1957	17685		6800		588	-(311)
1958	18409		6500		546	191
Av. 1954-58	17500		6180		527	-(195)
1959	18619		5800		473	-(196)
1960	19027		7000		556	-(372)
1961	19069		6000		465	-(1286)
1962	19274		6600		499	-(583)
1963	19397		7950		497	-(371)
Av. 1959-63	19077		6670		498	-(561)
1964	19447		7000		504	-(276)
1965	19521		7430		522	-(163)
1966	19644		8200		563	-(308)
1967	20015		9000		603	-(28)
1968	20386	420	8400	595	550	-(500)
Av. 1964-68	19800		8006		518	-(255)
1969	17050	1700	9468	1926	608	448
1972	17050	4200	11440	4850	678	1440
1975	17050	5683	12820	6560	739	1870

Sources: Data for 1953-68 are from the American Embassy, Ankara, except data for population and high-yielding varieties (HYV). The latter and all projections are by USAID, Turkey (see attachment). Population data are from "Agriculture in Turkey: Long Term Projections of Demand and Supply," by E.Z. Palmer, Robert College, Istanbul, 1966.

for the human food is about 420 lbs. per person annually, one of the highest rates in the world. (The flour extraction rate averages about 85%.)

The surplus (or deficit) each year indicates the adequacy or inadequacy of supplies of wheat. There have been exports of wheat in 1953-54, 1955-56 and 1958-59 but there have been net imports during every marketing year since 1958-59. Again, the situation has improved recently, with average annual imports being only 255,000 tons in 1964-68, compared with 561,000 tons annually in the previous five years (Table I).

The introduction of Mexican wheat into the coastal regions and of improved winter varieties for the Anatolia has caused a major change in the outlook for supplies of wheat in the future. As a result of this program, it is expected that, with average weather, adequate supplies of fertilizer, and the present price relationships, there will be a surplus of wheat every year in the foreseeable future, gradually increasing to a surplus of about 1,870,000 tons in 1975-6 (Table I). The bases for these estimates are described in detail in Attachment to this paper.

The overall wheat production situation, coupled with the strong recommendations of the Elkinton team (November-December 1966), led to important policy changes and the Government of Turkey asked for A.I.D. assistance in rapidly increasing wheat production. As a result, 22,500 tons of improved Mexican and U.S. varieties were imported for planting in the fall of 1967 in 20 of the 67 provinces in adapted areas of Turkey by approximately 60,000 farmers on about 920,000 acres. Use of this new

1/ A six-man team headed by Dr. C. M. Elkinton, then Food & Agriculture Officer in Pakistan, and now Provincial Director in Dacca, made a detailed study of Turkish agriculture at the request of the Ministry of Agriculture. This team had strong competences in economics and marketing, livestock, soils and water, plant breeding and pathology, and general agriculture and programming.

seed resulted in an additional 340,000-380,000 (estimated) metric tons of wheat being produced above what could have been expected from native wheats. About 1.6 million acres is expected to be planted during the fall of 1968 and spring of 1969 throughout Turkey with more than 200,000 farmers involved. (See Map No. 1).

Large scale introduction of Mexican wheat seed and the agricultural practices necessary to cultivate it in the coastal areas of Turkey, constituted what appears to be a major step in increasing cereals production. If this program in the coastal areas continues to be moderately successful, and if present price relationships continue, it should make a gross contribution of some three million metric tons of wheat production per year by 1970 (see Attachment). This would be enough (1) to keep Turkey at least self-sufficient in wheat in a year of normal rainfall, (2) it could provide an exportable surplus of wheat in the better years, (3) (better), it would release some land for the production of feed grains and forage for livestock, and/or (4) some wheat could be used for livestock and poultry feed.

A major increase in cereals production on the Anatolian Plateau can come about only if accompanied by the introduction of new cultivation practices which will utilize fertilizer to a greater extent and will conserve water. Then, the introduction of new seed varieties responsive to moisture conservation and higher levels of fertilizer use, nitrogen as well as P_2O_5 , will be practical.

3. Input Utilization

A. Seeds

Use of improved seed has shown considerable improvement since 1962

TABLE II

Use of Improved and Treated Seeds*1962-67 (000 tons)

<u>Year</u>	<u>Seeds Distributed</u>					<u>Cleaned and Treated Cereal Seeds</u>	
	<u>Total</u>	<u>Wheat</u>	<u>Barley</u>	<u>Cotton</u>	<u>Sugar Beets</u>	<u>Quantity</u>	<u>% of Total Cereal Seeds</u>
1962	93	53	17	19	3	275	14
1963	91	58	5	22	5	325	16
1964	96	57	5	25	6	355	17
1965	124	76	7	30	5	454	22
1966	186	126	15	33	7	536	25
1967	274	210	27	29	3		

* OIECO document AGR/WPI (68) 5/20 dated 9/2/68, p. 15.

(Table II), rising from 93,000 to 274,000 tons in 1967. One-half of this seed was wheat in 1967. In addition to the increased use of improved seed there has been a corresponding increase in the use of cleaned and chemically treated cereals seeds from 163,000 tons in 1962 to 511,000 tons in 1967.

A total of 22,500 tons of high quality wheat seed was imported by Turkey for the 1967-1968 season, as shown in Table III. Of this seed, 22,100 tons were Mexican varieties and 400 tons were U. S. varieties. All of the U. S. seed and 1,770 tons of the Mexican seed was certified and was used by State Seed Farms Directorate for seed increase purposes, largely through private contract growers; however, small quantities were also used in the adaptive research trials. The balance, amounting to 20,330 tons, was also of high quality but was classified as "commercial."

The original plan had been to obtain 20,000 tons including the 400 tons from the U. S. However, in order to completely fill the second ship and thereby make a saving in shipping costs, extra Mexican seed was purchased bringing the total tonnage up to 22,100.

To make sure that the seeds selected were of the highest quality obtainable, the Ministry of Agriculture sent a team of four men to Mexico to select and supervise shipment of the seed. Two of these men had been in Mexico previously in order to participate in an FAO-sponsored training program with Mexican wheats. This team arrived in Mexico in March, in time to select the farms and fields from which the seed would be harvested. During this phase of the operation, as mentioned earlier, they were accompanied by USAID/Turkey's Food and Agriculture Division Chief.

TABLE III

Varieties of Wheat Imported by Turkey*(1967)

	<u>Variety</u>	<u>Metric Tons</u>
<u>From Mexico:</u>	Lerna Rojo 64	6190
	Panjamo 62	6947
	Super X	6856
	Mayo 64	1185
	Hadadores 63	495
	Sonora 63	20
	No. 1	320
	Inio 66	5
	Noroeste 66	5
	Tobari 66	5
	Oviachic 66	0.3
	Jaral 66	4.7
	Cieta Caros	1.0
	Subtotal	<u>22,032.0</u>
<u>From U.S.A.:</u>	Bart	210
	Brevor	100
	Gaines	38
	Wanser	25
	Mugaines	1.5
	Warrior	6
	Gage	6
	Scout	6
	Lancer	6
	Druchamp	1.5
	Subtotal	<u>400.0</u>
	Grand Total	22,432.0

* These figures and those in Table IV are the latest (3-5-69) available from the Ministry of Agriculture. They show a discrepancy of 68 tons from the Ministry announced total purchased from Mexico. This is expected to be clarified later.

Two members of the Turkish team remained in Mexico until the seed was shipped to observe the harvesting, cleaning and bagging of the seed, both certified and commercial grades. Their requirements for purity and uniformity in the field were so rigid that the commercial seed was of essentially the same quality as the certified. Two members of the Government of Turkey's Purchasing Commission in Washington, D. C. joined the Turks in Mexico to assist with contract negotiations, arranging for shipping and other formalities.

The certified seed was put in polyethylene-lined cotton bags of 50-kilogram (110 lbs.) capacity, and the commercial grade seed was bagged in similarly lined new burlap bags of 74 kilograms (163 lbs.) capacity. Each bag was closed by machine stitching.

A serially numbered tag, which carried the signatures of two of the Turks certifying that the seed had been selected, processed and bagged under their supervision, was stitched to each bag. All bags were plainly stenciled with the variety name, the producer's name, where it was produced, the gross and net weight of seed and its port of destination. The final duty performed by this team of Turks was to supervise the loading of the seed into the ships.

The seed reached Turkey in three shipments (two from Mexico and one from the U. S.) in very good condition, dry and with very few damaged bags. The seed was removed from the ships and placed in clean dry storage and later was shipped by truck to the provinces, counties and villages.

The seed was not treated before shipment because treated seed cannot be sealed in plastic bags without lowering germination. However, all seeds were treated with a fungicide before planting, either at the county or village level

and in some cases by the farmers themselves. The purpose of this treatment was to prevent the development of smut, and was in compliance with Turkish regulations governing imported seeds.

Plans for distribution of the seed were developed prior to its arrival in Turkey and were adjusted from time to time to reflect changes in the local situations regarding farmer demand and other relevant factors. The distribution pattern followed is shown in Table IV.

B. Land

As yet, the area devoted to HW wheat is relatively small for two principal reasons - (1) the newness of the program and (2) the relatively small wheat acreage in the coastal areas where the Mexican varieties are adapted. In 1967, about 170,000 hectares (420,000 acres) were planted to these new varieties out of about 3.95 million acres of wheat planted in the coastal areas and 19.8 million acres of wheat planted in all of Turkey^{1/}.

In 1968, the area planted to the new varieties in the coastal regions increased to over 650,000 hectares (1.6 million acres) and about 19,700 acres of Mexican varieties are being planted in the spring of 1969 on irrigated land on the Plateau. Most of this land was planted in wheat previously although in the coastal areas Mexican wheat replaced some dryland cotton and very small amounts of irrigated cotton or other crops.

^{1/} Data of State Planning Office.

TABLE IV

Provincial Distribution of the Imported Wheat Seed

	<u>Province</u>	<u>Metric Tons</u>
Mexican Seed:	Adana	5092
	Hatay	1769
	Icel	1336
	Antalya	792
	Gaziantep	362
	Maras	475
	Denizli	370
	Manisa	2060
	Izmir	1140
	Aydin	965
	Mugla	300
	Balikesir	2299
	Canakkale	954
	Bursa	1128
	Kocaeli	125
	Sakarya	954
	Bolu	195
	Bilecik	20
	Istanbul	510
	Tekirdag	10
State Farms	1770	
Spring and experimental	460	
U.S. Seed:	State Seed Farms and contract growers	400
	TOTAL	22,316*

* Ministry of Agriculture figures as of
3-5-69.

C. Fertilizer

The key physical input, in addition to seed, making the Mexican wheat success in Turkey possible was fertilizer, whereas in Pakistan perhaps increased irrigation water was equally important. Turkey is fortunate in that the role of fertilizer in promoting crop production is becoming well understood by farmers and that the Government of Turkey has been able rapidly to increase supplies available to farmers. From 1961-1967 over 15,000 fertilizer demonstrations on major crops were carried out in Turkey with the assistance of the FAO. Added emphasis was given to fertilizer use by the massive educational campaign carried out with the 60,000 farmers involved in the Mexican wheat program in 1967-68 and response was very good.

Total fertilizer use increased slowly from approximately 8,000 nutrient tons in 1950 to 20,000 in 1960 ^{1/}. However, between 1960-1965 its use jumped to 186,000 tons and reached an estimated 417,000 nutrient tons in 1968. (Table V.)

Farmers are beginning to realize that wheat responds to both phosphate and nitrogen. Fertilizer has been used until recently largely on cash crops, particularly cotton, sugar beets, vegetables and tea. However, phosphate consumption on the Plateau (mostly on wheat) has increased ten-fold between 1962 and 1966. (Map No. 2) According to the State Planning Organization, fertilizer use on wheat was estimated at nearly 90,000 nutrient tons in 1967 with a projected use of 365,000 tons by 1972.

^{1/} Table 10 "Consumption of Fertilizer" - Trends in Turkish Agriculture, 1938-66.

TABLE V

Finished Fertilizer Production, Imports, Inventory and ConsumptionCY 1963 - 1968

(Nutrients - Metric Tons)

	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>
<u>NITROGEN N</u>						
Production	30,450	33,810	32,578	33,000	32,488	34,888
Imports	7,350	10,500	32,230	69,552	112,228	166,918
Stock Jan. 1	23,969	22,549	12,679	3,961	8,378	11,299
Less stock Dec. 31	<u>(22,549)</u>	<u>(12,679)</u>	<u>(3,961)</u>	<u>(8,246)</u>	<u>(11,270)</u>	<u>(20,253)</u>
Consumption	39,220	54,180	73,526	98,267	141,824	192,852
<u>PHOSPHATE P₂O₅</u>						
Production	32,400	28,080	40,308	40,042	37,143	53,487
Imports	15,300	155,555	52,691	65,350	131,201	213,651
Stock Jan. 1	7,631	15,972	11,907	23,540	30,391	46,687
Less stock Dec. 1	<u>(15,972)</u>	<u>(11,907)</u>	<u>(23,540)</u>	<u>(20,391)</u>	<u>(46,687)</u>	<u>(102,071)</u>
Consumption	39,359	47,700	81,366	98,541	152,048	211,934
<u>POTASH K₂O</u>						
Imports	10,500	4,600	5,775	5,500	7,867	10,000
Stock Jan. 1	--	--	--	400	160	527
Less stock Dec. 1	<u>--</u>	<u>--</u>	<u>(400)</u>	<u>(160)</u>	<u>(527)</u>	<u>(398)</u>
Consumption	10,500	4,600	5,375	5,740	7,500	10,129
<u>Consumption Total</u>	<u>89,079</u>	<u>106,480</u>	<u>160,267</u>	<u>202,543</u>	<u>301,372</u>	<u>414,915</u>

Source: 1963 to 1967 Commercial Fertilizer Development by Turkish Ministry of Agriculture Planning and Economic Research Agency Directorate.
 1968 - Ministry of Agriculture with conversion to nutrient tons for all numbers by USAID/Ankara.

UNCLASSIFIED

In the future it is expected that Mexican wheat will be planted on at least 3.2 million acres in the coastal regions in 1971 for 1972 harvest. Furthermore, it is likely that new moisture conserving practices, including the use of some semi-dwarf (HYV) varieties, will be followed on the Plateau in 1972. (See Attachment). Approximately 200,000 tons of nutrients will be required in that year, leaving only 165,000 tons for native wheat.

Distribution of fertilizer is carried out by a variety of State, private and cooperative enterprises with the State Supply Organization (T. Z. Donatim) holding about 50 percent of the market. Indications are that 1968 sales were apportioned as follows:

<u>1968 Fertilizer Sales Estimate</u>	<u>Percent of Market</u>
1. T. Z. Donatim	51
2. Agriculture Credit Cooperative Union	26
3. Sugar Monopolies	11
4. Taris	1
5. Resold through private dealers and other cooperatives	11

Until new domestic production facilities come on stream, the rapidly increasing demand for fertilizer will have to be met by imports (78% of total consumed in 1968). These will peak in 1969 and decline sharply in 1970, but even in 1970, a level of fertilizer imports higher than in 1967 will have to be sustained ^{1/}. By 1970, domestic production of fertilizer should reach 370,000

1/ Source: Report being prepared by AID/T, John M Hill, Consultant.

metric tons of nutrients (184,000 MT of nitrogen and 187,000 MT of phosphate). With a total demand for 637,000 MT of nutrients, a gap of 267,000 MT of nutrients will be left to be filled by imports. After 1970 imports will again rise. Current estimates for fall and spring planted Mexican wheat in 1968-1969 indicate about 1.6 million acres planted. Based on inventory reports and spot checks, estimates of fertilizer consumption on this acreage are shown in Table VI.

The rate of nitrogen use was held down partially by a supply shortage. Another contributing factor was that of the 200,000 farmers, about 140,000 planted Mexican wheat for the first time this year. Many of these farmers have yet to accept fully the value of nitrogen usage at the recommended rates for Mexican wheat (three times higher than recommended rates for native wheat). Recommended rates on native wheat are also not fully accepted by most farmers at the present time.

D. Irrigation

Turkey has given much importance to irrigation development, particularly in the building of large dams and main canals by D.S.I. (State Waterworks). Less attention has been given to the more difficult task of insuring efficient and timely "on farm" water use, a responsibility of TOPRAKSU (Government of Turkey's equivalent of USDA's Soil Conservation Service). From 1963-67 irrigation acreage was to expand 1,272,050 acres (from 2,754,050 to 4,026,100 acres). About 80 per cent of this increase was to be in large projects carried out by D.S.I. with TOPRAKSU being responsible for the remainder. More than half of the work was

TABLE VI

Fertilizer Consumption Estimate1968-69 Mexican Wheat

	<u>Nutrient Tons</u>
Nitrogen N	46,800 (1)
Phosphate P ₂ O ₅	<u>27,300</u> (2)
Total	74,100

-
- (1) Based on 60% usage at recommended rates of N.
(2) Based on 70% usage at recommended rates of P₂O₅.

planned for the coastal areas of the Mediterranean and Aegean regions where the greatest potential exists. Major crops to be affected were cotton, wheat (in rotation), fruits, vegetables, sugar beets, corn, rice and certain feed crops.

The amount of irrigated land planted to wheat was relatively small in 1967 and 1968 and excellent yields have been achieved without using irrigation water. However, the control of water, especially the elimination of runoff, promises to be very important in relation to the upcoming Anatolian wheat production program where weed control and conservation of water are both critically necessary.

E. Pesticides and Plant Protection

Chemicals for agricultural use have been used largely on industrial crops, cotton, fruits, olives and grapes with little or no use on cereals. With the possible exception of weed control chemicals, cereals are not expected to require much in the way of plant protection for next few years. As shown in Table VII, usage has increased from zero in 1950 to 38,000 tons in 1966 against an estimated need of 95,000 tons.

While some rust and smut have been observed in the field, no special plant protection measures have been taken except for two:

- (1) Almost all of the seed was treated in 1967, including fumigation of seed infested with weevils, and
- (2) The decision was made not to produce and sell seed of Super X and Mayo because of its susceptibility to yellow rust.

TABLE VII*

Utilization of Plant Protection Chemicals

1950-70 (000 tons)

<u>1950</u>	<u>1955</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>
0	4	15	13	25	26	37	36	38

* Page 14, OECD Document AGR/WPI (68) 5/20 dated September 2, 1968.

It is also evident that measures are going to have to be taken to help control weeds as heavier applications of fertilizers become commonplace. Extreme growths of several weeds have already been noted where heavier applications of N and P₂O₅ have been made for more than one year.

F. Mechanization and Equipment

Trends in mechanization are shown in Table VIII. Tractor numbers rose from 2,000 in 1948 to 44,000 in 1957, where they stabilized, then jumped to 65,000 in 1966 and to 81,000 in 1967. However, the use of animal draft power and the numbers of animals kept for draft have not changed significantly since 1957, in spite of the rapid increase in tractor units on farms. Tractor operation is not as efficient as it should be because of a lack of knowledge and experience in tractor operation and maintenance and because of a shortage of foreign exchange for parts. As a result many tractors are "out of action" for extensive periods and their owners are forced to maintain draft animals as well as tractors to insure timely cropping operations in case of tractor breakdowns.

The First Plan did not envision a reduction of animal units for power, rather it envisioned an increase in efficiency by increasing feed supplies; it emphasized improved tractor maintenance and fostered greater use of animal-drawn equipment. However, between 1963 and 1967, this policy was modified and a resulting large increase in tractor numbers occurred. Favorable credit terms enhanced this increase. It is expected that requirements for machinery will double during 1967-72 (from about \$52 million to \$105 million at 9 TL per dollar).

TABLE VIII 1/

Number of Tractors and Draught AnimalsArea Cultivated in Selected Years 1948 - 1967

Year	Tractor Nos. (000)	Area ^{2/} Culti- vated by Tractor Million Acres	Pairs of Draught Animals Million	Area culti- vated by Animals Million Acres	Total culti- vated area ^{3/} Million Acres
1948	2	0.247	2.4	34.086	34.333
1950	17	2.964	2.5	32.851	35.815
1955	40	7.410	2.6	44.460	51.870
1957	44	8.151	2.6	46.683	54.834
1960	42	7.904	2.6	49.647	57.551
1961	43	7.904	2.6	49.353	57.057
1962	44	8.151	2.7	49.153	57.304
1963	51	9.386	2.7	49.647	59.053
1964	52	9.633	2.7	49.157	58.786
1965	55	10.127	2.7	48.651	58.786
1966	65	12.103	2.7	47.177	59.280
1967	81				

1/ From page 12, OECD document AGR/WPI (68) 5/20

2/ At 186 acres per tractor

3/ Includes fallow land

Much of this increase will be devoted to implements for use with tractors with the major share being locally produced. Current efforts to develop moisture conservation and weed control procedures for use in the wheat growing area of Anatolia should greatly stimulate this trend. Current indications are that many small equipment manufacturers are already cognizant of this situation and are rapidly expanding operations to meet expected demand.

All farmers taking part in this program in 1967 and onward were urged to prepare their land with modern equipment and to plant the wheat with grain drills. In the case of the State Farms and their contract farmers, these were requirements. Reports submitted weekly by the American extension team indicated that a large part of the land was in fact well prepared and that at least 40-50% of all the Mexican wheat was seeded with drills. This varied from nearly 100% in Izmir to less than 10% in Balıkesir. Results, while inconclusive, indicated substantial increases in yield as well as savings in seed where drills were used instead of hand broadcasting.

The Ministry of Agriculture in 1967 purchased 16 U. S.-made, deep-furrow grain drills (cost - \$20,000 of Turkey's own foreign exchange) for use by the State Seed Farms on the Anatolian Plateau, primarily to plant the wheat obtained from the U. S. They were received, assembled and placed in operation under the guidance of one of the AID team members. These drills did such an outstanding job that several companies in Turkey are now manufacturing similar machines as well as regular grain drills to augment the current supply.

At least five private manufacturers have made and sold a large number of grain drills and other agricultural equipment. (One company built and sold 450 drills in 1968.) Turkey's largest private industrialist is manufacturing grain combines. As the program under this project continues to grow, large amounts of equipment will be required. Most of this will be manufactured in the private sector in Turkey; thus this assumes very important proportions in Turkey's future development.

The use of combine harvesters on large land holdings is on the increase, especially in the coastal regions. Hand harvesting and the slow sled thrashing is still prevalent on much of the Plateau where holdings are small. Much of the Mexican wheat was harvested on a custom basis by combine owners who moved their machines to the coastal areas for the early harvest of this wheat. After the Mexican wheat was harvested the combines moved back to the Plateau for the later wheat harvest at the higher altitudes. Combines of many makes, American, European and a few of Turkish assembly, were used.

(4) Profit Calculation

A study was made of the costs, returns, and net incomes of Mexican wheat in Turkey in 1968. This study is based on the best data available at the present time and was made by the Ministry of Agriculture in Denizli Province.

Seed and fertilizer were the principal cash inputs that were entirely new for this program. Some producers for the first time used drills for planting as recommended, but most of the drills had been used prior to this program. Prices of seed and fertilizers were established for the whole country by the Ministry of Agriculture at uniform rates of TL. 1.75 per kilo (about \$5.30 per bushel) for seed and TL 2.57 per kilo of N and TL 1.98 per kilo of P₂O₅ (about \$285 per metric ton of N and \$220 per ton of P₂O₅).^{1/}

Three varieties of Mexican wheat were included in the study, Super X, Lerma Rojo 64 and Penjamo 62. These data indicate that the net income per hectare of Mexican wheat averaged about \$197.80 in 1968, or about \$80 per acre (Table IX). This does not consider the value of the straw, since only a small proportion of the straw was utilized in Denizli where this study was made. (Large proportions of the straw produced are utilized in some provinces where Mexican wheat is grown, but the actual amounts used are not known.)

Under similar conditions of production, with current practices, the yield of a recommended native variety of wheat was 1572 kilos per hectare, (23.4 bu/A) giving a gross return of \$155.43. The cost of production using current practices was \$75.87 per hectare, leaving a net return of \$79.56 per hectare for land and management. This indicated a net program-benefit of about \$118 per hectare or \$47 per acre.

^{1/} Conversions are made at the official rate of TL. 9.00 = \$1.00.

TABLE IX

Costs and Incomes of Mexican Wheat and a Native Varietyin Denizli Province, Turkey, 1967 - 1968

(Amounts and Values per Hectare)

	<u>Mexican wheat</u> ¹	<u>Native wheat</u> ²
Number of farms	55	44
Hectares per farm	3.2	2.5
Costs per hectare (\$)		
Family labor	3.54	2.60
Hired labor	7.56	5.27
Seed	18.33	16.90
Water ³	3.62	0.87
Fertilizer	37.50	12.56
Power and implements	46.79	32.71
Interest (7.0%)	8.22	4.96
Total ⁴	125.64	75.87
Production and income		
Grain (kg)	3043	1572
Price per kg. (¢)	8.38	9.89
Total value (\$)	323.44	155.43
Net income (\$) ⁵	197.80	79.56

Source: A study by Agricultural Planning and Economic Research, Ministry of Agriculture, Turkey. Dollar values are converted from Turkish lira at Nine TL. per dollar.

¹ Data for Mexican wheat are simple averages for three varieties: Super-X, Lema Rojo 64 and Penjamo 62.

² The native variety (073-44) is one of the better native varieties for this area.

³ Most of the producers did not use irrigation for wheat.

⁴ Total cost, not including land rental.

⁵ Income from land and management.

Net income from Mexican wheat is so high that there is likely to be a major increase in area planted in wheat in the adapted areas. The area planted in Mexican wheat increased from about 420,000 acres in 1967 to approximately 1,600,000 acres in 1968 and this is expected to reach 4,200,000 acres by 1975 if present price relationships are maintained. Even if the price of wheat in Turkey declines to world levels it may be expected that the area planted to Mexican wheat will continue to increase substantially because the net income from Mexican wheat is higher than the net incomes of some other competitive crops especially barley and sunflowers. Some crops, such as sesame, peanuts, corn and sorghum can be grown in the summer as a second crop, after wheat harvest, where the land can be irrigated. Where irrigation is not available, Mexican wheat usually produces a higher net income than these crops. Tobacco, grapes and some other intensive crops generally provide higher family incomes than Mexican wheat because of their high labor utilization. The high net income achieved with wheat in conjunction with mechanization on some commercial farms, however, may cause some increase in planting of wheat and a corresponding reduction in areas planted to certain intensive crops.

(5) Policies

The fact that this project even exists is evidence of a change in Turkish government policies. It is evidence of a desire on the part of the government to be responsive to the needs and demands of progressive farmers. It marks the real beginning of a program to "guarantee every man a supply of food" and the efforts of the government to fulfill this goal.

While it can be (and has been) said that the Government was forced into the Mexican wheat program by a group of farmers, it is true also that after the

decision was made to undertake the program, the Government's actions and reactions were timely, realistic and effective.

A. Promotional and Educational Campaign

A vigorous and far-reaching educational program was undertaken by the Ministry of Agriculture, the ultimate purpose of which was to instruct the farmers - not just a select few, but all of them - in the cultural methods to be used with these new wheats in order to produce the highest possible yields. In developing this educational program, strong support and assistance was asked for and received from AID to facilitate the:

(1) Development of a plan or package of agronomic practices for raising Mexican wheat. This "recipe" set forth details of land preparation, depth and rate of seeding, use of fertilizers, etc. and was incorporated into a booklet which was distributed to all of the extension workers and to all of the farmers involved in the program. A revision of this booklet was prepared for use in the fall of 1968 with 110,000 copies being distributed to farmers and extension workers.

(2) Preparation of flip charts and other educational materials for use in farmer training in both years.

(3) Provision of a wheat production team of American farmers and county agents to work in the field with the local extension service in farmer training in the fall of 1967.

(4) Training of farmers which was done in four principal stages:

(a) A three-day training seminar was held in each of the three regions. The purpose of these seminars was two-fold; first, to teach the extension and State Farm leaders the details of raising Mexican wheat and, second, to teach them how most effectively to pass this information on to their county agents and then to the farmers.

These seminars were effectively conducted by Agricultural Ministry Research Station Personnel and AID technicians.

- (b) Training sessions were conducted by extension leaders for the county agents and assistant county agents. The American Team assisted with many of these sessions.
- (c) Training sessions were held for farmers. These were carried out by all levels of the extension service and were very strongly supported by the AID team. The farmer training meetings, several thousand in number, were largely held in villages and were well attended and effective. Every farmer in the program was contacted at least once and most of them more than once, and subsequent reports indicated that recommended practices were well followed.
- (d) A follow-up program was carried on at all levels which required that:
 - (1) Daily contact be maintained with the field by the Ministry through visits and by telephone, and between the Ministry and AID. In this way, emergency problems were quickly handled.
 - (2) Weekly reports covering the progress of the program be submitted by the Production Team members and that a weekly summary be prepared and distributed to the Ministry, OSU, State Farms and others interested in the program.
 - (3) Close liaison be maintained between the Agriculture Division and the members of the wheat team. For this purpose one Division man was assigned to each region and maintained liaison contacts through almost constant travel in the regions.
 - (4) Every farmer be furnished a report card on which to keep a complete

record of his Mexican wheat crop. This card contained data on the farmer, the farm, all cultivation practices, condition of the crop at all stages, a record of diseases, damage from any other source, and harvesting information. There was also a section for a record of visits by extension personnel or others. The county agents or their assistants also kept duplicates of many of these record cards which have been returned to the Ministry for evaluation. This report card, of which 65,000 copies were printed was very effective in helping the Ministry of Agriculture maintain close contact with the farmers and in control of the program.

(e) The Mexican wheat program was not without opposition and adverse comment. Shortly after the wheat arrived grain weevil was found in a small portion of the shipment. This immediately was hit by the leftist press with assertions to the effect that the wheat was unfit and inferior. Later after the wheat had been fumigated with a non-persistent insecticide there was adverse publicity about the pesticide used and the claim was made that it would make the wheat dangerous to health. The Minister himself counteracted this publicity very effectively by saying that he was not afraid to eat the wheat himself.

Several articles appeared in one paper at planting time which were very derogatory about the Mexican wheat which in a few cases, caused whole villages to withdraw from the program. While effective promotion and education programs were able to bring most of the farmers of these villages back into the program, it remains unknown just how much this adverse publicity affected it.

B. Price Policy

Current Government of Turkey policies affecting prices are considered basically sound and probably should be continued for the time being. However, development of these policies, in at least a few instances, does not appear to have been the

result of careful analysis of Turkish economic conditions.

In Turkey, the prices received by farmers for produce marketed and the prices of the principal commodities purchased by farmers appear to have moved rather close together. For example, the wholesale price index of foodstuffs and fodder has moved only slightly behind the price index of industrial raw materials and semi-finished products during the 1962-65 period.^{1/} Likewise, the costs of fertilizer and improved seed to the farmer, with some subsidy support, have in recent years moved in line with farm produce prices, or have moved in a direction moderately favorable to producers. Thus agriculture's terms of trade with the economy appear to have been moderately favorable to the farmer.

The Turkish Government has established a comprehensive government price support system to assure stable producer prices on the one hand and adequate consumer supplies on the other. Price supports for grain, sugar and tea are well above c.i.f. import cost and appear to be governed by domestic market considerations. In both 1967 and 1968, support prices for good grades of Mexican wheat equivalent to \$2.36 per bushel were announced before the planting season and simultaneously, the government announced that wheat of the same grade would be sold from government stocks at \$2.63 per bushel.

During the summer of 1968 the flour millers bought a large proportion of the wheat in the western part of Turkey. A study in Denizli Province obtained data from 55 producers of Mexican wheat and 44 producers of a recommended native variety (073-44). These prices received by these producers were substantially higher for native wheat than for Mexican wheat, 88.9 kurus and 79.9 kurus per kilo, respectively. The higher price for native wheat was, no doubt, caused largely by

^{1/} Source: Conjecture, Ministries of Commerce and Finance.

two factors:

- (1) The higher quality of 073-44 for bread making
The official price of hard wheat is ^{9 to 10} kurus above the price of Mexican wheat.
- (2) The later dates of selling the 073-44, since the time of harvest was two to four weeks later than that of the Mexican wheat.

The growing concern about the impending scarcity of wheat in Turkey caused prices to increase as the harvest season progressed. Price increases were slower during June and July when most of the wheat was harvested by the producers included in this study, but the amount of increase during this period is not known. The sales of native wheat were further delayed, however, because much of it was threshed by primitive methods, whereas a larger proportion of the Mexican wheat was harvested by combines.

(See also Appendix Table II)

C. Fiscal Policies

Historically, many countries, including Turkey in the Ottoman period, have employed land taxes which were unduly burdensome and sometimes inequitable and a disincentive to improvements in Agriculture. After the establishment of the Republic the Government of Turkey modernized the tax system in important respects, and with the passage of time the tax pendulum appears to have swung far toward a relatively light tax on agriculture. The land tax is based upon value appraisals made in the mid-1930's when land values were only a fraction of the current level. Further, it appears that few farmers pay income taxes and their payments are often small. Thus it must be concluded that even though farmers pay most of the excise taxes applicable to the general public, there exists no important disincentive to

agriculture with respect to taxes and fees.

In any case, there have been no recent changes in the agricultural tax structure or other fiscal policies which would materially influence a farmer's decisions as to how he should operate his farm business.

2. Fertilizer and Other Input Policies

There appears to be no comprehensive record or analysis of subsidies employed to encourage farmers to modernize and expand production. The known subsidies include: (a) sale of nitrogenous fertilizer in all parts of Turkey at the c.i.f. import price (below cost of Turkish production); (b) limited free or below cost use of pooled machinery; (c) agricultural credit at rates only sufficient to cover administrative costs, and well below the general market interest rates; and (d) free government control measures against widespread disease and insect epidemics such as of grasshoppers or tobacco mildew.

E. Markets

While modernization of marketing institutions and methods is one of Turkey's more promising possibilities for increasing farm income, marketing was apparently not a major factor influencing the Mexican wheat program except that the Soil Products Office (TMO) did announce purchase prices of wheat prior to planting at levels considerably above world market prices. To date, TMO has bought enough wheat to support the price at about 30% above world level.

It is still too early, however, to judge the ultimate success or failure of this marketing program in view of the small portion of the total wheat production of Turkey which has actually come from the HYV.

F. Discrimination

There has been no noticeable discrimination associated with this program.

6. Institutions

The effect of this program on some of the institutions of Turkey has been far reaching and the changes already made could have a very salutary effect on her future efforts towards self development. Many of these changes, however, have not been confined to one institution but have been such that they have had important effects outside of the individual institutions and have influenced the inter-relationships between agencies and departments and have promoted coordination of efforts to achieve a common goal. Among the more important of these changes were the following:

A. An Inter-Ministerial Wheat Council was appointed to establish policy and assure coordination of effort. The head of the State Planning Office was made Chairman of the Council and the Ministries of Agriculture, Finance, Village Affairs, and Energy and Natural Resources were all involved.

B. Wheat committees were appointed in the Ministry of Agriculture and in each of the three coastal regions.

C. A special budget of TL 13 million was provided, approximately half from Ministry of Agriculture budget sources and half from the AID trust fund to support the vast educational program, purchase vehicles, service excess property vehicles, pay salaries for the extra personnel and support special rates of per diem for the men working on this program. The budget also supported other incidental expenses necessary to the conduct of the program.

D. The permanent staff of the State Farms was increased by 30 people to expedite carrying out their part of the program.

E. Special assignments, and relief from other duties were given to 250 regular extension staff members to work with farmers to insure that they carry out the special cultural practices required.

F. Changes in the rules governing agricultural credit were made to enable the farmers to get the necessary money to pay for seed and fertilizer and in some cases to purchase grain drills. Major changes were made to speed up processing of loans and to relax collateral requirements.

G. The wheat research program was reorganized under one research Coordinator. This move is designed to bring all wheat research, both applied and fundamental, into focus on the most important wheat production problems and to insure the most rapid possible progress in determining varietal adaptation to different ecological conditions, response to fertilizers, dates and rates of planting, and, the development of new and better adapted varieties in the future.

A. Research

While the decision to introduce Mexican wheat was based not on the results of locally conducted official research (in fact many of the researchers opposed it), but on farmers experience, it was recognized early that something had to be done to improve the situation if continued success was to be assured.

The importance of agronomic research was also recognized by Ministry officials and at the direction of Minister of Agriculture Dagdas, wheat research was completely reorganized. All wheat research in Turkey, is now coordinated under the direction of Dr. Ahmet Demirliçakmak and has been divided into two sections, long term and short term.

(1) Short Term Research (Applied Research)

Extensive agronomic research will be conducted continuously as a part of the

UNCLASSIFIED

wheat production program. The purpose of this research is to learn as much as possible about varietal adaptation to different parts of the country, and also to learn varietal responses to various applications of fertilizers, dates, rates and methods of planting and the crop response to different methods of weed control.

The wheat growing parts of Turkey are essentially of two ecological types, those areas where spring wheats are adapted and those where winter wheats are adapted. The spring wheat areas are largely coastal along the Marmara, Aegean and Mediterranean coasts and at relatively low elevations. Winter wheat is adapted chiefly to the higher elevations included in what is called the Anatolian Plateau. Of the total wheat area in Turkey, spring wheats will constitute about 20% and winter wheats about 80%.

One hundred sixty-seven trial and demonstration plots to test and/or demonstrate varieties, fertilizer use, etc. were included in the 1967 program, and a slightly larger number made up the 1968 program.

This adoptive research program is handled by 16 agricultural research stations and Atatürk University at Erzurum. Trials, although under the direction of the staffs of the various institutions, may be conducted on the stations or in some cases on nearby selected farms. And, as stated earlier, the program is under the direction of one man (something new for Turkey.)

(2) Long-Term Research

The long term research includes wheat breeding for the development of *new* varieties and it is hoped that the Rockefeller Foundation will assist with this very important aspect. While the phrase "long term" is used, it is expected that such urgently needed information will be obtained in a relatively short

time as contrasted with the longer time normally required by a breeding program to develop improved varieties. It is, nevertheless recognized that "short term" research will continue and parallel the "long term" indefinitely.

The "long term" research program also is presently under the direct control of the wheat research coordinator.

B. Agricultural Extension

Turkey's Agricultural Extension Service has 1800 staff members from Director to Assistant County Agents. In addition, other General Directorates in the Ministry of Agriculture and the Ministry of Commerce (Agricultural Bank) and Ministry of Village Affairs, (TOPRAKSI), have people stationed in the rural areas to work with the farmers.

In order that Turkey may meet the opportunity and challenge of the new revolutionary changes in agricultural technology, the agricultural extension force is being expanded and up-graded.

In so far as work with the HYV is concerned, the extension service was the principal force in implementing the promotional program outlined earlier and made extraordinary efforts to make sure that the new wheats were used successfully by the farmers. For example, the service did assign about 250 of its staff members to work with farmers specifically on this program; it did authorize the use of extra automobiles for transportation; it did authorize extra per-diem payments; it did spend extra money for posters, brochures, and other training and promotional aids; it did conduct seminars and training meetings for its own workers as well as for farmers; it did coordinate its activities with other agencies of the government; and it did plan and systematize the whole program from the start.

The Extension Services, as did other government agencies, worked under the general direction of the Inter-Ministerial Council. When the vehicle shortage was pointed out by the Wheat Team, the importance of the Inter-Ministerial coordination committee became evident. In a very short time vehicles and drivers were made available on a temporary basis from the Highway Department, Topraksu, Plant Protection and D.S.I. which materially helped in getting extension men to the villages.

C. Input Distribution

The seed was selected in the field by a team of four Turkish specialists assisted by the Chief of the USAID Agriculture Division who went to Mexico for this purpose. This team supervised the harvest, cleaning, bagging and shipment of the seed. Thirteen thousand tons of seed reached Izmir and Mersin in July and the remainder arrived in Izmir and Iskenderun in August. The seed was promptly sorted and first distributed to the provinces by a plan made earlier. The seed was subsequently delivered to counties and villages. All distribution of seed and fertilizer was by truck and under the direction of the State Farms.

Recognizing the importance of the use of fertilizer with the Mexican Wheat if the desired results were to be obtained, the Inter-Ministerial Council established the rule that in order to obtain credit for seed the farmer must also take credit for the recommended amount of fertilizer to be obtained from Donatim or credit cooperatives. Credit when given was not in the form of cash but covered the desired amount of seed and the accompanying required amount of fertilizer. Adequate supplies of fertilizer were on hand at local distribution points when needed for all three applications.

With the very large increase in fertilizer supplies required for this program the scope of operations of both Donatim and the credit cooperatives were increased in size and effectiveness. Future rate of growth of Donatim, which also handles large amounts of agricultural machinery, will depend upon the provision of supplies of fertilizer either through increased manufacture or imports or both. The influence of the cereals program on Donatim has been extensive and, we feel, permanent.

Farmers were urged to plant the seed with grain drills. Manufacture of new drills was encouraged and credit was made available for their purchase. Several hundred were manufactured and widely distributed. The percentage of seed planted by drill was relatively high on large farms and low on small ones. All of the certified Mexican seed (1760 tons) and the 400 tons of US seed which was planted on State Farms was drilled. In order to plant the US seed properly, the Ministry of Agriculture purchased from the US 16 deep furrow drills. Stands obtained following use of these drills were excellent.

D. Credit

The support given the wheat program by the Agricultural Bank is one of the remarkable features of this project. The Bank (which has been assisted by AID for many years) responded to requests for assistance by making some of its senior people available for consultation and by sending out central representatives to help the local branches solve problems and to see that money was made available when and as needed.

In an interview on January 30, 1969, Mr. Ismet Alver, Asst. Chief of the Agriculture Credit Division of the Agricultural Bank said that many changes were made in the Bank's procedures to support the Mexican wheat effort, among the

most important of which were:

(1) Mexican Wheat loans (seed and fertilizer) were granted on a note with two signatures. The old way required that land be put up as security. This made getting loans difficult because the farmer may not have owned the land or could not prove title or he may not have wanted to use it as security.

(2) In the past, if a farmer had an outstanding unpaid loan, he could not get a second one until the other was paid. This rule was relaxed and wheat loans were granted even when a previous loan was not repaid. This was particularly important to cotton farmers who could not repay cotton loans until they had sold their cotton, which was often after wheat planting.

(3) Credit at 7% was made available for grain drills. Two, three and sometimes four signatures were required on these notes. Repayment was to be in four years.

(4) If a farmer has a disaster or for any reason loses his crop, repayment of his wheat loan is deferred a year and he can get a second loan for the next crop. This is a new practice.

(5) The Bank sends its personnel to villages which are too far from the Branch Banks for the farmers to reach easily. These men help the farmers with the loan procedures.

(6) All Mexican wheat loans were in kind, and to get seed loans, farmers were required to take loans for the required amount of fertilizer.

(7) Repayment of wheat loans has been excellent - much better than under the old procedures.

(8) The credit cooperatives get their money from the Ag. Bank and follow the same loan procedures as the Bank.

TABLE X

Credit Allocations to Support Wheat Production

<u>Year</u>	<u>Wheat Seed Loans (TL. Million)</u>	<u>Wheat Drill Loans (Number)</u>
<u>Before Mexican Wheat</u>		
1965		30 drills
1966	75	52 drills
<u>After Mexican Wheat Introduction</u>		
1967	243 (50 million for Mexican Wheat)	181 drills
1968	300	300 drills
1969	500 or more	500 drills

See Table X for information supplied by Mr. Alver regarding allocations by the Bank to support the Wheat Program.

Mr. Alver's final comment was "The changes made for Mexican Wheat Loans have worked so well they have been made a permanent part of our procedures."

E. Marketing and Storage

Practically all of the inputs needed for the first two years of this project have been handled in the public sector and the scale of operations, while significant has not been great enough to require special marketing and storage facilities except for a little short term storage which was rented to house seed and fertilizer temporarily in some isolated terms.

F. Cooperatives

Cooperatives played an active part in this program. The credit cooperatives helped in the distribution of credit with money obtained from the Agricultural Bank, following the same modified loan regulations. They also distributed a substantial amount of the fertilizer used on the wheat. These operations required substantial changes in their methods of operation as outlined in the section on credit.

7. Weather

Turkish climate is characterized as "continental," meaning that within a country approximately the size of France (a little larger than Texas) a climate range exists that is roughly comparable to that of the United States or Europe, i.e., ranging from arid to humid, from sub-arctic to sub-tropical and from sea level to high mountains.

There are two basic sets of conditions in Turkey under which wheat is grown. The first, found on the Anatolian plateau, includes limited rainfall (16 inches

or less per year), sub-freezing winter temperatures, and very little developed irrigation water. Under these conditions winter wheat is usually grown. The second set of conditions includes more generous rainfall, mild or very mild climate and, in many cases, irrigation water. These conditions are found along the coastal lands of Turkey and to a limited extent in the transitional parts of the plateau. There is little summer rainfall in any of Turkish wheat production area. Map III indicates average rainfall conditions for the various areas of Turkey and Map IV indicates the areas receiving less than 400 mm. annually. While these figures are averages, rainfall as well as temperature will ordinarily exhibit wide fluctuations from the mean.^{1/}

According to Extension agents, the Meteorological Directorate and farmers, the weather in the coastal areas, where the Mexican wheat was planted, exhibited greater extremes during the 1967-68 growing season than had been experienced for 30 years. There was relatively little precipitation at planting time in the fall. During the winter there was excessive rainfall, in some cases taking the form of snow, resulting in extreme flooding during January and February. In fact some fields were reported under water for up to 20 days. Winter temperatures were also extreme, with some areas reporting temperatures below freezing at least once a month during every month from November to April. The record low recorded in the coastal areas where Mexican wheat was planted was -25°C . at Bolu in January. In Gaziantep, temperatures lower than 0°C . were recorded on 98 days. During the spring, on the other hand, the weather was unusually dry, with some areas going without rain for up to 72 days.

^{1/} See also Part VIII, 2, P. 22, Tables V, VI, and VII and Appendix B of Introduction of Mexican Wheat in Turkey, 1967-68, EOT report Oregon State University Contract, NESA 339.

These extremes of drought, flooding, and low temperatures exposed the Mexican wheat varieties to tremendous stresses. The opinion of all concerned was that they stood up unusually well. In fact, about the only favorable aspect of the 1967-68 wheat growing season was that the low rainfall in March and April tended to discourage rust development. Further evidence of the inclement weather for wheat in Turkey in 1967-68 is the fact that the wheat yields in the plateau areas were much below the average for the last few years. This reduction in yield was caused by the extreme drought during the fall and spring.

Conversely, the prospects for the 1968-69 growing season are much improved. Rains during the fall, winter, and early spring have been timely except for a relatively small part of the coastal area which experienced some floods in January. The temperatures generally have also been milder than those experienced in the winter of 1967-68.

II. ASSESSMENT OF CAUSES

It is difficult to assess, with any degree of certainty, the causes for the success of the Mexican wheat program in Turkey. First, because it has been in operation officially for only one year, and second, because everything was done in so much of a hurry that there has been no opportunity to observe the effect of decisions as they were made. However, we feel that we are in a position to make some judgments as to the factors which were primarily responsible for the success of this program.

First, after the decision was made to introduce Mexican wheat on a large scale, essentially all of the best managerial and physical resources of the Government of Turkey having any application to agriculture were brought to bear on this program.

Second, the program was directed by a man (the Minister of Agriculture) who was enthusiastic about the program, was convinced of its feasibility, and was able to convince others of the necessity for making it work.

Third, there was reasonably good evidence available in Turkey that the results that might be achieved were very high, that yields might be two, three or even four times as much as farmers ordinarily got.

Fourth, all of the inputs necessary were brought together to support the program: fertilizer, seed, improved technology, credit, etc., plus the new confidence of the individual extension workers that what they were telling the farmers was right.

Fifth, the institutions needed to support such a program were in place, generally well staffed, and willing to change to better promote increased wheat production, and

Sixth, the top officials of the Government of Turkey and A.I.D., backed up by evidence from other areas were convinced of the feasibility of the program and supported it enthusiastically.

To go back to the origin of the project, the first seed was brought in by an A.I.D. technician and planted by one farmer. His neighbors, all large progressive operators and politically astute men, saw the results of this small planting and brought pressure to bear on the Minister of Agriculture and the Government to introduce the new varieties. They were finally given permission to bring in 60 tons of seed. The results from this were equally outstanding. Other farmers, in conjunction with those originally involved, then brought pressure to bear on the Minister of Agriculture and the Government to expand the program still farther. A team was brought in from the United States to evaluate the possibilities and their report was favorable. USAID at the request of the Government of Turkey offered to help finance the program so that, from the beginning, the farmers, the politicians, the Minister of Agriculture and the foreign advisors all supported the decision to conduct such a program. In addition, AID policies were such as to encourage the Government to embark on such a venture because (1) of the apparent unavailability of wheat in the U. S. at that time and (2) U. S. insistence on self-help. The only major resistance to the project came from a few conservative officials in the Ministry of Agriculture, including research officers, and from the anti-U. S. forces present in the country.

Considering these factors, pro and con, the Minister of Agriculture made the decision to import wheat from Mexico and with the help of other Government departments brought to bear all of the expertise he could command to support the project. His enthusiasm and determination must be ranked as one of the most important reasons for the success of the program. Without such leadership it is doubtful that anything approaching the success of this project could have been achieved.

The new varieties were also introduced as part of a "package" so that to the maximum extent possible, the farmers could reap the benefit of the capability bred into the new seeds and every effort was made to insure that every ingredient required in the "package" was on hand at the time needed.

It might be added that the "package approach" was successful beyond even the expectations of the American technicians and that an estimated 90% of the farmers taking part in the program followed directions to the letter in the first year. The results were almost universally good in the 1967-68 season but somewhat lower yields are expected from the 1968-69 crop because of a less intensive extension effort, limited supplies of nitrogen fertilizer, expansion of the Mexican wheat acreage to more marginal land, and the decision of a few farmers that the whole "package" is not required.

The experience of the Government of Turkey indicates that now it is possible and, under certain conditions, desirable to make massive introductions of new varieties and/or practices, whereas as recently as ten years ago such an undertaking would have been impossible. However, the agriculturists on the AID/Turkey staff emphasize that such introductions normally should be made with caution and must be backed up with suitable research both before and after

the introduction to insure compatibility of the new varieties and/or practices to the new environment and to prevent disastrous outbreaks of new (or old) plant diseases. The wide range of adaptation of the new varieties makes it imperative that as the new varieties spread from place to place around the world, newer varieties with a different genetic background must be developed locally to replace them.

The results obtained from this program indicate that where serious food shortages exist, it would be unwise to delay the introduction of new varieties or practices if they have been found to be satisfactory under similar conditions in other countries. However, intensive research efforts should parallel and follow the introduction.

III. U. S. AID ROLE

1. Policy Influence

USAID assisted in the grand strategy for the program in its early stages. The strategy involved a number of major actions, chief of which were the following: (a) encouragement and guidance in the early stages of policy making including decisions as to the total quantity of wheat seed to be imported, (b) making available a U. S. loan to Turkey equivalent to the amount of the seed purchase, (c) selection of varieties, (d) a massive farmer education program, (e) Stateside training of key Turkish officials, (f) provision of required fertilizer, (g) provision of credit and (h) the development of an effective system of adaptive research.

The fact must be remembered that this strategy was not developed by AID alone, but rather with AID as chief advisor and guide. Since the Turks played the major role in its development, it was wholeheartedly accepted by the Government of Turkey and fully implemented. Without AID guidance there is no doubt but that certain parts of the strategy might have been missed or overlooked and more mistakes might have been made. Whether the program would have gone forward without AID help may be open to question but the fact remains that this was a program of tremendous human input, both Turkish and American, with the Minister of Agriculture providing the spark to ignite what turned into a fine performance.

2. Capital Inputs

The Minister of Agriculture requested both capital and technical help from AID. His first request included the financing of a 60,000 ton seed import. This was later negotiated downward by steps to 20,000 tons. AID, trying to expedite its help, sought to set up a cash barter arrangement which proved unworkable. It then advised the Ministry of Finance of tentative approval of an agricultural sector loan equivalent to the cost of seed and its transportation. Recognizing that this loan procedure would be slow in implementation, AID recommended that the Government of Turkey make its own foreign currency available for the immediate purchase of seed. This was done and the loan for \$3.45 million was later approved. Further inputs of 145 U. S. military surplus vehicles and some participant training were made available to support the extension service in its farmer education program.

3. Technical Assistance Inputs

What turned out to be a very significant factor in the decision to conduct the wheat program was the report of the so called Ellington Team referred to earlier. This report as well as comments of the team members individually, strongly supported the whole idea. This team in looking at the whole agricultural situation in Turkey, pointed out that there were several areas where savings could be made and production increases secured but that wheat improvement presented the best opportunities at the time.

A At the policy level, assistance was given by the Chief of the Agriculture Division and his assistants as well as others at the management level as requested by the Minister and the State Planning Office.

B. One AID technician was present at the time who had worked a two year tour advising the Agricultural Bank and other technicians had worked with Bank officials for several years. Also, many bank officials had spent time in the U. S. as participants. While the input of these technicians and participants was not directly responsible for the changes made to support the wheat program, nevertheless this long time assistance and training undoubtedly laid the ground work for the flexibility and superior performance exhibited by the Bank at this critical time.

C. One of the most significant technical assistance inputs made by the Mission was the provision of a team of 12 county agents and farmers to work with the Turkish Government agencies.

The American extension team exerted a major influence in changing a relatively ineffective local extension service into one which became imbued with enthusiasm and very effective in reaching and teaching farmers.

Some influence was also exerted on the adoptive research program in that all such research was brought under the direction of a single coordinator and trials were made uniform on a countrywide basis.

4. Overall Effectiveness and Lessons

AID influence was probably most crucial in upgrading the extension service and it is unlikely that the measure of success achieved would have been possible without this influence and the extension team.

The truly decisive role in this HYV program was played by Bahri Dagdas, the Minister of Agriculture. The role of AID, while important at critical

times (see the PAR) was probably secondary. The loan was important but, after all, Turkey bought the wheat seed a year before the loan was approved. Also the fact must not be overlooked that without the Rockefeller Foundation breeding programs at CYMIT, IRRI and elsewhere, there would in all probability be no HYV programs.

Insofar as PL 480 was concerned, the overall effect and influence was probably negative. While plenty of food was available in the U. S., even though "self help" was insisted upon, the Government of Turkey was not under strong pressure to radically change its procedures to increase agricultural production. But when it was announced in the middle sixties that a world food supply shortage was looming on the horizon and the U. S. announced that it did not have enough food to supplement the world's food supplies, a new sense of urgency was felt by the Government of Turkey. The possibility of people being hungry in a country such as Turkey is one that a democratic and responsive society can not tolerate so that immediate and direct action was called for.

It is our opinion that the type of inputs that were put into this particular program are probably as effective as may be found. The U. S. contribution was relatively small when compared with the first year's results but it was effective and seems to have stimulated a maximum of self help in the second year on the part of Turkey.

5. Operational Problems

Such problems, as far as "Cereals Production" was concerned, were covered in detail in the PAR sent to AID/W on February 20, 1969.

No further comment will be made here except to say that during the course of the project, personnel of the Government of Turkey and U. S. AID have worked together very closely, serving on the same committees, jointly reporting activities, jointly making decisions and jointly stimulating action on the part of the farmers.

Because of this close relationship at all levels of government, and because of the leadership of the Minister of Agriculture, problems were solved as they arose and a relatively high degree of success was achieved.

IV. SOCIAL, POLITICAL AND ECONOMIC CONSIDERATIONS

1. Differential Adoption of the New Program

Detailed records were kept on 158 farms in the Marmara Region. These records indicated that the operators of small farms realized lower yields (52.1 bu/A) from plantings of Mexican wheat than the large ones (74 bu/A). This difference resulted largely from less complete use of improved practices, although many of both groups followed the full program very well. The use of drills for planting the seed was more common on the larger farms, and this practice caused a yield increase of about 12 bu per acre, about 2/3 of the total difference between the yields of the small farms and the large ones that were studied. Following the complete fertilizer program appeared to cause a yield increase of about 29 bu per acre, although this no doubt was associated with higher use of other improved practices.

There has been no study made of the effects of other social and economic factors in the acceptance of the program. The Agricultural Bank, in some cases, withheld credit from farmers who had outstanding debts to the Bank. Also, credit was less readily available to tenants and to operators of small farms, but the available information indicates that, in the Marmara Region, no more than 10% of the farms in the program planted more than 50 hectares and that more than 80% had less than 10 hectares of Mexican wheat each.

2. Differential Availability of Inputs

(See IV. 1. above.)

3. Employment Effects

The Mexican wheat program in Turkey has had little effect on wages or employment practices. No doubt the increase in use of fertilizer has increased the employment of workers for the application of the fertilizer, especially as a result of using three applications instead of the usual single application. Also, many of these producers previously had not used an fertilizer for wheat, whereas at least 90% of them used fertilizer for Mexican wheat. This is a minor item, however, because each application of fertilizer requires only about one man-day of work per farm.

The program has caused an increase in use of drills for planting wheat, replacing the planting by hand where this occurred. This probably affected no more than five per cent of the farms in the program and could not have reduced the employment of labor to a significant extent. Actually, the planting of wheat by hand requires only about one half man-day per farm and some of this labor is used to assist in operation of a drill, where a drill is used.

The increased incomes of producers, however, may cause increased purchases of tractors as a result of the increased availability of funds for this purpose. There is no information in regard to the extent to which this may be expected.

4. Income Effects

The average area of land planted in Mexican wheat was about 10 hectares (25 acres) per farm in the program. This indicates an increase in net income of about \$310 per farm. The majority of the farms, however, probably realized no more than half of this amount of increase because of the small area planted to Mexican wheat. There is no information to indicate the average income per

farm prior to this program, but the increase per hectare was about 150%. Since wheat provides probably half of the net income of these farms, it may be estimated that the planting of Mexican wheat on all of the wheat land on these farms would increase their total net income about 75% above the previous level. Family labor, however, constitutes a significant part of the cost of wheat production, so that the family income probably has increased only about 50% as a result of the program.

This additional income probably has been used largely to improve the level of family living, since the total increase in income per family was only about \$200 for most families, nevertheless, some of this increased income has been used to improve the practices used for production of wheat and other crops, including the increased use of mechanization.

5. Social Effects

It is believed that the program has not caused any significant sociological problems up to the present time.

6. Political Effects

The program is too young to have had lasting or significant political effects.

7. Economic Costs

A. Substitution Effects

While it is expected that Mexican wheat may replace cotton in a few areas, it is too early yet to detect the extent of such developments in Turkey.

B. Foreign Exchange Costs

The foreign exchange cost of the purchase of Mexican wheat seed in 1967 was about \$3,500,000, of which \$3.45 million was replaced by an offsetting dollar loan in this amount, provided through the program. It may be assumed that all of the fertilizer used for Mexican wheat was imported, since domestic production has been only a fraction of total national requirements in recent years. The cost

of the fertilizer required to service this program is assumed to have been about \$3.5 million. A total delivered cost of \$4,300,000 for the imported fertilizer is indicated. It is estimated that \$8,000,000 would have been spent to import fertilizer without the program, including \$3,500,000 as a cost of the program for increased foreign exchange ^{1/}.

Thus, the total foreign exchange cost for seed and fertilizer was about \$7,000,000 of which half was financed by AID. This is about \$41.13 per hectare or \$16.47 per acre planted in Mexican wheat for harvest in 1968. The plantings for 1969 did not require the importation of any wheat seed, and the imports of fertilizer per hectare were lower than in the previous year because of lower rates of fertilizer use. It is estimated that the foreign exchange cost of fertilizer for the 1969 crop has been about \$16.00 per hectare (\$6.40 per acre) or a total of \$10,400,000 on 650,000 hectares. This rate per hectare is expected to increase gradually during the next five years or more and the area planted in Mexican wheat may increase to as much as 1,300,000 hectares in 1972 and 1,500,000 hectares in 1974 (3,211,000 and 3,700,000 acres respectively). Thus, the import cost of fertilizer for Mexican wheat may increase to as much as \$22,000,000 before the new Turkish plants are in full production, probably in 1972. After that, domestic fertilizers should be available, for which the foreign exchange costs are only about 20% of the import costs of the finished products.

C. Program Budget Costs

The Government of Turkey expanded substantially its extension program in Mexican wheat areas in 1967. The principal fund used for this purpose was

^{1/} It is estimated that the average application of fertilizer on native wheat on this land would have been 20 kilos of P₂O₅ and 2 kilos of N per hectare.

TL 13,500,000, of which TL 6,000,000 was derived from Trust Funds. The Turkish contribution to this fund came from budgets for other purposes in the Ministry of Agriculture, thus reducing those other programs to an unknown extent.

D. Urban Income Effects

Grain prices were maintained at previous levels.

B. Taste Factors

Concern was expressed in the early stages about the acceptability of Mexican wheat to Turkish tastes. Most of the breads made in Turkey use a leavening agent, usually yeast. This undoubtedly played a part in the acceptance of Mexican wheat in bread making. Following the harvest from the first sixty tons of imported seed, Ministry of Agriculture personnel tested the baking qualities and found them entirely acceptable. This acceptance became widespread and some bakers even placed signs in shops advertising the fact that their bread was made from Mexican wheat.

V. PROJECTIONS

In Turkey, the production of wheat is expected to meet domestic requirements in 1969-70, if the weather is average. In later years it is expected that there will be substantial surpluses of wheat unless there are changes in the relative prices of wheat and other commodities or unless there is an effective program to promote increased use of wheat as a feed for livestock or to substitute some wheat acreage for feed or other crops.

The attached paper on this subject gives the detailed description of procedures used in estimating future production and requirements for wheat in Turkey, as well as our projections of the amounts of wheat that will be produced in 1969, 1972 and 1975 under the assumptions given.

As a result of AID's assessment of the potential production of wheat in the years immediately ahead, conversations (and work) have started with the Government of Turkey on how to develop alternative crops and alternative export commodities to replace wheat and on feasible methods for materially increasing farm incomes during the years immediately ahead.

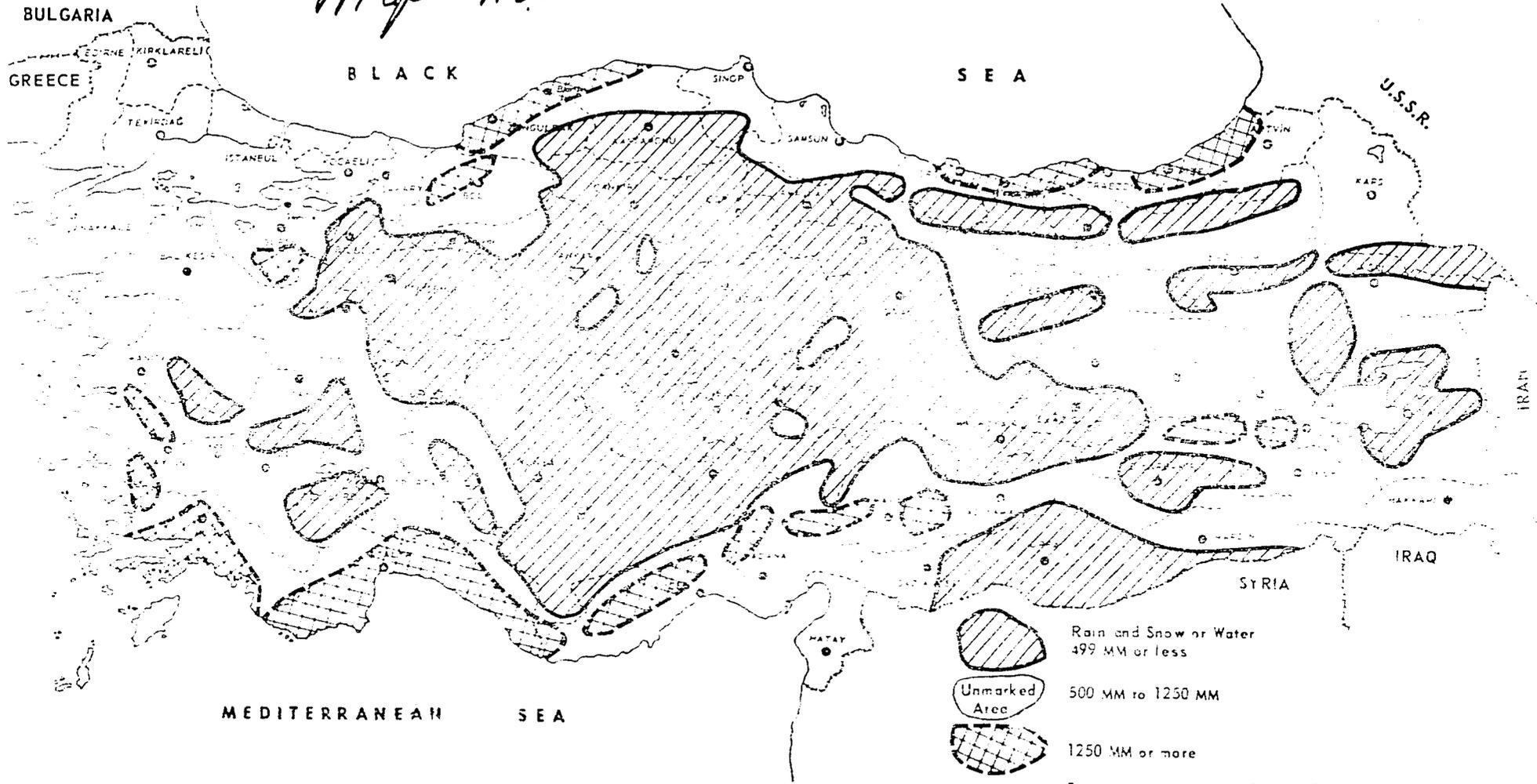
Map No. 2



TURKEY
POPULATION SALES FOR P. O. DONATION BY SALES DISTRICTS

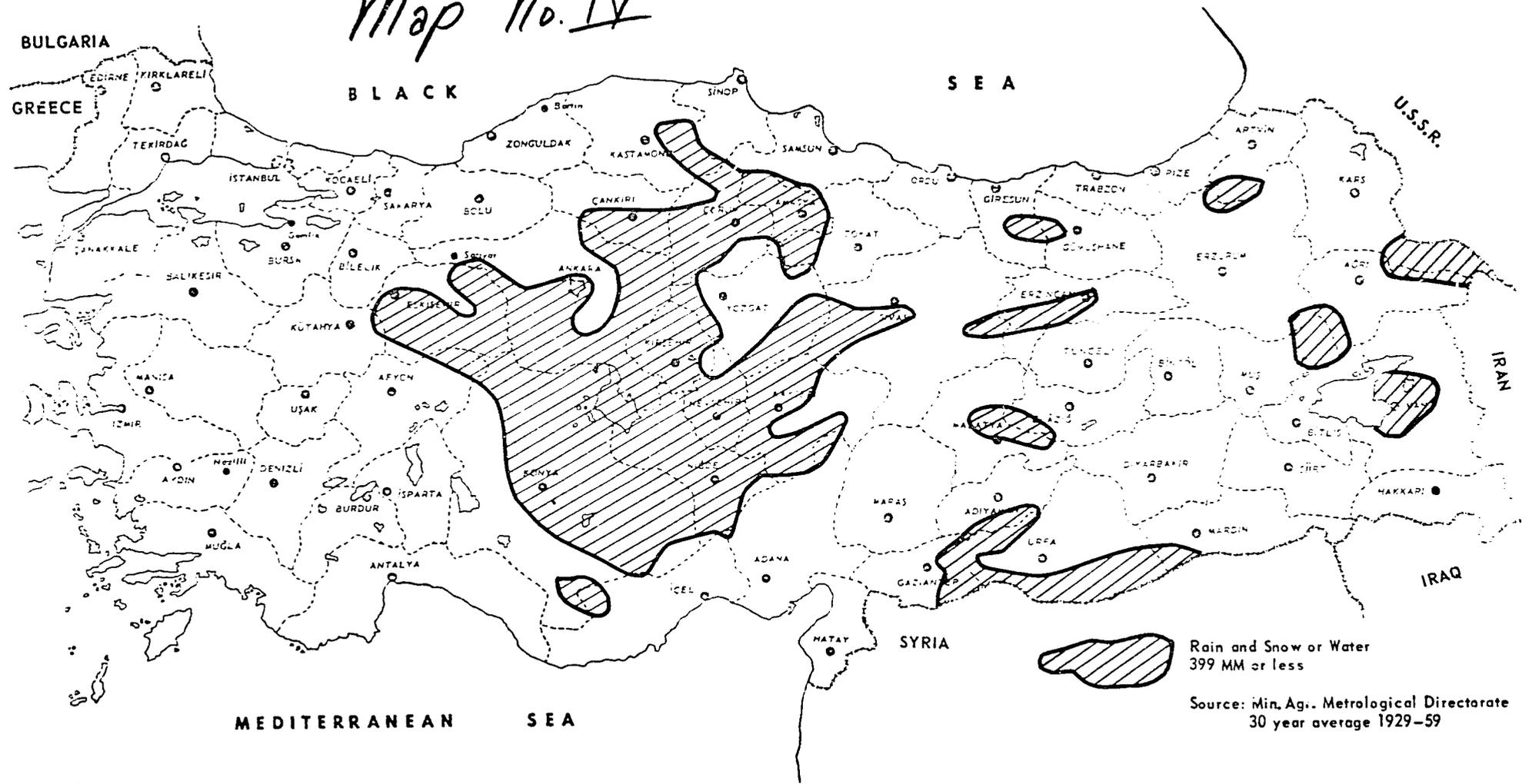
YEAR	TOTAL POPULATION	TOTAL SALES	AVERAGE SALES PER PERSON
1924	1,234,567	234,567	0.19
1925	1,234,567	234,567	0.19
1926	1,234,567	234,567	0.19

Map No. III



Source: Min. Agr. Metrological Directorate
30 year average 1929-59

Map No. IV



Rain and Snow or Water
399 MM or less

Source: Min. Agri. Metrological Directorate
30 year average 1929-59

BIBLIOGRAPHY

1. Turkey "Green Revolution in wheat - Self Help in Action - Ralph Gleason War on Hunger September 1968 Vol II No. 9.
2. Wheat Production Team December Meetings, L. M. Humphrey, FEA 1/5/68.
3. Management of Government of Turkey Wheat Seed Import Program 1967-68 L. M. Humphrey and Food & Agriculture Division Staff November 1967.
4. Introduction of Mexican Wheat in Turkey 1967-68 EOT Report OSU Contract 1967-68 HESA 339 7/25/68; also Preliminary Report.
5. CEMTO unclassified document EC/4/AG/F/D3 Ad Hoc Working Party on Fertilizer.
6. Trends in Turkish Agriculture - Graphs & Statistics 1938-66 Publication No. 31 Planning & Research Organization, Ministry of Agriculture, Ankara 1968.
7. EOT Report, Harvey Johnson, ANKARA TOAID A-1658 11/29/68.
8. EOT Report, Ephraim Hixson, ANKARA TOAID A-1706 12/17/68.
9. EOT Report, Ralph Gleason, ANKARA TOAID A-1257 6/28/68.
10. Turkey - A Background Analysis (prepared for OSU Project, Control of Weeds in LDC). Dr. Granville Jensen and Steve Wilson, Department of Geography OSU, September 1968.
11. Wheat Research and Training Program, Minister of Agriculture, Government of Turkey December 1967.
12. Narrative Statements on Accomplishments, ANKARA TOAID A-1717 12/16/68.
13. Prospects for Turkish Agriculture (A Report by Study Team to the Minister of Agriculture) Ankara, December 1966.
14. Agricultural Development in Southern European Countries Turkey OECD Document AGR/WPI (68) 5/20 9/2/68.
15. Agricultural Progress - Turkey, Dr. James Blume, HESA/TECH 2/26/68.

UNCLASSIFIED

BIBLIOGRAPHY (Continued)

16. Selected Food and Agriculture Division Weekly Activity Reports
USAID/TURKEY.
17. P.B.S. & P: USAID/TURKEY FY 70.
18. Mexican Wheat, 1967-68 Experiences and 1968-69 Forecast.
ANKARA TOAID A-68, 2/4/69.
19. Cereals Production - PAR as of 1/30/69.
277-11-130-444.

PROSPECTS FOR WHEAT PRODUCTION AND POSSIBLE SURPLUSES IN TURKEY1968 to 1975*SUMMARY

Improved practices and new varieties are expected to cause substantial increase in annual production of wheat through 1975. Under the assumptions used in this analysis, burdensome surpluses of wheat are expected to occur before 1975 unless appropriate measures are implemented by the Government of Turkey (Table 1). Also, it is expected that there will be a small increase in carry-over of wheat at the end of the marketing year of 1969-70. This major change in outlook for wheat production in Turkey has resulted from the adoption of a new concept for wheat production which includes the planting of high-yielding varieties, heavy applications of fertilizer and other improved practices.

The conditions of production and demand which have been assumed in preparing these estimates of future wheat production and requirements are as follows:

1. Average weather.
2. Maintenance of the present area of land planted in wheat.
3. Gradual increase in utilization of fertilizer and other improved practices for wheat production, reaching 75% of the needs where short-stem varieties are planted in 1975.
4. Adequate supplies of good wheat seed to meet the demand in 1975 and thereafter.
5. Moderate progress in application of improved practices for wheat production in the Highlands.
6. An annual increase of 3.0% in domestic demand for wheat, with no increase in use of wheat as feed. In addition, it is assumed that the decline in extraction rate for flour will cause an annual increase of 60,000 tons of wheat used for making flour.

FUTURE PRODUCTION AND SURPLUSES OF WHEAT

The expected rapid increases in production of wheat and the probable national surpluses will be in marked contrast to the usual importation of wheat from foreign sources during recent years, although good weather made imports unnecessary in 1967-68.

* This paper has been prepared by Leonard H. Rhodes, USAID-Turkey, with the assistance of other members of the staff of USAID-Turkey, March, 1969.

The average annual importation of wheat was 340,000 tons in the five years of 1962-66, inclusive, and the trend has been declining.¹ This average annual volume of importations is about equal to the increase in wheat production that resulted from the harvest of Mexican varieties in 1968. Therefore, it is estimated that the 1968 crop would have been equal to the domestic demand in 1968-69, if the weather had been average. In other words, the importations of wheat in 1968-69 have been necessitated by the below-average weather conditions for the 1968 crop. The average temperature at six stations in Central Anatolia in November, 1967 was only 6.8°C, compared to the 10-year average of 8.3°C. This may have significantly reduced the full development of the wheat. The spring development also was restricted by the shortage of precipitation at these stations, there having been only 67% of the 10-year average rainfall in April, 1968, and 80% in the three months of April-June.

The national requirement of wheat for 1968-69 is estimated to be 8,700,000 tons, based on data from the American Embassy,¹ except that the seed requirement is based on the planting of only 6,900,000 hectares, as estimated by the National Planning Organization (SPO)². Consequently, the estimated national requirements for 1968-69 are as follows (also see Appendix):

<u>Disposition</u>	<u>Tons</u>
Human food (183 kg. per capita)	6,200,000
Industrial use (food products)	650,000
Seed (100 kg. per hectare on 6.9 mil. Ha.)	1,242,000
Feed (3.0% of production)	260,000
Waste (4% of production)	348,000
TOTAL REQUIREMENTS	8,700,000

The domestic demand for wheat in future years is estimated on the basis of the assumed increase of 3.0% per year. This relatively high rate of increase is used here in order to provide conservative estimates of future surpluses of wheat. This 3.0% rate may be compared with the 2.5% rate as estimated by SPO. Also, the population is increasing at an annual rate of less than 3.0% and the rising level of living may cause a decline in consumption of wheat per capita before 1975. Furthermore, there will be some decline in amount used as seed as a result of increased use of mechanical planters which plant only about 100 kilos per hectare versus 200 kilos used for hand planting. On the other hand, there will be some increase in human consumption of wheat as a substitute for other grains now consumed

¹ American Agricultural Attache, Turkey.

The Embassy estimate is based on the planting of 8,055,000 hectares.

² Second National Five-year Plan, Turkey.

by people, especially rye, corn and millet. Besides, it is estimated that the extraction rate of flour will decline in modern mills from 80% to 70% by 1975, causing an increase of 60,000 tons in annual use of wheat each year.

Under the above assumptions, the production of wheat in Turkey is expected to increase more than the demand each year during the foreseeable future, continuing beyond 1975 (Table 1). In 1968, the Mexican varieties were harvested from about 170,000 hectares in the warm coastal areas with an average yield of about 3500 kilos per hectare³. Thus, it is estimated that these plantings produced 595,000 tons of wheat, an increase of 340,000 tons above the amount that probably would have been produced if "native" varieties had been planted on the same land⁴.

In the fall of 1968, the Mexican varieties were planted in the warm areas on about 650,000 hectares for harvest in 1969 (Appendix)². However, the average yield of these plantings in 1969 is expected to be only about 2800 kilos per hectare. The lower yields will result from the lower level of technology used, especially the use of only about 60% of the recommended amount of nitrogen fertilizer for the 1969 crop (Appendix).

In the Highlands, about 38,000 hectares of short-stem varieties are being planted for harvest in 1969, mostly without irrigation. It is estimated that these varieties will yield about 2800 kilos per hectare in 1969 since the plantings are being made (some in the fall and some in the spring) under rather close control of State Farms and the Ministry of Agriculture (Appendix). In addition to the increased production due to new varieties with improved practices, there will be minor increases in yields of the "native" varieties planted on the remaining wheat land of the country so that, under the above assumptions, the surplus in 1969 is expected to be about 148,000 tons (Table 1).

The rapid increase in the area of land planted in Mexican varieties is expected to continue until nearly all of the available land in warm areas is producing these varieties. This will be a result of the additional profit of at least TL 1000 per hectare that most producers realize by planting Mexican wheat compared to native wheat⁵. Thus, the harvest of the Mexican varieties in the warm areas is expected to reach 1,200,000 hectares in 1972 and 1,300,000 hectares in 1975, assuming no change in total area planted in wheat in these areas (Table 1). This is based on continuation of planting the estimated 1,400,000 hectares on which wheat was planted in these areas in 1966. In that year, there were 1,450,000 hectares of wheat planted in the 18 major provinces in which Mexican wheat was harvested in 1968⁶. In 1969

³ Introduction of Mexican Wheat in Turkey, 1967-68, USAID, Turkey, July, 1968.

⁴ The term "native" is used in the paper to include all varieties of wheat planted in Turkey other than short-stem varieties.

⁵ Unpublished information obtained in studies by USAID Turkey.

⁶ TL 9.00 = \$1.00.

⁷ Data are from the State Institute of Statistics.

APPENDIX I

Table 1. ESTIMATED PRODUCTION AND SURPLUSES OF WHEAT IN JORDAN ASSUMING NO CHANGE IN AREA PLANTED, 1968, 1969, 1972 AND 1975

(Average weather is assumed)^{a/}

<u>TYPE</u>	<u>1968</u>	<u>1969</u>	<u>1972</u>	<u>1975</u>
<u>Area Harvested (1000 Ha.)</u>				
Highlands:				
Improved practices	-0	38	500	1000
Other wheat	5500	5462	5000	4,500
Warm areas:				
Mexican wheat	170	650	1200	1300
Other wheat	1230	750	200	100
Total	6900	6900	6900	6900
<u>Yield per Hectare (Kg.)</u>				
Highlands:				
Improved practices	-0	2800	2500	2500
Other wheat	1160	1183	1256	1334
Warm areas:				
Mexican wheat	3500	2800	3000	3200
Other wheat	1400	1440	1550	1660
All areas	1261	1372	1658	1858
<u>Production (1000 T.)</u>				
Highlands:				
Improved practices	-0	106	1250	2500
Other wheat	6383	6462	6280	6000
Warm areas:				
Mexican wheat	595	1820	3600	4160
Other wheat	1722	1080	310	160
Total	8700	9468	11,440	12,820
<u>Domestic demand (1000 T.)</u>	8700	9020	10,000	10,950
<u>Surplus (1000 T.)</u>	-0	448	1440	1870

A. For other assumptions, see Page 1.

Note: It is estimated that the production in 1968 would have been equal to domestic demand, if the weather had been average. Years indicated are years of harvest.

UNCLASSIFIED

and future years, Mexican wheat will be harvested from fall plantings in the warm parts of 23 provinces but, because some parts of these provinces are too cold for Mexican wheat, only 1,400,000 hectares of "wheat" land are estimated to be suitable for full planting of Mexican wheat in all 23 provinces.

The yields of the Mexican varieties in the warm areas are expected to increase gradually from 2000 kilos per hectare in 1969 to 3000 kilos in 1972 and 3200 kilos in 1975 (Appendix). Much higher yields are feasible, so that these estimates are conservative. Thus, it is estimated that the production from these plantings will reach 3,600,000 tons in 1972 and 4,160,000 tons in 1975 (Table 1).

In the Highlands, there has been relatively little experience with the moisture conservation practices and the short-stem varieties that are needed for major increases in yields of wheat on non-irrigated land. Estimates of results and rate of progress on this program, therefore, are based on broad experience in the USA and a small amount of experience in Turkey. This seems reasonably reliable, however, since some parts of the USA have a climate that is very similar to that of the Highlands of Turkey. Preliminary studies in Turkey indicate that farmers will be able to buy the new implements for moisture conservation at a cost of about TL 25,000 per set for a tractor and TL 2500 per set for animal power. Thus, the initial cost of implements will be about TL 250 per hectare and the costs of operating them will be about equal to the cost with present equipment and methods. It is estimated that the benefits of the new practices will be about TL 3.00 for each TL of cost, allowing five years to amortize the cost of the new implements for moisture conservation and deep furrow planting². (At export prices of wheat, this ratio would be about 2.00:1.00).

As stated above, about 38,000 hectares of short-stem varieties are being planted in the Highlands for 1969 harvest². Of this, about 30,000 hectares are fall-planted American and Russian varieties with moisture conservation practices on State Farms and 8000 hectares will be Mexican varieties on irrigated land and planted in the spring. Also, at least 15 demonstration plantings will be made in which Mexican varieties will be planted on dry land in the spring of 1969. Considering all of these developments, it is estimated that these high-yielding varieties will be planted with recommended practices on about 500,000 hectares for harvest in 1972 and 1,000,000 hectares for 1975 harvest. The average yield of all these plantings (in the Highlands) is estimated at 2500 kilos in both 1972 and 1975, although the average in 1969 is expected to be 2800 kilos (Appendix). This would produce a total of 1,250,000 tons of grain from these plantings in 1972 and 2,500,000 tons in 1975 (Table 1).

The total production of wheat, therefore, is expected to increase from 3,700,000 tons in 1968 to 12,320,000 tons in 1975, or an increase of 47.4% in seven years. This assumes average weather and other conditions specified on page 1. In any one year, of course, the weather conditions are likely to cause variations of perhaps 10% to 15% above or below these estimates. Nevertheless, these estimates indicate the expected levels of production in 1969, 1972 and 1975. These amounts of production would provide substantial surpluses above domestic needs before 1972

and increasing annually through and beyond 1975, unless there is a rapid increase in consumption of wheat by the 13,000,000 cattle and 33,000,000 sheep in Turkey. Assuming that increased use of wheat as animal feed will not occur, the surplus of wheat probably will reach about 1,440,000 tons in 1972 and 1,870,000 tons in 1975 (Table 1).

EFFECTS OF POSSIBLE CHANGES IN CONDITIONS

Fertilizer:

Fertilizer supplies will be of crucial importance in the realization of the expected wheat production since it is assumed that producers will apply about 70% of the recommended amounts per hectare in 1972 and 75% in 1975. This will require about 200,000 tons of nutrients for the 1,700,000 hectares of high-yielding varieties in 1972. At the same time, there will be increases in rates of fertilizer used on native varieties, so that the total amount used in the country for these varieties (on less hectares) probably will not decline below the 90,000 tons of nutrients used in 1967^{2/}. Thus, it seems that the SFO projected use of 215,000 tons of nutrients for all wheat in 1972 will be exceeded if total production of wheat reaches 11,440,000 tons in 1972 (Table 1). At least 75% of the demand for fertilizer for wheat seems likely to be met in 1975, however, since failure to do so would result in shortages for other crops, as well as for wheat. A serious shortage of fertilizer would restrict production of many crops and it might cause re-sales of available supplies of fertilizer at excessive prices.

Weather:

The weather is an unknown factor for any year in the future. During the 10-year period of 1959-68, the average variation in production of wheat between successive years was 820,000 tons, or about 11.2%^{1/}. The use of new varieties and improved cultural practices for wheat should reduce these year-to-year variations in production, but major fluctuations cannot be prevented. Thus, the production in 1969, for example, could provide a surplus of a million tons or more, or it could be insufficient to meet the domestic needs. Likewise, the surplus in 1972-73 could be less than 1,000,000 tons or it could be more than 2,000,000 tons. Consequently, the Government of Turkey should be prepared to deal with a deficit in 1969-70, or with a surplus of more than 1,000,000 tons in any year in the future, including 1969-70.

Area of Wheat:

The area of land planted in wheat is likely to increase substantially if present prices of wheat are maintained. This will result from the large increase in net income per hectare for land and management (about TL 1000 above that of native wheat) that producers are now able to realize from planting Mexican wheat, while similar increases in incomes are not so readily available from improved practices for competitive crops. Cotton on dry land, for example, produces only about 700 kilos of seed cotton per hectare which has a gross value of about TL 1500^{2/}. Mexican wheat planted on this land, with 75% of the recommended practices,

probably will yield 3000 kilos per hectare, giving a gross income of TL 2400. On this dry land, the cost of producing the cotton is about equal to the cost of producing Mexican wheat. Even irrigated cotton, in many cases, produces less than 1700 kilos of seed cotton per hectare, whereas wheat should yield at least 3500 kilos per hectare on this land. The cost of producing a hectare of irrigated cotton is about TL 1000 above the cost of producing wheat, so that a yield of at least 1850 kilos of cotton is necessary on irrigated land in order to provide a net income equal to that of Mexican wheat on the same land. This does not consider the extra income that may be obtained from summer crops planted after the wheat is harvested. However, probably more than 80% of the irrigated cotton land is too wet to produce a good crop of wheat, although nearly all of the non-irrigated cotton land is well suited to the production of wheat. There are other crops on dry land which also may be partially replaced by wheat, such as barley, oats, sesame, vetch, sunflower, tobacco, grapes, etc. There are probably 400,000 hectares of these other crops in warm areas, in addition to 400,000 hectares of irrigated cotton and 300,000 hectares of dry land cotton. It is estimated, therefore, that the increased plantings of wheat in the warm areas might reach 300,000 hectares by 1975. In the Highlands, barley generally yields more than wheat, so that about 2,750,000 hectares of barley are planted annually, even though the price is lower than the price of wheat. There are other factors, which also influence these plantings, but, nevertheless, the new varieties and practices for wheat in the Highlands could cause some substitution of wheat for barley, if present prices are maintained.

The increase in area planted in wheat in warm areas might occur quickly, if present prices are maintained. Thus, the area planted in Mexican wheat in these areas might reach 1,600,000 hectares in 1975 instead of the estimated 1,300,000 hectares which has been assumed in this paper (Table 1). This would increase wheat production in 1975 about 1,000,000 tons above the present estimate and it would cause a substantial reduction in production of other crops, especially cotton. In the Highlands, the substitution of wheat for other crops will be rather slow because of the lack of knowledge and the new equipment that producers need in order to realize substantial increases in yields of wheat. For this reason, it is not feasible to estimate the extent of increased plantings of wheat in the Highlands in any given year. The increase is likely to be slow and small before 1972. Government programs to improve the technology used for most competing crops could greatly improve their economic position compared to wheat.

Disposal of Surpluses:

The prospective surpluses of wheat may be stored, exported or used as feed for animals. The Government has facilities to store about 2,000,000 tons of grain, half of which is needed each year to provide supplies for flour mills before the next harvest. These storage facilities, therefore, are very likely to be filled by the fall of 1970 if there are no exports of wheat and no major increases in use of wheat as feed before then. However, it will be important to have these facilities nearly empty before the harvest of the 1971 crop, if the weather is average or above for that crop. The surplus in that year with average weather is

likely to be about a million tons, enough to fill the storage facilities, assuming that another million tons will be stored by the Government for domestic use.

Exports of wheat at current prices would involve a Government loss of 25 kurug or more per kilo or at least TL 250,000,000 for each million tons exported. This loss might be increased substantially by declines in world prices of wheat, which should be anticipated. Also, Turkey may not be able to obtain "hard" currency for exports of wheat. It is recognized that the Government cannot, in the foreseeable future, adopt a policy that will allow a decline in wheat prices, i.e. in relation to prices of other products. Nevertheless, it is possible that successive annual surpluses of 1,000,000 tons or more of wheat might cause unacceptable costs of price support for wheat. Also, any surplus in excess of a million tons probably would require the construction of additional storage facilities if the price support program is to be effective. This could happen in any future year when the weather is good.

Wheat Prices:

The possible effects of a decline in wheat prices, therefore, should be recognized for planning purposes, even though it cannot be predicted at this time. A decline of wheat prices to the level of barley prices would have the following important effects in Turkey:

1. Increased areas of land would be planted in feed crops instead of wheat.
2. The possible increase in total area planted in wheat would be restricted or prevented.
3. The use of wheat as feed would be encouraged.
4. Government losses on exports of wheat would be reduced or eliminated.
5. Production and exports of livestock products and some other products would be increased, probably more than enough to offset the loss of foreign exchange that would result from exporting less wheat.
6. The cost of producing bread would be reduced.

With lower prices of wheat, Government programs could encourage increased production of feed crops in the Highlands, mostly on land now used for wheat and fallow. It is estimated that minimum rations could be provided for present cattle and sheep in Turkey by production increases of 10,000,000 tons of forage crops and 5,000,000 tons of grain feeds. Many years will be required to accomplish these increases in feed consumption, but this would increase the value of livestock products probably TL 15,000,000,000, or an increase of about 200% above the present value of animal products. SPO has projected increases of about 1,000,000 tons of forage crops and 2,000,000 tons of feed grains by 1972². This would require the planting of an additional 300,000 hectares of forage crops, about 2.5% of the land now used for wheat and fallow and only 10% of the additional plantings of forage crops that are needed to provide adequate feed for present animals. Cross-bred cows, however, would require nearly twice as much feed as present animals and would provide a proportionate increase in production of milk and meat.

The livestock programs and reduced prices of wheat would also increase the amount of wheat used as feed for animals. With the new practices for wheat, the

cost of producing a ton of wheat may be lower than that of barley or other feed grains in many areas. Wheat is slightly better than barley as a feed because of the greater amount of protein and it could be used to improve the rations of all classes of animals. Any additional grain used to improve the present rations would provide benefits at least equal to 200% of the value of the additional grains used. Again, it is emphasized that wheat will not be used extensively as feed, if the price of wheat remains substantially above the price of barley. Even with equal prices of wheat and barley, extensive educational programs will be necessary to promote complete livestock programs for village herds and flocks, and this can be done only in villages that have satisfactory markets for milk.

Thus, if the price of wheat were to decline, there would be less wheat planted and more wheat consumed by animals than if present prices are maintained. This would reduce the volume of wheat that would be exported and it would increase the volume of exports of livestock products, cotton and some other crops that compete with wheat for available land. This would increase the total value of agricultural products in Turkey, it would increase the value of exports and it would reduce the total Government subsidy on exports of these products. A million tons of wheat used as feed to provide adequate animal rations should increase the value of livestock products about TL 1,500,000,000, whereas the value of this amount of wheat for export is less than TL 600,000,000.

RECOMMENDATIONS

The Government of Turkey can do much to alleviate the problems that will arise as a result of the high yields and high incomes from Mexican wheat in the near future. The measures that would be most useful are the following:

1. Increase the intensity of campaigns to promote the adoption of improved technology for the production of competitive crops, especially cotton, barley, vetch and alfalfa. Improved varieties of cotton, for example, may make it possible to double-crop with wheat and cotton each year.
2. Promote increased feeding of grain and hay to animals for production of milk and meat. This might include demonstrations using wheat and hay in animal rations. Proper feeding will demonstrate the high income from feed crops compared to cash crops, such as wheat.
3. Improve the procedures for forecasting wheat production so that a surplus or deficit can be anticipated several months before harvest.

APPENDIXPROSPECTIVE PLANTINGS AND YIELDS OF WHEAT IN TURKEY1969, 1972 and 1975

The total area of land planted in wheat in Turkey is estimated to be 6,900,000 hectares for harvest in 1968. This is the SPO estimate^{2/} and it may be compared with the SIS estimate of 8,000,000 hectares in 1967^{1/}. The lower figure seems to be a good compromise for this analysis since the study by Robert College concluded that the best estimate of the area planted in 1965 was only about 75% of the SIS estimate^{1/}. For this study, the area of land planted in wheat is assumed to remain constant at 6,900,000 hectares through 1975. This seems reasonable; there is little basis on which to forecast the extent of change, and also the assumption of no change seems to provide some desirable conservatism in the estimates of future production of wheat in Turkey.

Yields of wheat in Turkey are increasing rapidly as a result of plantings of high-yielding varieties which were brought mostly from Mexico and the USA in 1967. Nearly 100 research plantings of new wheat varieties were made in Turkey in 1967, but the results of these studies are not yet available.

The yield of Mexican varieties in warm areas of coastal provinces in 1968 has been estimated to average about 3500 kilos per hectare^{3/}. Also, it has been estimated that native varieties would have produced about 1500 kilos per hectare, if they had been planted on the same land in that year^{3/}. These are only rough estimates since they are based on observations by AID wheat experts working in Mexican wheat areas of Turkey during the crop year of 1967-68. The average yield of all wheat in the 11 principal Mexican wheat provinces was 1385 kilos per hectare in the period 1965-67^{1/}. Thus, it is estimated that the average yield of all native varieties in the warm coastal areas in 1968 would have been 1400 kilos per hectare, if the weather had been average.

These estimates of yields of the new and old varieties in the Highlands and in the warm areas result in an estimated national average of 1261 kilos per hectare in 1968 and 1780 kilos in 1975. This may be compared with the Government estimate of 1200 kilos per hectare in 1966^{1/}. The average annual increase in production of wheat in Turkey between the 3-year periods of 1960-62 and 1965-67 was 2.6% but, no doubt, this rate has increased since 1964 as a result of the rapid increase in use of fertilizer on native varieties^{1/}. The Mexican wheat alone caused a yield increase of about 50 kilos per hectare, or about 4.0%, in 1968.

^{1/} Agriculture in Turkey: Long-Term Projections of Supply and Demand, by E.Z. Palmer, Robert College, Istanbul, Turkey, 1966.

The national average yield of wheat increased 2.2% per year between the 5-year periods of 1958-62 and 1963-67⁹. Yields of native varieties are expected to continue to increase at an annual rate of slightly more than 2.0% per year through 1975, i.e. 2.0% in the Highlands and 3.0% in the warm areas (Table 1). Therefore, the planting of high-yielding varieties with other improved practices will cause much more rapid over-all increases in yields than have occurred in past years, reaching a national average yield of about 1780 kilos per hectare in 1975. All yield estimates for 1968, 1969, 1972 and 1975 are based on the assumption of average weather. Since there was considerably more rain than normal during September to December, 1968, the condition of wheat for the 1969 crop in the Highlands is better than average. The floods in some parts of the warm area have not damaged a significant part of the 1969 crop of wheat.

The yield of Mexican varieties in warm areas in 1969 is expected to be only about 2800 kilos per hectare, compared with 3500 kilos in 1968. This decline will result from the approximately 40% shortage of nitrogen fertilizer and lower rates of use of other improved practices and inputs². This has been a natural result of the nearly 300% increase in area planted in these new varieties for the 1969 crop, compared with that of 1968, and an increase in the number of farmers involved from about 60,000 in 1967-68 to probably 200,000 farmers in 1968-69². Also, all of the seed was sold to farmers by the Government in 1967-68, whereas probably more than half of the seed for the 1969 crop was held by producers from their own 1968 harvest or obtained from neighboring producers. Much of the planting for the 1969 crop, therefore, has been made without compliance with Government instructions in regard to the use of fertilizer and other practices. The estimated yield of 2800 kilos in 1969 has been calculated roughly on the basis of the effects of fertilizer in other countries, as well as in Turkey. It is estimated that an average yield of 4000 kilos per hectare was obtained in Turkey in 1967-68 where all of the recommended fertilizer and other practices were used¹⁰. This is 2500 kilos above the average yield of 1500 kilos from native varieties planted on similar land. Since nitrogen probably will be the limiting factor and the available supply is only about 60% of the recommended amount for the 1969 crop, the increase is expected to be only about 1500 kilos above that of native varieties, or 3000 kilos (60% of 2500 = 1500 + 1500 = 3000). However, an average yield of only 2800 kilos is expected from Mexican varieties in warm areas in 1969 because of the probability of using less than 60% of other needed practices and slightly poorer land than was used in 1967-68¹⁰. (The yield of Mexican wheat without fertilization is unknown in Turkey, but it probably would be little more than the yield of native varieties with the low rate of fertilization that is used for these varieties in the warm areas of Turkey).

The yields of the improved (short-stem) varieties in the Highlands have been estimated on the basis of results of a very few and scattered studies in Turkey and using some information from studies of these varieties in the USA. The cold weather

⁹ The 1969 Spring Nitrogen Supply and Effect on Yield of Mexican Wheat, January 7, 1969, by John Hill, Fertilizer Advisor, AID Turkey.

¹⁰ In West Pakistan, studies indicate that nitrogen and phosphorous fertilizers produced up to 28 kilos of Mexican wheat per kilo of these nutrients used. In India, ratios of 15-20:1 were obtained.

requires that the Mexican varieties be planted in the spring in the Highlands. One Mexican variety (Lerma Rojo) was harvested in 1968 from 150 hectares of spring plantings on irrigated land in a Highland province of Turkey. Careful checks of yields from these 150 hectares in five villages showed an average of 4430 kg. per hectare. It appears, therefore, that Mexican varieties have the capacity to produce as much per hectare in the Highlands as on coastal lands, i.e. with irrigation in the Highlands.

Mexican wheat also has been spring-planted in a few places in the Highlands where irrigation was not available. The results of these plantings indicate that yields from such plantings will be at least 2000 kilos per hectare and possibly 3000 kilos^{11/}. The seed of fall-planted US and Russian varieties for the Highlands arrived too late in 1967 for proper testing, but experience in the USA under similar conditions indicates that yields of 3000 kilos per hectare may be expected in Turkey where good practices are used.

The plantings of the short-stem varieties in the Highlands for harvest in 1969 will be almost entirely under direct control of the Government, with about 30,000 hectares of fall-planted varieties on State Farms and about 8000 hectares of Mexican wheat being planted in the spring on irrigated land under the control of the Ministry of Agriculture. With this high degree of control, it is expected that the average yield of these plantings in 1969 will be about 2800 kilos per hectare. This is the weighted average of the expected average yields of 2500 kilos on State Farms and 3500 kilos on the irrigated lands. Other varieties (native) in the Highlands are expected to yield 2% more in 1969 than in 1968, or 1183 kilos per hectare (assuming average weather in both years). This 2% annual increase in yield of native varieties in the Highlands is assumed to continue through 1975.

In 1972 and 1975, the Mexican varieties planted in the fall in warm areas are expected to yield more than in 1969 but not as much as in 1968, perhaps about 3000 and 3200 kilos per hectare, respectively (Table 1). This assumes that about 70% to 75% of the needed fertilizer and other improved practices will be used. The introduction of better and newer varieties could produce much higher yields, whereas the failure to replace unsuited varieties or failure to provide adequate amounts of fertilizer could prevent yields from increasing to this level. The average yield of native varieties in warm areas is expected to continue to increase about 3% per year, although perhaps no more than 100,000 hectares will be planted in 1975.

In the Highlands, progress will be relatively slow in the planting of winter-hardy, short-stem varieties between now and 1972. This requires the purchase of new types of implements by producers for moisture conservation and deep furrow planting in early fall. Nevertheless, it is expected that, by 1972, these winter

^{11/} Thirteen varieties were planted at the Ankara Experiment Station on March 28, three of which produced an average yield of 2020 kilos per hectare in 1968. These trials were on unfertilized land which had been in sanfoin, a legume crop, during several preceding years.

and spring varieties will be planted on about 900,000 hectares, or about 7% of the wheat land in the Highlands with yields averaging 2500 kilos per hectare. A major limiting factor in this program will be the availability of the needed implements for moisture conservation. About 100 sets of these implements for use with tractors are expected to be used to prepare land for the crop of 1970. Each set probably will prepare and plant about 100 hectares, using a tractor. It seems feasible, therefore, to provide 3000 to 5000 of these sets of tractor implements for the 1972 crop and 8000 to 10,000 for 1975. In addition, some implements will be provided for use with animal power, and a substantial area in the Highlands will be planted with Mexican varieties in the spring, both with irrigation and without it.

The spring planting of Mexican varieties on dry land does not require a complete moisture conservation program, although the land should be chiseled during the previous summer or fall. Scattered experience indicates that these varieties can be planted in the spring without irrigation, giving results approaching those of the new winter-hardy varieties and about twice the present average yield of native fall-planted varieties. In this way, it may be possible in some Highland areas to produce a good crop every year by spring planting of Mexican wheat, even without irrigation. Further studies of this are underway^{2/}. In 1968, the average yield of spring-planted Mexican varieties on irrigated land in cold areas was about equal to the average yield of these varieties in warm areas. However, since only about 3.0% of all wheat in Turkey is on irrigated land, it seems likely that these plantings will be largely on non-irrigated land, although plantings on irrigated land in the Highlands might reach 100,000 hectares in 1972. The uncertainty of plantings and yields of high-yielding varieties in the Highlands leads to the estimated average yield of only 2500 kilos per hectare in 1972 and in 1975 for all improved varieties in the Highlands (Table 1).

APPENDIX II

T.M.O.'s Purchase and Sale Prices for the 1968 - 1969 Marketing Year
in Comparison with the Previous Marketing Year

<u>Cereals</u>	<u>1967/68</u>		<u>1968/69</u>	
	<u>Purchase</u>	<u>Sale</u>	<u>Purchase</u>	<u>Sale</u>
	<u>Kurus per Kilogram</u>			
Hard (durum) wheat for macaroni				
Grade I (Anatolia & Thrace)	86	97	86	97
Grade I (Southeast Anatolia)	83	93	83	93
Grade II (Anatolia & Thrace)	83	94	83	94
Grade II (Southeast Anatolia)	80	90	80	90
Anatolian white wheat (hard)	80	86	80	86
Soft wheat for bread (Mexico ^{1/} , Topbas, Florance and Sunter)	78	87	78	87
Red wheat for bread (soft & hard)	77	86	77	86
SIIA wheat for bread (soft & hard) ^{2/}	75	84	75	84
Rye	57	67	57	67
Malting barley	55	65	60	70
White barley	50	60	55	65
SIIA barley ^{2/}	47	60	52	65
Black barley	35	45	40	50
White oats	47	57	52	62
SIIA oats ^{2/}	45	57	50	62
Black oats	43	57	43	62

^{1/} Produced from several varieties of the Mexican wheat imported last year.

^{2/} These are grown in the provinces of Seyhan, Icel, Hatay and Antalya where the climate is not very suitable for high quality of cereals.

Source: The Official Gazette dated June 15, 1968.

UNCLASSIFIED



Department of State

TELEGRAM

UNCLASSIFIED 510

PAGE 01 STATE 057788

17
ORIGIN AID 35

INFO NEA 06, E 04, IGA 02, INR 07, /054 R

DRAFTED BY: ERICE PPC/POL/ES
APPROVED BY: JOHN EDDISON NESA/NE
NESA/NE BLANGMAID (SUBS)
NESA/TECH JBLUMS
AA/WOH ADASPIT
PPC/POL/ES DMCCLELLAND
DISTRIBUTION: ACTION AAPC INFO PRR AWOH N COMM 35P
66667

096752

R 152254Z APR 69
FM SECSTATE WASHDC
TO AMEMBASSY ANKARA

UNCLAS STATE 057788

AIDAC

SUBJECT: TURKEY WHEAT PAPER, SUBMITTED MARCH 21, 1969

REF: TOAID A-141 DTD 3/21/69

1. EXCELLENT JOB. CONGRATULATIONS IN ORDER FOR PAPER AND PAR.
2. ONE IMPORTANT OMISSION IS (1) DESCRIBING AID'S ROLE IN BUILDING INSTITUTIONS WHICH SUPPORTED HYV PROGRAM. THIS SPELLED OUT PARAGRAPH 3. OTHER OMISSIONS SPELLED OUT PARAGRAPH 4 ARRANGED ACCORDING TO USAID OUTLINE. TELEGRAM INFORMATION BY APRIL 23 FOR FULL IMPACT ON GLOBAL PAPER DRAFTS.
3. TECHNICAL ASSISTANCE INPUTS. HISTORICAL SIDE OF PART III 3 IS INADEQUATE. WE NEED AT LEAST A SUMMARY OF EXTENT AND SIGNIFICANCE OF LONG TERM U.S. INPUT INTO INSTITUTIONS WHICH LATER CONTRIBUTED TO HYV, INCLUDING RESEARCH SERVICE, EXTIONS SERVICE, AGRICULTURAL BANK (AGRICULTURE CREDIT DIVISION), TMO, DONATIM, AGRICULTURAL CREDIT COOPERATIVE UNION, STATE SEED FARMS. ALSO, DID TRADITIONAL OBJECTIVES AND STRUCTURE OF ASSISTED INSTITUTIONS, AS

UNCLASSIFIED
3



Department of State

TELEGRAM

UNCLASSIFIED

PAGE 02 STATE 057788

PREVIOUSLY SANCTIONED BY USAID, HAVE TO BE REDESIGNED TO SERVICE THE HYV PROGRAM?

4. OTHER OMISSIONS

I 3 FERTILIZER. WHICH DISTRIBUTORS HANDLED "PACKAGED" AND UNPACKAGED HYV FERTILIZER?

4 PROFIT. IS DENIZLI REPRESENTATIVE OF COAST? IS 073-44 REPRESENTATIVE OF NATIVE WHEAT?

5A PROMOTION. HOW DID 68/69 PACKAGE AND PROMOTIONAL CAMPAIGN DIFFER FROM PREVIOUS YEAR? DID SPECIAL ADMINISTRATIVE MECHANISMS SURVIVE?

5B GIVE MARKET AND SUPPORT PRICES FOR WHEAT AND FERTILIZER. 1960-67.

5D FERTILIZER POLICIES. DESCRIBE GOT ACTION TO INCREASE DOMESTIC FERTILIZER CAPACITY.

6D CREDIT. WHAT PERCENTAGE OF FARMERS USING MEXICANI SEED NEEDED CREDIT, AND THUS PRESUMABLY USED PACKAGE DESCRIBED PAGE 417

6E MARKETING. HOW WAS INCREASED COAST OUTPUT HANDLED? DESCRIBE ROLE OF TMO IN MOVING LOCAL SURPLUSES, IF ANY. IS TMO ADEQUATELY FUNDED TO CLEAR CROPS EXPECTED NEXT FEW YEARS?

6F COOPS. WHAT PERCENTAGE OF FARMERS USING MEXICANI SEED GOT CREDIT AND/OR FERTILIZER THROUGH COOPERATIVES?

6G EDUCATION. CAN WE ASSUME UNIVERSITIES PLAYED NO RE?

II. CAUSES. CONSIDERING, AMONG OTHER THINGS, THE SIGNIFICANCE OF THE RAPID INCREASE IN USE OF IMPROVED DOMESTIC VARIETIES (PAGE 11) ESTIMATE SPEED WITH WHICH MEXICAN SEEDS WOULD HAVE SPREAD ON COAST WITHOUT PACKAGE, EXTENSION OR OREGONI.

IV-1 DIFFERENTIAL ADOPTION. WHAT WAS TYPOLOGY OF THE 60,000 FARMERS? ESTIMATE PERCENTAGE OF LARGE PROGRESSIVE FARMERS.

UNCLASSIFIED



Department of State

TELEGRAM

UNCLASSIFIED

PAGE 03 STATE 057788

SMALL PROGRESSIVE FARMERS, SMALL SUBSISTENCE FARMERS,
HOW MANY ALREADY USED FERTILIZER, USED IMPROVED DOMESTIC
WHEAT SEED, PLANTED COTTON.

3 EMPLOYMENT EFFECTS. PAPERS IGNORE HARVEST. WAS THERE
UNUSUAL LABOR SHORTAGE AT HARVEST? WHAT PERCENTAGE MEXICAN
WHEAT WAS HARVESTED BY COMBINES MENTIONED PAGE 297
ROGERS

UNCLASSIFIED

CONFIDENTIAL

DEPARTMENT OF STATE

UNCLASSIFIED
CLASSIFICATION

For each address check one ACTION | INFO

AGR 4
X FEB 4
DATE REC'D.

ORIGINATOR

TO AID/Washington TOAID A- 213 X

FEA
D
DD
EVAL
ADCD
ADC
ADEP
POD
CID
CIRON

FROM ANKARA

DATE SENT
April 25, 1969

SUBJECT The Introduction of Mexican Wheat into Turkish Agriculture.
Amendment No. 1.

REFERENCE (A) STATE 057788, (B) ~~ANKARA~~ TOAID A-141.

Emb.
AMB
DCM
ECON
AGATT
COMATT

1. Thanks for commendation on the paper and PAR.
2. III. 3. Technical Assistance Inputs

AID and its predecessor agencies have conducted agricultural programs in Turkey for about 20 years, with the first participant, Turkey's present Prime Minister, returning after one year of training in September 1950 to rejoin the State Hydraulic Works (DSI). Since that time many large projects to support agricultural development with emphasis on research and extension have been carried out and many people, including some who are now supreme court judges, senators and members of the Grand National Assembly, have been trained. The records concerning most of these activities have been sent to Washington so that detailed information on them no longer exists in the Mission.

In examining such records as do exist here, however, we find that support of various kinds has been given in many areas that probably contributed to the success of the wheat program.

Table I shows the local currency loans and Table II the local currency grants that have been made in support of activities of this kind. Table III is a listing of Dollar projects involving participants, technicians, or commodities or some combination of the three categories of assistance which may, and probably did, have some effect on this program.

A hurried review of returned participants, leaving out the 25 wheat participants in CY 1967 and 1968, indicates that of about 1,250 people

SEARCHED	INDEXED	FILED	APR 25 1969
J. WILSON/EM Humphrey/		J. SKILLEN, Director	
J. HILL/mgb.paj		4/22/69	

ACLEB/EVAL *ACLEB*
WEPOLK/POB *Wolk*

UNCLASSIFIED

CLASSIFICATION
(Do not type below this line)

receiving training under the projects listed in Table III, we can identify about 470 as being in positions where they might have been and probably were associated with this activity. See Table IV, "Returned Participants in Institutions Associated with the Mexican Wheat Introduction." This list is incomplete since some participants have changed jobs since the participant directory was prepared and the job descriptions for others were so incomplete that they were disregarded when the above summation was made whereas, in actual fact, they might have been involved in the program.

It will be noted, also, that many returned participants are working in agencies other than those sponsoring the training. T.M.O., for example, has never had a participant program under the F&A Division, yet three people, including the General Director, (Research Administration), were agricultural participants. Many participants, too, have been promoted into better jobs. All of the 27 people shown in Lines 13 and 14 of Table IV were trained for technical jobs but they now hold senior administrative positions of responsibility and trust in their ministries or agencies.

The Agricultural Bank, particularly, reflects the effect of having many senior officers trained in the U. S. This institution was quite responsive to the demands made upon it for money to support the program by the farmers, the cooperatives and the supply organizations. As shown in Table I through IV, AID has invested and loaned rather large sums of money for use in various programs conducted by this bank.

It is evident that AID has also provided considerable assistance in the form of advisers, training and commodities to the research and the extension services. Both services were making some progress in the traditional manner when Mexican wheat was introduced. Neither service recognized the opportunity when it first arrived but the farmers did. Bypassing the services, the farmers went directly to the Minister for help.

The extension service, at the Minister's urging, was ready, willing and able to do an excellent job of training and guiding 60,000 farmers the first year, over 200,000 the second. The extension staff was almost complete, it was fairly well trained, and it had an impressive story to tell. It is difficult to determine now just how much assistance AID has put into the extension service but it is a relatively large amount, and as a result the Turkish service is similar to that found in the U. S. Since the service was organized on the American pattern, it could and did work very well with the American advisers in teaching farmers to raise wheat American-Mexican style.

It seems to us that the performance of the extension service on this project points up one of the major lessons to be learned from the Green Revolution. That lesson is that the returns from building "extension services," "research services," "Universities," or any other institution are likely to be small and disappointing if the building of that institution is the goal in itself. If, however, the

institution has a job to do with a high, visible pay off, like introducing Mexican wheat into Turkey, the services will almost build and shape themselves to respond to the opportunity. With U. S. help, the extension service was ready to function. With the excitement of the possibility offered by the Mexican wheat and with the need for food, the extension service did function very creditably, for which the U. S. can take considerable credit.

The research service has had a great amount of help also and is patterned to a great extent after the U. S. system. It also lacked a stimulus to make a concentrated effort until Mexican wheat came along. Now it seems to be stepping up the pace of its activities and, in conjunction with the Rockefeller Foundation, is planning to start a big wheat research program. It is also starting to do more work on protein improvement of cereals, sorghum, alfalfa, etc., and looking to the day when land can be spared from food production for export crops, it is starting a program on fruits and vegetables for export with very little physical help from us. Again, the U. S. can take some credit for the work already done but just what our contributions have done is difficult to evaluate.

Agricultural credit cooperatives have been fostered by the Agricultural Bank for several years and were finally separated from the bank administratively last year, although their headquarters are still in the Bank headquarters building. Therefore, it is impossible to separate AID's help to the Bank and to the Union of Credit Cooperatives. Even now Bank officials in the U. S. for training (such as the Assistant Director General for Agricultural Credit) spend about as much time studying cooperatives as they do looking at the various other aspects of borrowing and lending money on behalf of farmers.

Several technicians have worked in Turkey on seed and fertilizer production problems but they have not worked specifically with the State Farms or Donatim to solve them. However, as noted in Table IV, many officers of both organizations are returned U. S. participants and some of their programs have been influenced by AID advisers assigned to work on general supply programs. Even now, the State Farm Directorate is a primary force working with us to introduce the stubble mulch method of wheat cultivation on the plateau.

All things considered, the traditional objectives and structures of the above-mentioned institutions did not have to be altered in order for them to service the IXV program. Nothing was dropped from the Government's other programs but the efforts of all Government agencies in the areas suitable for Mexican wheat production were focused on just one goal -- producing more wheat by planting 20,000 tons of Mexican wheat seed in such a way as to make it yield the maximum return. They missed their goal by about 3,000 tons but everything else was done efficiently, effectively and profitably without any major structural changes.

3. I. 3. C. Fertilizer

There is no unpackaged fertilizer used in Turkey. One "experimental boatload" of bulk phosphate was shipped to Samsun on T. Z. Donatim's account last year. This ship carried the required bags and the fertilizer was bagged as it left the ship and was then distributed at the "farm" level.

4. I. 4. Profit Calculation

The area under question is in the Mendere River Valley and is considered to be comparable to other coastal regions. The OY3/44 variety is representative of the average native Turkish varieties found in Mexican wheat areas.

5. I. 5. A. Promotional and Educational Campaign

The number of farmers in the Mexican wheat program increased from about 60,000 in 1967-68 to well over 200,000 in 1968-69. At the same time there was no increase in extension personnel, facilities or financing. As a consequence the highly concentrated job done in 1967-68 could not be exactly duplicated this year. Some farmers were never reached directly and cannot be expected to apply the entire "package" of practices as well as would otherwise be the case, although they did have the example of previous Mexican wheat growers in their areas to observe and follow.

The improved administrative mechanisms did survive although somewhat diluted on a "per farmer" basis. The progressive changes made would appear to be permanent. This is based on information obtained from the Provincial Directors.

6. I. 5. B. Price Policy

Market and support prices for wheat and fertilizer are given in Tables V and VI.

7. I. 5. D. Fertilizer and Other Input Policies

Turkey's goal is to be self sufficient in fertilizer. Following a study by TVA in 1966, the recommendation was made to the Government of Turkey that the plant at Kutahia be expanded and that one of the plants making single super phosphate be converted to triple. TVA also recommended that three new plants be built: one at Mersin to produce CAN and DAP, one at Samsun to make triple super or DAP and one at Elazig to make normal super. All of this construction is now under way. The new plants will come on stream in 1970 and 1971.

The TVA study made fertilizer consumption projections which showed that when the conversions and new plants were completed Turkey would be self sufficient in fertilizer. This was before Mexican wheat. The vast increase in use of fertilizer for this crop and on other crops has made the TVA projections obsolete. Other new plants are needed but it will be 5 to 8 years before any of them can be completed. In the meantime Turkey must import more fertilizer.

UNCLASSIFIED

8. I. 6. D. Credit

Information obtained from the Agricultural Bank indicates that 80 to 85% of the farmers growing Mexican wheat obtained credit. About 10% used cash and 5% are not accounted for. Credit was in "kind" and the farmers were required to take the required amount of fertilizer to match the seed they obtained.

9. I. 6. E. Marketing and Storage

The Director General of TMO has informed us that very little grain was offered for sale to that organization from the 1967-68 Mexican wheat crop. Millers in the area were actively buying wheat during the harvest period at prices ranging up to about 5 kuras per kilo more than the TMO purchase price.

He also states that, as a minimum, TMO wants to buy 1.5 million tons of wheat in 1969 and is ready to buy any amount at the announced procurement price. TMO activities are financed on an annual basis through allocations made by the Council of Ministers and the Director General regards it as inconceivable that the money to protect the guaranteed support price will not be forthcoming on time.

was

A meeting of the Regional Directors of TMO ~~was~~ held April 21 to plan the purchase campaign for summer 1969. New procurement teams will be authorized for the coastal regions and will start trading immediately. Considerable storage capacity already exists in the coastal areas but TMO is prepared to ship excess wheat to dry plateau areas where it will be pile stored on plastic sheeting and covered by plastic. The Director General assured us that such storage is good for at least six months and that even in years of high rainfall (such as last year) losses have been very low. In response to a question, the Director General stated that TMO had bought more domestic wheat in 1953 than in any other year. In that year, it bought almost 2 million tons and "since that time we have gained experience and built most of our storage so the prospect of buying three or four million tons does not worry us."

10. I. 6. F. Cooperatives

The Agricultural Bank informs us that about 50% of the farmers using Mexican wheat seed got credit through the Coops. The rest, with a few exceptions, got their credit from the Agricultural (Ziraat) Bank. The exceptions, very few in number, may have obtained credit from private sources. The credit coops got their financing through the Agricultural Bank so fundamentally practically all the credit came from this source.

The credit cooperatives did not supply any fertilizer or seed the first year of the Mexican wheat program but they did handle some fertilizers for the second year's program under the same conditions and prices as established by the Agricultural Bank and Donatim.

11. I. 6. C. Education

The universities played no direct, active part in the Mexican wheat program except that the seminar held in the fall of 1967 in the Aegean region was given in a room on the Ege University campus. It cannot be denied, on the other hand, that most of the officials who took part in the program are graduates of Turkish agricultural universities.

12. II. Assessment of Causes

This is a very difficult question to answer in a meaningful way. A factor, not mentioned in your telegram (STATE 057788) is the influence of and the determination of the Minister of Agriculture. Without this influence, opposition to the program would have slowed if not killed it. If it is assumed that the Minister's influence was present but other factors (the package of practices, fertilizer, credit, extension and the Oregon team) were absent the spread of Mexican wheat might have been about one fifth as fast as it has been or perhaps slower. This, however, is at best a loose guesstimate. There is no way of actually measuring the precise influence of individual factors in a program of this kind because they are all interrelated and the absence of any one of them might have prevented any success at all.

13. IV. 1. Differential Adoption of the New Program

We believe that all farmers in this program the first year were progressive and none would be considered to be in the subsistence class. Large and small are relative terms in Turkey but we assume that about 70% of the participants in the program might be classed as small farmers and 30% as relatively large farmers. It is also assumed that most of the farmers had some experience with fertilizer but very few had had experience with fertilizer on wheat. These same farmers probably used improved native wheat varieties to some extent. We estimate that about one fourth of the participating farmers planted cotton, and most of them, especially where irrigation is available, will continue to plant cotton with Mexican wheat in the rotation.

14. IV. 3. Employment Effects

Mexican wheat had no appreciable effect on labor. The 170,000 hectares is too small a part of the 8,115,000 hectares planted to wheat to exert any real influence. We estimate that at least 70% of the Mexican wheat was harvested with combines. This will probably be true again this season since combines are already being transported from the plateau to the coastal areas to take part in the early harvest there.

KOMER

UNCLASSIFIED

TABLE I

Local Currency Loan Projects

<u>Number</u>	<u>Description</u>	<u>Amount Million TL</u>	<u>Date</u>
277-44-140-066	Loan fund for the purchase of plant protection equipment	12	11/4/63
277-41-190-069	Loan to TMO for purchase of up to 300,000 m. tons of wheat from domestic or foreign sources	134	11/28/64
277-44-120-060	Loan for the purchase of land preparation, farm irrigation and soil conservation equipment	19	9/3/63
277-44-140-061	Loan for the establishment of a supervised credit program in the Agricultural Bank	25	4/24/63
CR-44-19-4 (CP-OSWCF-1)	Loan fund for purchases of tractors and equipment	5 5	9/19/60 9/15/61

TABLE II

Local Currency Grants

<u>Number</u>	<u>Description</u>	<u>Amount Million TL</u>	<u>Date</u>
44-13-37	Support of regional uniform crop variety testing	850	11/21/60
44-11-30	Agricultural information techniques	680	12/8/60
44-12-19	Agricultural training and work camps	3,000	4/15/60
44-12-9	Demonstrations in land and water use	1,250	1/15/60
44-11-8	Construction of facilities for agricultural training center	2,577	5/12/60
44-11-7	Training agricultural extension personnel	5,680	4/15/60

TABLE III

Dollar Projects

<u>Number</u>	<u>Type</u>	<u>Description</u>	<u>Participants</u>	<u>Amount (\$000)</u>
277-11-130-444	TA	Cereals production	25	240
277-22-190-447	Loan	Agricultural development and control	-	3,000
277-22-120-437	Loan	High-yielding varieties of wheat	-	3,450
277-11-190-425	TA	Integrated agricultural services	43	356
277-11-120-426	TA	On-farm water development	61	688
277-22-120-390	Loan	Equipment for operation and maintenance	-	4,400
277-11-140-334	TA	Plant protection	15	110
277-15-140-333	TA	Agricultural economic planning	20	576
277-15-140-332	TA	Agricultural credit and marketing	9	46
277-11-120-324	TA	Heavy equipment maintenance training center	14	142
277-11-140-283	TA	Agricultural cooperatives	1	4
277-11-120-275	TA	Irrigation and drainage engineers	-	Unknown
277-11-150-270	TA	Agricultural marketing and processing - Crop improvement	3	2
277-11-190-263	TA	General agricultural administration	14	Unknown
277-11-190-262	TA	Agricultural machinery training	-	Unknown
277-12-250-259	Loan	Grain storage - TMO	-	2,367
277-11-130-239	TA	Livestock and crop development	45	Unknown
277-15-190-241	TA	Agricultural machinery	7	Unknown

TABLE III
(cont.)Dollar Projects

<u>Number</u>	<u>Type</u>	<u>Description</u>	<u>Participants</u>	<u>Amount (\$000)</u>
277-11-110-237	TA	Agricultural research demonstration and extension	14	Unknown
277-11-120-238	TA	Land and water resources	7	Unknown
277-11-140-224	TA	Plant breeding	5	Unknown
277-15-110-230	TA	Agricultural extension and information materials	-	12
277-11-190-219	TA	Cotton machinery and agricultural equipment	2	9
277-11-110-220	TA	Legume breeding and research methods	1	4
277-11-110-221	TA	Agricultural extension and information methods	4	19
277-11-110-222	TA	Soils productivity research training	1	3
277-11-110-211	TA	Ataturk University Faculty of Agriculture	183	3,702
277-11-110-195	TA	Study of agricultural extension and methods	15	21
277-11-140-198	TA	State Farm production	5	7
277-15-110-202	TA	Agricultural visual aids	-	-
277-11-140-203	TA	Plant protection and insect control	2	9
277-11-190-188	TA	Certification and testing of seed	2	5
277-11-140-189	TA	Farm machinery training	3	12
277-11-120-190	TA	Administration of irrigation programs	2	3
277-11-120-166	TA	Irrigation training	4	13
277-11-120-160	TA	Soils use and management	5	17

TABLE III
(cont.)

Dollar Projects

<u>Number</u>	<u>Type</u>	<u>Description</u>	<u>Participants</u>	<u>Amount (\$000)</u>
277-11-130-157	TA	Plant protection	3	16
277-11-130-156	TA	Wheat production	3	8
277-11-190-155	TA	Farm mechanization	13	41
277-11-130-151	TA	Crops, grass and forage development	50	473
277-11-120-149	TA	Land and water use and conservation	131	1,497
277-11-130-147	TA	Agricultural extension methods	4	Unknown
277-11-120-142	TA	Water resources and management development	218	2,116
277-11-140-129	TA	General agricultural training	64	99
277-11-140-083	TA	Farm Management Institute	1	2
277-11-190-077	TA	Agricultural trainees	45	96
277-11-190-076	TA	Agricultural administrators training	15	30
277-11-190-027	TA	Agricultural trainees	28	93
277-11-190-026	TA	Agricultural advisory group	-	182
277-11-120-023	TA	Irrigation and water development	4	13
277-11-110-075	TA	Agricultural Extension	68	916

TABLE IV*

Returned Participants in Institutions Associated with
the Mexican Wheat Introduction

<u>Institution</u>	<u>No. of Participants</u>
Research stations focusing on cereal production	77
Teknik Ziraat (extension) and information services	96
Agriculture Bank and credit cooperatives	40
T.M.O.	3
T.Z. Boranım	19
Ministry of Commerce and others dealing with fertilizer	10
State Farms and seed certification	19
Plant Protection General Directorate	52
Toprakcu	99
Agricultural Planning	13
Machinery Development	16
Agricultural Marketing	2
Administration of Ministry of Agriculture	20
Administration of Ministry of Village Affairs	7

*Directory of Participants, USAID Training Office
USAID/Turkey, May 1968.

TABLE V*

TMO Buying (B)(Support) and Selling(S) Prices of Wheat in Turkey
(Prices in Kuruş per Kilogram)**

Type of wheat	1960-61		1961-62		1962-63		1963-64		1964-65		1965-66		1966-67		1967-68		1968-69	
	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S
Durum	50	58	73	83	78	88												
Grade I Anatolia & Thrace							78	88	78	88	86	97	86	97	86	97	86	97
Grade I S.E. Anatolia							75	85	-	-	-	-	83	93	83	93	83	93
Grade III Anatolia & Thrace													83	94	83	94	83	94
Grade II S.E. Anatolia													80	90	80	90	80	90
Anatolian white wheat	50	-	64	-	75	-	75	-	75	-	83	86	80	86	80	86	80	86
Soft wheat for bread (Mexican, Topbag, Florance & Sunter)	50	58	63	75	73	75	73	80	-	-	78	87	78	87	78	87	78	87
Red wheat for bread (soft and hard)											77	86	78	87	78	87	78	87
Sika wheat for bread (soft and hard)											75	84	77	86	77	86	77	86

ANICARA

* Information supplied by T.M.O.

** To convert kuruş per kg to \$ per bu, use the following equation:

$$\frac{27.2 \times \text{kuruş per kg}}{9} = \$ \text{ per bu.}$$

UNCLASSIFIED

14

TABLE VI

14

Cost in Kurus* per Kilogram to the Farmer
for Various Types of Chemical Fertilizers

Type of Fertilizer Analysis	Packaging	1960	61	62	63	64	65	66	67	68	69	
UNCLASSIFIED	Ammonium Sulfate 20-21% N	Paper	55	50	47	63	63	63	59	59	54	54
	Ammonium Sulfate 20-21% N	Jute or Polyethylene						68	64	64	58	58
	Ammonium Nitrate 20-21% N	Paper			60	60	60	60	56	56	54	54
	Ammonium Nitrate 20-21% N	Jute or Polyethylene						65	61	61	58	58
	Ammonium Nitrate 26% N	Polyethylene								75	65	65
	Super Phosphate - Granulated 16-18% P ₂ O ₅	Paper						45	41	37	37	37
	Super Phosphate - Dust 16-18% P ₂ O ₅	Paper	50	50	44	44	44	45	40	37	37	37
	Triple Super Phosphate - Granulated 43% P ₂ O ₅	Polyethylene				98	120	110	110	95	85	85
	Potash 48-50% K ₂ O	Polyethylene	85	85	75	80	80	100	100	90	80	80

TOWARD A - 213

ANEKANA

UNCLASSIFIED

* To convert kurus/kg to \$/metric ton, use this equation: Kurus/kg X 1.11 = \$/mt.
To get \$ per short ton of 2000 lbs.: \$/mt X .91 = \$/short ton

MEMORANDUM

DEPARTMENT OF STATE

CLASSIFICATION

For each address check one ACTION

INFO

DATE RECD.

JG
cc: fcl/m

TO - AID/W TOAID A - 1658

55

FROM - ANKARA

DATE SENT

November 25, 1968

SUBJECT - End of Tour Report Harvey P. H. Johnson - "Chronology of First Year of Mexican Wheat Campaign in Turkey"

REFERENCE - M.O. 326.3 - Project No. 277-11-130-444, Cereals Production; Loan No. 277-M-082, Wheat Seed

Name: Harvey P. H. Johnson Job Title: Deputy Food & Agriculture Officer

Country of Assignment: Turkey

Tour of Duty Began: November 1, 1966

Tour of Duty Ended: December 9, 1968

Prior Country Assignments: None

It was my good fortune to arrive in Turkey just before an American team of advisors met with Ministry of Agriculture personnel and others on the direction agriculture should develop in Turkey. A major product of those several discussions was the Mexican wheat program which I have had the opportunity to be closely associated with since its inception.

The Mexican wheat introduction came about so rapidly that it was impossible to formalize a project for it. Had a project been a necessary prerequisite the timing advantage we had would have been lost.

It is clearly understandable that a large program such as the Mexican wheat introduction would encounter many doubters, particularly so since agricultural highlights in Turkey up to this time had been few and far between. My purpose for including comments about these doubts in this report is not to be vindictive but rather to show that such issues have to be met and resolved.

PAGE 1 OF 1 PAGES

3 DRAFTER: HPH:Johnson:sa	FOIA	PHONE NO: 156	DATE: 9/24/68	APPROVED BY: DJ: Bartlett Harvey
---------------------------	------	---------------	---------------	----------------------------------

AID AND OTHER INTERESTS
FOIA:JRWILSON

UNCLASSIFIED
CLASSIFICATION

(Do not type below this line)

3
APPROVED
DATE
BY
654
APPROVED
DATE
BY
CIA
PCY

A chronicle of events was kept on the wheat introduction for the entire first year and until normal reporting and documentation made such a chronicle no longer necessary. For this report it has been further edited by including statements of policy and recommendation in addition to the mere reporting of events on a given day. If the events and planning can be useful to someone else in a somewhat similar circumstance the effort of recording these decisions will be worthwhile.

The introduction of Mexican wheat to Turkish agriculture involved many policy and technical decisions on the part of both the Turkish Government and USAID.

According to Sadettin Demirez, Manager of the Research Station at Adapazari, interest in Mexican wheat research first began in 1959 by contacting the Rockefeller Research Organization in Mexico. This led to the planting of 17 lines of Mexican types in 1960. In 1961-62 this was increased to 51 - a large number but not all of which were Mexican wheats and in 1963 there were 10. At the close of the 1964 season there were 10 Mexican lines that seemed to have much promise. These were planted again in the two following years (65 and 66) along with checks and other new strains. The Mexican varieties were the top performers with relatively little disease problems except with Sonora 64 which rusted badly. Sonora 63 showed some rust but a variety which they called Espigas was very resistant. Some of the same Mexican lines were included in research plots elsewhere in Turkey but the Adapazari trials were the ones usually cited by Ankara personnel. Turkey had sent four of its plant breeders to Mexico for observation and study at the Rockefeller Research Station in Mexico prior to the request for commercial plantings in the spring of 1967. Despite the favorable test findings Turkish seed officials were reluctant to move along at a faster rate on Mexican wheats due possibly to two reasons; first that their requirement calls for 3 to 5 years of continuous testing and secondly the prevailing opinion that native varieties were as good.

In the summer of 1965 a progressive farmer near Adana with the help of two AID employees obtained a few kilograms of two Mexican varieties, Sonora 64 and Hema Rojo. These yielded 63 and 61.5 bushels per acre respectively compared to 31.5 bushels per acre from a local variety. This performance sparked the interest of 100 farmers in that area to band together and import on their own 60 MT of Sonora 64. The Barzen Seed Company of Minneapolis Minnesota acted as their agent. The seed cost \$259.00 MT laid down at Iskenderun. Added to this were customs and other costs making the seed a precious item to these farmers. This private farmer activity at the onset received only passive endorsement from the Minister of Agriculture and outright opposition from others in the Ministry which did not create good relationship.

With the foregoing as history over a longer period of time, we can now start with a more chronological presentation.

November 14 to December 16, 1966 - A Study Team of U.S. agricultural specialists visited Turkey at the request of the Ministry of Agriculture. One member was Dr. Orville A. Vogel, a noted USDA wheat breeder from the State of Washington. His presence had a great impact on the wheat program which was later developed.

December 8, 1966 - Dr. Vogel met with a group in Tarsus which included five leading farmers. At this meeting he gave encouragement to the growing of Mexican wheat in the Adana area. The privately imported wheat had arrived late but a good portion of it had now been planted. He talked about higher fertilizer requirements and the need of good drainage. Minutes of this meeting were distributed to the 106 farmers who heretofore had received little or no technical information on how to grow the new wheat.

January 11, 1967 - The Minister of Agriculture on the eve of Bekir Dayrami invited two AID representatives in to tell them of his plan for agriculture. He stated that he had gained confidence in his 15 months of office on a theory, which was later supported by the Study Team members, that Turkey could use the new Mexican wheats effectively in its coastal area. He wanted to import 50 to 60 thousand tons which would be enough seed to plant 1/3 of the coastal area including the Black Sea. He stated that Turkey's research had been slow and that he wanted to use improved varieties from other countries. This was a crash program he said in order to prevent importation of as much as half a million tons of wheat in 1968. He wanted Turkey to become self sufficient in wheat production, in fact, he aimed at a 3-fold increase to 30 million tons yearly wheat production within a short span of years. This meeting marked the beginning of the real thrust towards a Mexican wheat program for Turkey. The dynamic leadership which the Minister was anxious to give this program was and has been most helpful.

January 14 - A follow up meeting was held with Ministry personnel. At this meeting the request was made of USAID to provide up to \$10,000,000 in long term credit for the purchase of the seed. AID suggested preparation of an action plan and an early appraisal of seed varieties and the amounts required of each. Many members of the Ministry seemed almost stunned at the enormous quantity requested.

January 16 - A second follow up meeting was held with Ministry personnel to discuss varieties. The suggestion was made that decision on variety selection be delayed until performance of Sonora 64 in Adana and test results could be evaluated. Six uniform variety tests containing nine different Mexican varieties had been planted in December, 1966 throughout the coastal areas. AID stressed that immediate determination of varieties had to be made since harvest in Mexico would begin in April.

January 17 - A letter was written to Mr. Horton AID/W requesting his help on locating source of several Mexican varieties. He was very helpful.

January 17 - Another meeting with Ministry personnel to discuss action plan developed by AID. The steps presented were agreed upon as target dates and goals. Ministry request for funds now increased to include U.S. purchase of 3000 grain drills, 50 furrow former drills and 100 red weeders.

January 18 - The impact of the Minister's request now became felt in the Mission. Another meeting was held with the Minister by the top administrative officers using the German language which the Minister understands. The understanding which AID gained from this meeting was that the Minister was only interested in loan funds and that he did not desire AID technical assistance. This later proved

to be a misunderstanding, no doubt due to translation difficulty. There was considerable concern expressed by top AID officials and in particular by members of the Economic Planning Division as to the advisability of AID involvement in such a crash program - the size of the program, the stability of the extension service, the lack of drills, the danger of rust, the inferior quality of Mexican wheats etc. It became extremely difficult for the T&A Division to keep the program alive.

January 21 - Dr. Robert Pfeiffer, wheat breeder from Penn. State University, who was on a Fulbright Fellowship assigned to Ataturk University arrived for consultation.

January 23 - Another meeting between AID and Ministry personnel. This meeting permitted Economic Planning persons to get a better understanding of the Minister's request. They also raised question about GOI being able to finance this on their own since each year GOI buys a much greater amount of seed from its own State Farms and contract farmers to sell as seed to farmers. They continued to question the size of request in view of smaller beginning recommended by Dr. Vogel, who could not possibly have anticipated the Minister's ambitious request.

January 25 - Turkish radio gave reports of the Minister's request for a large Mexican wheat import. News about the new "wonder wheat" spread rapidly. Repeated radio broadcasts followed at later dates.

January 25 - Dr. Vogel had recommended the services of Drs. Jackson and Kronstad of Oregon State University for two short term tours of Turkey to evaluate Mexican wheat potential.

January 29-30 - Letters were written to Dr. Borloug, Dr. Vogel, AID Mission in India, UNDA and Dr. Narvaez of Pakistan requesting advice on Turkey's proposed program and information that these persons might have on local experience with Mexican wheats.

January 31 - Feb. 3 - Dr. Pfeiffer and AID representatives made trip to Adana to observe commercial plantings of 106 farmers and two uniform variety tests. Found considerable nitrogen starvation. Many of the farmers had not applied nitrogen at time of seeding. Variety tests were poor. On February 1 a farmer meeting was called attended by 60 of the participating farmers. AID representatives talked about the urgent and immediate need of applying nitrogen. They recommended application of 6 kg. pure nitrogen per hectare either in the sulphate or nitrate forms and suggested that larger applications would be even more beneficial. Information received later indicated excellent cooperation with some farmers applying less, many following recommendations and a few going higher. Interest at the farmer meeting was very good.

January 31 - Mission concurred on services of Jackson and Kronstad.

February 1 - Mr. O. L. Mirns, Chief Agricultural Branch, NESEA Washington arrived for a few days. He was exposed to some Mission discussion on the size of request, adequacy of extension service to handle program, need for drills, availability of fertilizer, transportation, etc. After weighing the discussion he took a firm position that a crash program was a possibility despite much comment to the contrary. Dr. Pfeiffer also felt the crash program was possible.

February 1 - Washington telegram asked whether GDT willing purchase seed with own funds or would GDT make seeds eligible commodity under program loan. Also indicated Minneapolis meeting being arranged for Vogel, Borloug, Moscan.

February 2 - Director sent telegram to Washington (Rume) giving activity to date and referred to Washington's concern about disease problems.

February 3 - Wheat import proposal generally received little support from Turkish research people who felt more experimental work was necessary. They questioned rust and cold resistance, also had concern about quality of Mexican wheat. The Minister held firm to his contention that researchers had been slow in coming up with new varieties and ideas and that success elsewhere had been such as to make the risk of a large introduction less dangerous.

February 4 - Letter from Horton together with information from other sources indicated that supply of wheat from Mexico might be limited and expensive.

February 7 - Several comments made around Mission that a 20,000 to 25,000 ton import was more acceptable. The Minister started talking in terms of 40,000.

February 8 - Director wrote letter to Mr. Rume AID/W suggesting that wheat program would comply with War on Hunger concept. Suggested project agreement procedure including some GDT performance requirements.

February 9 - Mission Capital Projects Division recommended procedures for preparation of Intensive Review Request and gave outline of information required. There was mention of a proposed loan.

February 9 - Dr. Moscan, Borloug, Vogel, Cummings, Gibling and Fletcher met in Chicago to discuss Turkey's wheat program. Their recommendation was that no more than 5000 tons be considered due to lack of familiarity by Turkish farmers in planting new type wheats. Dr. Borloug offered his assistance in directing GDT personnel to Mexicans but said actual arrangements would have to be between the two governments.

February 10 - Report of U.S. Agriculture Study Team ready for distribution to Ministry of Agriculture. The report while favorable on prospects of Mexican wheat for coastal areas did not and could not anticipate the large size of import requested by the Minister of Agriculture.

February 11 - AID met with ministry people in Ministry to determine private drill manufacturers in Turkey as to number and capability. Learned that potential capacity was adequate to meet needs if bonafide orders were submitted.

February 13 - FEA made request to Mission to set aside 5,000,000 TL local currency funds (Special Project Funds). Such funds to be used to implement wheat program. COT had not made request for this item.

February 21 - Mission approved having Dr. Vogel go to Mexico along with Jackson and Kronstad to evaluate Mexican wheat potential for Turkey.

February 24 - Minister of Agriculture sent letter to Minister of Finance requesting a loan to finance importation of 20,000 tons of wheat.

February 27 - Mr. Otto Ahsen representing CCC from USDA in Washington attended a meeting with Ministry of Finance representatives and AID to consider method of financing wheat from Mexico. It was pointed out that since it will take a long time for U.S. to process a loan that COT should provide funds for purchase of wheat subject to reimbursement after loan agreement was completed. This was agreed to by Ministry of Finance however they requested that wheat purchase be considered a grant to Turkey. They were told this was very unlikely and that PL 480 procedure could not be used since it involved bringing in wheat from Mexico, not U.S. Consideration was given to the use of barter for U.S. handling of Mexican wheat portion.

March 2 - Meeting of AID with Ministry of Agriculture personnel on preparation of extension materials and seed drill requirements which now reduced to 1400. AID urged consideration of the several private machinery manufacturers in Turkey. Meetings with private manufacturers were subsequently held and a limited number of drills produced. COT approval of drill design, credit arrangements and farmer commitments for drills held production down.

March 3 - Made distribution and translation of Reader's Digest article "Mexico Closes the Food Gap" and 1965 Rockefeller Report from Pakistan covering Mexican wheat introduction in that country. This was distributed by Ministry of Agriculture. Later a portion of 1966 Pakistan report was also reproduced.

March 5 - Mission position more positive that a crash program possible on Mexican wheat import. Influence of Director in particular very helpful in moving program along. The advantage of having support from top officials of host country and Mission is invaluable.

March 7 - Minister of Finance sent letter to AID making application for a development loan of \$5,500,000 for a High Yield Variety Wheat Seed Project.

March 8 - Meeting of AID with Ministry of Agriculture and TMO (Toprak Mahsulleri Ofisi) personnel to determine responsible agency for purchase of wheat in Mexico. TMO agreed to do so working through Mr. Kunter, Turkish Economic Counselor in Washington D.C.

March 8 - Chief of Division FEA AID left for U.S. to go on to Mexico and help Turkish group of four select wheat. Reports up to this time had left the impression that seed would be in short supply and that this factor would limit

size of program. Sending AID representative was a very valuable decision.

March 13 - AID Deputy Director and other AID members met with Agriculture and Finance Ministry personnel to further program understanding on wheat program. Learned that there had not been full understanding of the three for one requirement set on seed distribution and control of program. Believe this was now made clear. AID/W had suggested that $\frac{1}{4}$ of wheat import be under a closely supervised program.

March 14 - Warren Kevan and Dr. Jackson arrived from Oregon State University for an 18 day visit in Turkey. Together with an AID representative and local official they left following day for Adana then on to Antalya, Denizli and Izmir. Visited farmers, research stations and Topraksu stations to gather as much background as possible on Mexican wheat potential in the coastal area of Turkey. On the 27th they met with other research people to evaluate wheat varieties for Anatolia. Left on 29th for Adapazari and Eskigehir for further study of wheat potential. Returned to Washington April 2 for a debriefing session on April 3.

March 18 - Four man Turkish team arrived in Mexico following several days delay, to select wheat. These four were to be joined later by representatives of EAO who would have authorization to purchase wheat using COT funds. One person was from State Farms other three were plant breeders, two of which stayed for three weeks. The State Farm person and one wheat breeder stayed for almost four months and followed through on selection, purchase and loading of wheat.

March 20 - John Strom, author of Reader's Digest article "Mexico Closes the Food Gap" met with Minister of Agriculture and others of Ministry. Told about great possibilities of Mexican wheat but stressed the need of careful organization and planning on part of COT in order to handle as large a program as planned.

March 24 - Turgut Ozal, Undersecretary of SPO was appointed head of Wheat Seed Project Coordinating Committee, a Government wide group with representatives from Ministries of Agriculture, Finance, Commerce, Village Affairs and Energy & Natural Resources. This committee was to be responsible for broad policy and implementation problem. Heretofore there had been a working committee (National Seed Improvement Advisory Committee) in the Ministry of Agriculture headed by Ekrem Cihay which continued to function.

March 27 - AID met with COT research people to determine varieties and tonnages of wheat for the Anatolia plateau. A total of 400 tons was agreed upon to include six from northwest United States and four from Nebraska.

March 13 - Ozal stated he would send letter via Washington to Mexico authorizing COT wheat purchase - this was delayed.

March 28 - AID met with Minister of Finance acknowledging their request for a development loan of \$7,500,000 for new wheat import. Letter stated agreement in principle to finance importation of 20,000 tons but that it would take time to

process and obtain approval of loan therefore GOI should be prepared to make initial purchase of seed, restricted seed law along with provision for growing crop and the three for one distribution principle that had been outlined earlier.

March 29 - Jackson & Kronstad prepared tentative report on Cultural Practices For Soil Dwarf Wheats. Also helped in preparing step by step program for growing Mexican wheats.

March 31 - Submitted Intensive Review Request to Washington for a loan for 20,000 MT wheat at a cost not to exceed \$5,500,000. Stated there was strong GOI demand for high yielding Mexican seeds and that adequate fertilizer and credit would be available.

March 31 - State Farms submitted program for handling of 400 tons of Anatolian wheat on six of its farms.

April 4 - Mr. Gifford SAC working with State Farms advised that State Farms was preparing a detailed program on the supervision and control of 4600 tons of Mexican wheat which together with the 400 tons for the Anatolia would add up to the 5000 tons required for the three for one distribution recommended by Washington.

April 4 - Word from Mexico indicated ample wheat supply and good selection of varieties but no word from GOI on purchase authorization.

April 5 - Letter from Washington gave concurrence of Blume & Horton on placing project under intensive review but included several questions which were difficult, in fact impossible to answer at that time i.e. number of Turks in programs - their skill and training, organizational structure, report from 206 farms in Adana now growing Mexican wheat, tonnage and type of fertilizer and plans for supply procurement and distribution. Started drafting loan agreement.

April 6 - Received letter from Kronstad and Jackson outlining questions asked at Washington debriefing session and their answers. The following are summaries of those questions and answers:

- Q. What is potential of Mexican wheat in Turkey?
- A. Generally favorable from a yield and disease resistant standpoint.
- Q. What were reactions to present Sonora 64 plantings?
- A. Ranged from good to poor depending on amount of fertilizer used and soil moisture. The best plots except at Adiyaman were poor.
- Q. Will improved varieties improve yields on Anatolian Plateau?
- A. Only if cultural practices are improved.
- Q. What important cultural practices need to be improved on coast?
- A. Much more use of nitrogen. Use of drills and good drainage.
- Q. How successful would a supervised program on 5,000 tons be?
- A. It appeared that this would be a tremendous job based on past experience of poor performance of extension service. Fertilizer supply seemed

adequate for fall but uncertain for 1968 spring. Transportation was lacking for extension service and State Farms.

Q. Are Turkish research workers capable of capitalizing on new varieties?

A. Research seemed weak and disorganized.

Q. Reaction to Sonora 64 on disease?

A. Found some evidence of stripe rust. Environmental conditions were very favorable for an epidemic of this disease. Powdery mildew was present in Leman Hojo. Additional tonnage of Sonora 64 should not be imported.

Q. Impressions of Bekirchir Experiment Station?

A. Very good. Also favorably impressed with soils and Fertilizer Research Institute.

Q.

The foregoing debriefing did not help matters much between the Mission and doubtful colleagues in Washington.

April 6 - Washington Turkey Desk recommends approval of IRR but with many reservations. Wheat program must be closely controlled and all the precautions that came out of the Jackson-Kronstad debriefing were emphasized. They asked as to resources GOT would commit - wanted economic justification - viewed program as part of War on Hunger.

April 8 - Telegram from Washington advised that Kunter unable to leave Washington for Mexico to purchase wheat due to lack of GOT funds.

April 10 - Still no GOT authorization to purchase wheat. Spending of funds had to be authorized by Council of Ministers and Agricultural Bank. It was taking time to get all these signatures.

April 10 - Telegrams from Washington stated smaller import than 20,000 should be considered indicating Kronstad-Jackson report not favorable, time getting late and shortage of funds. Suggested not more than two million dollars if in fact even that much.

April 10 - State Farms presented detailed program for handling controlled portion of program (4600 + 400 tons). Stated adequacy of personnel (would hire 30 extra) fertilizer and other required inputs. Would keep good records and have close supervision.

April 12 - Meeting in AID director's office with John Funari, AID Washington, who came to Turkey with grain. The wheat program could be launched at 20,000 ton level. Clifford of MID indicated how State Farms would handle controlled program with contract farmers. Stated that State Farms had long experience with supervision of contract farmers - that in 1966 they had 130,000 acres in seed program with contract farmers. Any controlled program would require about 140,000 acres more but this would be no real problem since know how is available. Had work sheet explaining step by step outline of how job would be done. Believe Funari was impressed with this as well as with enthusiasm which Mission personnel now displayed on possibility of this program.

April 14 - Sent telegram to Washington telling how State Farms would handle controlled portion of program. Detailed information sent to Mims via pouch. Mission stated to Washington that it felt there was solid assurance of success for full 20,000 ton program.

April 15 - Washington in telegram suggested Mission proceed with loan paper up to 20,000 tons.

April 17 - Jackson and Kronstad explored in Oregon the suggestion made while they were in Turkey that county agents be sent to Turkey in early September for four months to supervise land preparation, planting and fertilization out in the provinces. They said interest looked good.

April 17 - Mr. Cihay, head of Agricultural Ministry wheat committee (working committee) held meeting in Izmir acquainting provincial personnel with program and assessing drill, vehicle and personnel requirements. Held similar meetings later at Adapazari and Adana thus including all three regions.

April 18 - Horton in Mexico aiding Turks with wheat purchase. Washington opposition to 20,000 ton program diminishing following receipt of information about handling controlled portion of wheat program.

April 19 - Letter of credit from COT received in Mexico. Now OK to buy wheat.

April 21 - Letter from Horton in Mexico stated agreement reached between COT and Mexico on purchase of 17,830 ton portion (commercial seed) of wheat. Purchase made from several wheat producers associations who wanted \$120.00 per ton - Turks offered \$116.00. Final settlement \$120.00, made arrangements for later purchase of 1770 tons of certified seed. There were six varieties of commercial seed and ten of certified. 1770 tons of certified seed was purchased from Productora Nacional de Semillas for \$148.40 per MT.

April 21 - Telegram from Washington indicated approval of ERR. Requested justification. Related program to War on Hunger. Requested that a number of items be included in draft loan paper.

April 22 - Telegram from Washington advised that barter procedure was disapproved for third country purchases. Recommended project loan instead. AID Turkey replied to this same day recommending agricultural sector loan equal to cost of seed, small amount of equipment and required services.

April 23 - State Farms agreed to purchase with own foreign exchange 16 John Deere deep furrow drills from U.S. Sent telegram to John Deere requesting they hold this number until purchase arrangements completed.

April 23 - Letter from Mission Director to Minister of Finance advised that barter arrangements not possible and that alternative would be agriculture sector loan to cover total foreign exchange costs i.e. seed (20,000 tons) and foreign exchange shipping costs. The 50-50 shipping requirement was waived for the wheat shipment. Sector loan to be administered like program loan.

when satisfactory evidence is available on 5000 ton controlled plantings.

May 3 - Made formal request to Excess Properties for 145 vehicles for wheat program. Several informal requests had been made earlier. Had information from COT that they would give wheat program top priority in their distribution of excess property vehicles.

May 11 - Five copies of draft loan paper carried to Washington by Director. Routine annexes mailed by pouch. Loan amount is \$3.45 million.

May 15-20 - Dr. Norman Goetze of Oregon State returned home from Jordan via Turkey and together with Jackson and Kronstad who just arrived for second short tour, conducted a week long seminar (week of May 22) for about 40 State Farm personnel who were to be in charge of controlled portion of wheat program. Together with Turks, FAO and other AID instructors they covered all phases of Mexican and Anatolian Plateau wheat production including record keeping and instructions on how to conduct group meetings. Concurrent with this seminar there was a meeting on wheat research attended by several Turkish research men and Jackson and Kronstad. They discussed type of uniform research to be conducted in 1967-68 with heavy emphasis on adaptive research. Jackson and Kronstad reaction to program success now much more favorable.

May 23 - Mission concurs funding of Wheat Production Team from Oregon and Washington by Technical Support.

May 23 - AID Communications Media Division and FEA discuss types of publications and instruction media to be used with Ministry of Agriculture. The following were recommended with number of each:

1. Why Mexican wheat (25,000)
2. Instructions to Agricultural Technicians (400)
3. How to Grow Semi Dwarf Wheat (25,000 later increased to 45,000)
4. Wall Newspaper A (20,000)
5. Wall Newspaper B (20,000)
6. Flipchart - How to Grow Mexican Wheat (300)
7. Slide Sets (60 sets)
8. Film: What Turkey is doing about its Wheat Problem
9. Press Conference
10. Radio Broadcasts

Numbers 4, 5 and 8 may not be used. Press conferences will take place from time to time. Radio broadcasts will originate locally. The remaining recommendations will see widespread use.

May 29 - June 8 - Jackson, Kronstad, COT and AID conducted one day meetings for extension personnel and leading farmers in each of the three regions. Interest was very good. Attendance was Adana 75, Izmir 150, Adana 220.

June 2 - Minister of Agriculture, AID Deputy Director and others from AID went to

Adana to observe harvest of this year's Sonora 64 crop. Reactions were favorable and a large number of local people attended the harvest celebration. Several pictures were taken of Minister who felt this was a day of fine achievement for Turkey. Yield from 80 of the 106 farmers averaged 300 kg./decare (44 bushels per acre). Highest was 662 (97 bushels) lowest 170 (25 bushels). Sonora 64 yield was 2 1/2 times greater than local varieties as averaged from farms having both Sonora 64 and a local variety.

June 3 - Mission sent telegram to Washington stating that vehicle supply was still very short - that excess property route would not be able to supply required 145 in time. Recommended that components for 100 locally manufactured pickup trucks be added to list of commodities eligible under program part of wheat loan. Estimated value was \$150,000. No action was taken.

June 7 - Discussion held on lira budget to support program. Estimates prepared by State Farms and General Directorate of Agriculture. Vehicle shortage continues to be greatest concern. State Supply Office has agreed to give wheat program top priority on locally manufactured vehicles. Has asked AID to finance importation of replacement parts.

June 9 - Most of art work completed for pamphlet on how to grow Mexican wheat and flip charts. Agreement on recommendations to be included except for fertilizer use.

June 9 - State Farms report a large number of contacts with potential wheat farmers and state interest good.

June 9 - Ankara Research Station planning to run quality analysis on Mexican wheats harvested from the 6 trials in coastal region.

June 20 - Telegram to Washington authorized Leland Anderson (on home leave) to go to Oregon June 28 to meet with Wheat Production Team members for briefing.

June 25 - Ahmet Denizligamal of Agricultural Ministry appointed to coordinate all research work for Mexican and Anatolian Plateau wheats.

June 29 - Drs. Hixson and Humphrey, AID Egypt and Mr. Colling, AID Jordan assigned to Turkey on safe-haven status arrived.

June 30 - AID contract signed with Oregon State University for providing technical service and assistance to Turkey during planting time. Contract included services of a. One extension Agent Team Leader for not more than 12 months (later a revision was made calling for 3 men for 12 months); b. 11 Extension Agent Team Members (later reduced to 9) for not more than 4 months and c. 5 consultants as required.

July 3 - Received early copies of the Participant Journal (a Mission publication) wheat issue. This issue was devoted to the Mexican wheat import and well illustrated with pictures. 7200 extra copies were printed to provide distribution

of 300 copies to other missions rather than the usual 50. Ministry of Agriculture requested 15,000 copies of a Turkish version. This was never completed.

July 3 - Shortage of vehicles for extension service a real problem. Excess property route not obtaining results. Ministry of Finance agreed to make available \$400,000 in Foreign Exchange to Ministry of Agriculture for procurement of vehicles and/or procurement of component parts to permit greater assembly in Turkey. Ministry of Agriculture unable to raise lira funds to take advantage of foreign exchange.

July 5 - 15 man Turkish wheat participant team left for a 22-day tour of Washington, Oregon and Mexican wheat areas. Purpose was to view wheat operations and cultural practices in U.S. and to observe seed breeding in Mexico. Five members to go to Moline, Illinois instead of Mexico to meet with farm implement manufacturers. Group consisted of 6 provincial extension directors, 5 State Farm Directors, the Chairman of the Wheat Committee, the Research Director of wheat program, a seed certification representative and a news and radio writer. Drs. Vogel, Jackson and Kronstad were to participate in tour.

July 10 - Agricultural Bank sent representative from Ankara to the 3 coastal regions to explain credit policies of bank for new wheat import to provincial extension personnel and to resolve credit problems already showing up.

July 10 - Discussion on setting up an AID Trust Fund for 6,000,000 T.L. underway. Fund to be used to implement wheat program. Project agreement for such fund initiated.

July 15 - The S.S. Pireos docked in Izmir with 14,000 tons of Mexican wheat. Half was unloaded in Izmir and the remainder in Iskenderun. There had been some water leakage into the hold of ship but polyethylene liners in each bag prevented damage to seed. Some 200-400 bags appeared to be wet which were re-bagged and re-labeled. Bags were well marked but not segregated in hold of ship by variety and destination.

July 22 - 400 tons of U.S. wheat varieties purchased at prices ranging from \$141.00 to \$220.00 per MT. Average price \$190.20. All of the seed certified except 33 tons which is registered.

July 24 - Following to date statements made on status of wheat program. First Business Bulletin completed, 100% flip charts ready, newly imported seed being stored adequately, State Farms have more applications than they can handle, seed treatment procedures being studied, fertilizer for fall application appears adequate and well distributed, agricultural Bank offices have not received full instructions on how to handle credit from headquarters, lack of drills is problem as is lack of vehicles.

July 27 - 6,000,000 T.L. Trust Fund project for wheat program implementation approved. Understanding is that it is to meet partial requirements of a larger

project totaling 13,621,000 T.L. COT to provide remainder of 7,621,000 T.L. Total project include purchases of 50 trucks and 45 pick-ups and to provide drivers salaries and per diems, technicians per diems, operation and maintenance of vehicles and publication of training materials.

August 1 - Report on Hixson visit to seven State Farms indicated that some chiseling for 1968 fall seeding following program recommended by Vogel had started. Also noted that spring operations following Vogel recommendations had been practiced on fields on which 400 ton U.S. import will be planted in fall of 1967.

August 1 - Ahmet Demirgözü held meeting with Turkish researchers and AID to discuss outlined plans of trials for both coastal and Anatolia plateau areas. Use 50 planned for each of the two areas.

August 1 - Continuing field trips made by safe-haven personnel. There is report of an opinion expressed by some Turkish extension persons and farmers that 12 kg. per decare nitrogen application is too large. Some claim their fields are so fertile that this amount would create excess application.

August 5 - 944,000 T.L. Special Trust Fund approved to cover expenses of Oregon Wheat Production Team members while in Turkey.

August 6 - Mission and COT concur on nomination of 12 man Wheat Production Team from Oregon as included in Oregon State contract. Five extra consultants as suggested by OSU not included in approval at this time.

August 6 - Regional training seminars for field technicians scheduled as follows:

Marmara Region at Yeşilköy - August 16-18

Izmir Region at Ege University - August 24-26

Mediterranean Region at Mersin - September 4-6

August 7 - Ambassador from Saudi Arabia to Turkey asked U.S. Ambassador Hart for bulletins and other material on new wheat. This delivered to him by Agricultural Attache.

August 9 - Price of Mexican wheat established as T.L. 1.75 per kilo for commercial and T.L. 2.00 for certified. This price covered total government cost of importing seed. It was almost twice the cost of Turkish commercial seed. No subsidy was involved - a commendable governmental position.

August 14 - A reporting card for use by farmers growing Mexican wheat has been prepared. Record as to time, rate and variety of planting can be noted as well as information on all cultural methods employed including fertilizer use. Date of harvest and yield will also be included. There is space to record date of farm or village visitations by extension personnel or others.

August 15 - Second boat of wheat arrived in Izmir with 6100 tons. COT on its own purchased an additional 2500 tons of Mexican wheat to the heretofore J.S. Loan commitment of 19,600 tons. This quantity helped save on freight charges. Bill?

unloaded at Izmir, other half at Mersin.

August 20 - The 12 man Wheat Production Team arrived. There were 5 extra dependents. Three members will stay for 12 months the other 9 for 4 months. They will be located out in the wheat growing areas.

August 21-26 - Briefing of wheat team to include review of USAID/agriculture program in Turkey, background of Mexican wheat program, plan of implementation - role of U.S. technicians, State Farm responsibilities, organization of Agriculture Ministry at various levels, farm credit, technical recommendations and communications with villagers. Turkish and AID personnel conducted briefing.

August 22 - Was informed from Ministry of Agriculture that 30 trucks had been purchased using joint funds approved July 27. 15 delivered to State Farms and 15 to Ministry. Had placed order for 36 pick-ups.

August 24-26 - The second of 3 regional seminars held in Izmir. Program almost wholly conducted by Turkish personnel with some AID participation. Subjects included research, seed distribution policy, farmer selection, credit provisions for seed and fertilizer, technical aspects of wheat growing with particular emphasis on need of 12 kg./decare use of nitrogen, use of training aids, record keeping, characteristics of new wheats, responsibility of Extension Personnel and seminar evaluation. Similar programs were held in the other two regions. Attendance was good but confined mainly to provincial personnel with some county representation. Most provinces held similar seminars later for their county personnel.

August 27 - Dr. Humphrey nominated as Agronomy Advisor-Wheat and to be Chief, Cereals Production Branch, a proposed new F&A project. All wheat activities heretofore had been conducted without a project.

September 4 - Members of Oregon Wheat Production Team now out in their respective areas obtaining first hand information of the job ahead of them.

September 5 - Dr. John Gibler of the Rockefeller Foundation arrived to hold preliminary discussion with Ministry of Agriculture representatives in regards to establishing a wheat research center in Turkey. In December, 1966, Drs. Giber and Stakman had visited Turkey and other Middle East countries with the view of establishing a wheat center for the Middle East. Information received later indicated that their choice had been Lebanon but with the outbreak of hostilities in early June, 1967 that choice was abandoned. This visit of Dr. Giber therefore indicated renewed interest in establishing in Turkey.

September 8 - Was informed that State Farms were to handle only the certified seed portion which is 1,770 tons Mexican wheat plus 400 for Anatolia. Original Mission understanding was that they would be in charge of full 5000 (4600 plus 400).

September 11 - Wheat Team members start sending in weekly reports following a set

format agreed upon at the briefing session. This report has headings on seed, fertilizer, seeding, training, transportation, land preparation, credit, attitudes towards program, adequacy of support and special problems. These reports to be summarized by regions and included in a single report which is sent out again to all members plus Mission and Washington distribution. First reports from field mentioned some shortage of interpreters and transportation for team members. Ministry of Agriculture had agreed to provide these services but did not have all arrangements completed when team arrived.

September 15 - Drs. Sterling Wortland and Ralph Cummings, Director and Associate Director, respectively, of agricultural sciences for the Rockefeller Foundation arrived in Turkey to join Dr. Gibler for further consultation and negotiations with GOF representatives on establishing a Research Center in Turkey.

September 16 - Reports from field appear generally favorable. Fertilizer and seed indicated as being available and well distributed. Some credit problems still exist. Farmer training being held. Drills and transportation are in very short supply. Attitude towards program good to excellent.

September 23 - Reports continue favorable from field.

September 23 & 24 - A two day conference conducted by State Farms at Altinova Farm attended by about 30 directors, assistants and farm machinery personnel. FAO and AID represented. Purpose of meeting was to discuss step by step procedure in moisture conservation or as referred to "The Stubble Mulch System". Some also refer to it as the Vogel system. The first step of deep chiseling had already been started and completed on about 60,000 decares. This will open up the hard and dry soils following wheat harvest and permit winter moisture storage. The goal set for fall chiseling on all State Farms, a new practice to Turkey, is 150,000 decares - a very commendable beginning.

September 25 - Plans for experimental trials completed and assignments of responsibility sent out to 16 different research stations. The general plan calls for a total of 172 trials roughly half for coastal areas and the other half for the Anatolia Plateau. The following are the tests with numbers of each: uniform variety trials - 37 on coast, 33 on Anatolia; time of seeding - 15 for coast, 15 for Anatolia; rate of seeding - 4 for coast, 8 for Anatolia; varying amounts of fertilizer particularly N - 15 for coast, 13 for Anatolia; source and amounts of N - 4 for coast, 11 for Anatolia; time and amounts of N - 4 for coast, 11 for Anatolia.

September 28 - GOF and AID sent representation to England to examine and make arrangements for a large number of surplus vehicles under GOF procurement. Report from them today indicated 124 vehicles are available and arrangements being made to ship them to Turkey for the wheat program.

September 28 & 29 - Minister of Finance had requested release of \$3,450,000 U.S. loan to Turkey. Mission held two meetings to determine whether 25% controlled portion of program and other requirements had been met in

view of State Farms supervising certified seed portion only (1770 plus 400) It was felt by several that the supervision given to entire program was greater than originally anticipated and as such the 25% requirement had been met. It was decided to withhold Mission approval of loan until a more satisfactory COT position on vehicle availability was attained.

September 30 - Ministry of Agriculture announced that price of wheat next spring including new production of Mexican wheat would not be lower than price set in 1967. Contract farmers will get normal extra price of about 15 kuruş for wheat qualifying for certification.

October 1 - Several Istanbul newspapers carried an article which translated reads as follows: "A great part of the wheat seed imported from the USA is infested with a pest - myzopertha. It was discovered by the Bornova Agricultural Anti Pest Institute (Izmir). The utilization of the seed has been stopped until further notice. This insect is detrimental to human health besides lowering production. Agricultural experts are touring the region to establish the infested wheat and destroy it." It is of interest that the U.S. wheat (400 tons) is not due to arrive Turkey until October 15. This matter was taken up with Ekrem Günay on October 2 who stated the Minister had held a 4 hour conference the day before (Sunday) on this very matter and had decided to send Ekrem Günay and the two Turkish representatives who stayed in Mexico for the entire selection period, down to Izmir to determine the exact nature of the news story and to hold a subsequent news conference. There have been several newspaper stories recently attacking the wheat program, stating the quality was poor, that Turkish varieties were better but had not been given opportunity and that American interest was to introduce Mexican wheat to replace cotton, a surplus crop in U.S. Agriculture Ministry people consider these statements to be politically inspired.

October 2 - Informed that order placed for 100 pickups of the 145 listed under joint fund of July 27. Turkish lira for entire amount had been deposited with Istanbul agent of State Supply Office. Might receive some pickups by October 15.

October 3 - Economic data prepared for team members pointing out that 17 row drills used on 1000 decares per year can pay for themselves in three years from savings of seed and fertilizer. Data also included on value of nitrogen use and that large applications are justifiable from a benefit - cost ratio basis.

October 5 - Front page headlines carried answer to stories that wheat was weevil infested. Stated that $\frac{1}{2}$ of 1% of bags found in Izmir area had weevils - that these were wheat weevils common to a large number of countries and that there was no cause for alarm to human health. The Minister broadcast similar comments on radio the night before. Earlier in week he had stated that he would not object to eating bread from this so called weevil infested wheat. Again claims were made that these anti-wheat statements came from those opposed to the wheat program and had political overtones.

October 9 - Wheat Team members met with Ekrem Günay in morning to report on wheat program to date. General reaction was that program was moving along very

well but that vehicle shortage was a critical item. When asked to transfer vehicles into wheat program from other activities Ekrem Bey replied this was impossible but that some effort would be made to do so. Shortage of operating funds at county levels was mentioned. Seed was not to be resacked in plastic lined bags after treatment but placed in burlap bags instead. Demonstration days were to be worked out at provincial levels according to need. Team members were urged to consult closely and often with extension directors.

October 10 - AID met with Ekrem Günay to determine whether advisable to ask top authorities to move local manufacture of vehicles along faster. Ekrem Bey felt ample pressure had already been placed on this. Stated that only 15 trucks and 13 pickups had been made available to wheat program to date - about 15% of requirement. Planned to have central wheat program for 1,000,000 hectares in 1968 (600,000 for coastal Mexican wheat and 400,000 for Anatolia where American wheats might prove to be the ones desired). Ministry is giving thought to have committee like the ones for wheat for other crops like barley, corn, rice, potatoes and pistachio. Ekrem Günay, Sadettin Demiröz and Ahmet Demirliçakmak to meet late December or early January to summarize steps taken to introduce and implement a Mexican wheat program in Turkey. This to be summarized in final form at harvest time next June and July.

October 11 - Through informal contact Deputy Director advised Turgut Özal about vehicle shortage for county extension personnel.

October 13 - Assistant AID Director, Management made arrangements with Ankara taxi firm to hire 8 vehicles for Oregon Team so as to permit these men greater opportunity to work in trouble areas and to give special encouragement to large growers. Rental rate to be 115 lira per day for driver and car plus gasoline cost. Daily rate to be effective up until 3000 km. have been driven in a month at which time an extra 80 kuruş would be added per km.

October 14 - Turgut Özal made arrangements with DSI and Topraksu and other organizations for release of 50 vehicles to wheat program for next 60 days.

October 20 - Reports from team members indicate that adverse publicity on wheat i.e. weevil infestation, small wheat kernels seed treatment poisonous, linking this with the wholly unrelated death of several children from exposure to new insecticides in Mexico, and other attacks have had their effect on creating doubt on the part of several farmers. Cases were reported of whole villages backing away from the new wheat due to this type of propaganda. Two professors Aras and Koçtürk are largely responsible for this publicity. The Minister, against whom most of their attacks are directed, made counter attacks.

October 23 - Met with Ekrem Günay to discuss possible over and under seed distributions by provinces. Ekrem Bey who keeps in close touch with all areas felt there was no need for alarm yet in such provinces as Mardin, Muğla, Çanakkale, Balıkesir and Denizli where shortfalls seem apparent. He urged him to visit these areas himself - also suggested use of influential farmers to meet with villagers as Can Eliyeçil so successfully did in Mersin area recently.

October 24 - 400 tons of U.S. wheat arrived at Mersin. State Farms have 25 trucks ready for loading and plan to lease an additional 25. Research has a truck on hand for its share. Hope to be planting by November 1.

October 31 - Vehicles have been released from such organizations as DSI, Topraksu and Highway Department for use on wheat program. Exact number unknown.

November 1 - The undersecretary of Agriculture spent the greater part of 3 days in Manisa Province where leadership has been weak and distribution of seed slow. He made some personnel changes and urged greater activity in getting information to villagers and in particular to large land holders.

November 2 - The Ministry of Agriculture has advised those provinces which have not distributed all their seed that none of it will be transferred out and that they will have to utilize their entire quota. This is a pressure tactic to keep promotion activity at high level.

November 2 - Some planting is underway. The greater activity will start around November 15. Some cotton land has been fully picked and prepared for wheat but the majority has not.

November 3 - Adverse publicity to wheat program is no longer much of a problem although some questions are still raised by farmers as to quality of bread. In one province a dentist made the rounds saying bread made from Mexican wheat is dark, almost black and smelly. These same farmers have been receptive to statements made by extension personnel refuting such allegations. The success of seed distribution varies from province to province in direct relationship to extension leadership, often top leadership. Some extension personnel seem incapable of mounting enthusiasm, it is such a new experience to them, others are developing into forceful leaders and the men under them respond correspondingly. The Oregon team members are well received and doing a tremendous job. It would have been short sighted not to have had them.

Observations from a province having good leadership may be helpful. Here they do the following: 1. Insist that all fields, even small ones, be drilled pointing out that this saves seed, and makes for uniform depth of seed and fertilizer placement. 2. Urge village coops to buy drills and help them set up rental fees breaking such fees down to tractor, drill and man use. 3. Insist that some person, trained in drill maintenance and operation, accompany drill on all plantings. 4. Appoint village leader to coordinate plantings so as to keep drill working effectively including night operations where extra lighting are available for tractor. 5. Provide spare drill parts at known distribution points. 6. Urge drill manufactures to have men out with drills until satisfactory operations obtained. 7. Hold demonstrations on drill operation, seeding rate and fertilizer distribution. 8. Insist on following set rules for planting, fertilizing and land preparation. 9. Have coops give receipts for all drill rental collections to Extension Office if drills be owned by this agency. 10. Use wide variety of visual aids to tell the benefits from and advantages of growing Mexican wheat - this to include answers to cost of wheat, extra income from Mexican wheat over domestic, high tillering ability, and absolute need of large fertilizer applica-

tion. 11. Conduct nightly meetings in villages at tea houses or other meeting places. Hold afternoon meetings also whenever possible but as seeding time approaches delegate some of the extension men to follow up on plantings during daylight hours. 12. Arrange meetings through village leaders and invite coop. leaders, bank leaders wherever possible. Invite them to participate. Invite and answer farmer questions at close of meetings. 13. Prepare their own visual aids, pamphlets and pictures to augment the short supply from COF sources. 14. Give simple instructions on land drainage with emphasis on removing surface water immediately following each rain using shovels if needed.

November 3 - The applied research program for 1967-1968 has been completed. This program outlines procedure in conducting 37 uniform variety trials in the coastal area and 33 in the Anatolian area; 15 times of seeding trials for the coastal area and 15 in the Anatolia; 4 rate of seeding plus varying rates of nitrogen in the coastal area and 8 on the Anatolia; 15 tests on rates of fertilizer application on coast and 13 on Anatolia; 3 tests on sources and rates of nitrogen on coast and 14 on Anatolia; 3 tests on time of nitrogen application with varying rates on coast and 11 on Anatolia. The research program is a very ambitious one and may not be fully completed. The longer range objectives, particularly on new variety development, are being compiled by the Ministry of Agriculture as part of its presentation to the Rockefeller Foundation for establishing a Center in Turkey.

November 6 - A shipment of 102 U.S. excess property vehicles arrived in Istanbul from England. All but 8 will be used in wheat program. Shipment included 62 1/2 ton pick-ups, 22 1/2 ton trucks, 8 3/4 ton closed trucks, 8 sedans and station wagons, two ambulances, a fork lift and \$25,000 worth of spare parts.

November 8 - A group of AID and Ministry of Agriculture people visited the Polatli State Farm to observe planting of U.S. wheats with John Deere furrow former drills. Drills were performing very well and a field seeded earlier with native wheat with the new drill was showing excellent and uniform emergence. It is expected that the entire 400 tons of U.S. wheats will be planted even though they arrived late. Most of the planting will be on State Farms.

November 9 - Minister of Agriculture and Ercan Günay in charge of wheat committee, met with local members of Extension Service, Agricultural Bank and others in Çukurova area to discuss in particular, credit problems that were still troublesome. This meeting was very helpful. Steps required to obtain credit in some areas has been very slow and cumbersome often to the point of discouraging the applicant. Much progress has come to reduce this. Credit for Mexican wheat and the required fertilizer is in kind.

November 12 - Oregon Team members met with AID in Ankara to evaluate program to date. It appears there will be areas that will not use the entire quota. Six provinces report no left over, the remaining vary from 10 to 35% of quota as probable left over. In quantity it appears that 5,000 tons of commercial seed will not be planted this fall. Reasons given for short fall are excess rains during October in south where almost half of seed was allotted. This has delayed cotton harvest and land preparation to a point where it may be impossible to plant wheat. One area reported rainfall four times normal for October. A second reason

for lack of planting is slowness in resolving credit problems and the third reason is unfavorable publicity. It should be noted however, that there are many counties where more than 20% of the wheat planted is the new Mexican varieties. Wheat already planted is showing excellent emergence and very vigorous and healthy growth. Wheat Team members and AID met with Ekrem Gunay to discuss programs. It appeared that Ministry was not as alarmed about possible short fall as ourselves. Credit problems are being resolved in most areas.

November 14 - A new wave of adverse publicity is being printed in one large newspaper (Akşam) by the same two professors - Aras and Koçtürk. They are presenting a new story each day. Articles contain some facts stated in a way to gain reader confidence then go on to leave out important issues that were considered and resolved when program was first launched. Much of their comment is not correct.

November 22 - The serialized articles by Aras and Koçtürk have continued and perhaps will for some time to come. Articles from November 13 through 22 have been translated and reproduced along with a cover statement. Ministry personnel are not too concerned about this publicity - they claim it is mainly politically inspired and vindictive against the Minister.

November 27 - A storm which brought snow and freezing temperatures to the Anatolian plateau on November 21 has kept temperatures at or below freezing a greater portion of the time since. Temperatures are likewise cold along coastal areas which together with more rain has kept plantings down for the period. This is unseasonably cold and wet and may further reduce plantings of Mexican wheat. Ministry personnel have advised that requests are continuing to come in for the planting of Mexican wheats on the Anatolian plateau next spring, particularly where irrigation is possible. 448 tons have been set aside for this which quantity may be increased.

November 29 - It is reported that the present strife between Turkey and Greece over Cyprus is having adverse effect on wheat plantings particularly along southern coast which is so close to Cyprus. Villagers as well as other Turkish citizens are highly incensed over the Greek attack on two Turkish Cyprus villages which resulted in several deaths.

December 1 - Farmers are very pleased with stands of Mexican wheat. Heavy tillering has been observed which in some cases has caused additional farmers to request seed. Some cotton fields intended for wheat are yet to be harvested which will greatly delay planting. In some areas poor instruction on drill use and maintenance was provided. One Oregon agent made this statement, "this is undoubtedly the best large scale training program I have ever been associated with."

December 1 - Most of the 400 tons import of U.S. varieties has been planted despite the unfavorable weather for the past two weeks. Some early planted U.S. wheat is up with reports that rate and percent of emergence are better than the local varieties.

December 4 - The use of drills for planting varied greatly with provinces - ranging from 3% to better than 70%, depending to a large degree on the stress placed on drill use. Some of the new drills, particularly those made in Southern Turkey were poor with gears lasting only a day or two. One drill manufacturer kept representative out in area to follow up on weaknesses of their drills. Changes will be made from such follow-up as well as from recommendations made by some members of Oregon Team.

December 11 - Held final meeting with 12-man Oregon team. Discussed shortfalls and potential plantings yet to be made. Allocations to provinces, according to team member figures, totalled 21,652 tons. As of the 9th of December 15691 tons of this had been distributed with 984 tons still expected to go out for a total of 16,675 tons of Mexican wheat for fall plantings. The Ministry is retaining 448 tons for spring plantings much of which has been requested for the Anatolian Plateau. This amount together with the 400 tons of U.S. wheat both considered as planted leaves a shortfall of 4,777 tons or 21.2%. If, however, the shortfall should be charged against the 20,000 tons, the amount which the AID loan covers, then the uncommitted tonnage is only 2,277 tons or 11.4%.

9 team members were asked to give comments on reasons for shortfalls. Not all provinces experienced all of the items listed below nor to the same degree. The following are not listed in order of importance since this would be difficult to do and no two provinces would have the same order of importance.

1. Adverse publicity - common to all areas in a lesser or greater degree.
2. Some resale of seed - small growers to large at reduced prices to obtain cash. Limited amount of this was done.
3. Adverse weather - mostly too wet but some too dry.
4. Sale of Sonora 64 by last year's growers at prices both higher and lower than program price.
5. Lack of enthusiasm or leadership with some extension personnel.
6. Credit problems at onset of program in particular.
7. Late arrival of education materials and program information.
8. Lack of orientation as to purpose of American team.
9. Small land holdings - often with poorer farmers.
10. Not enough attention given to size of farm in distribution.

Consideration was also given to plus factors of the program. Listed below were those given, again not in order of importance:

1. Generally good attitude - farmers and extension personnel were interested in program.
2. Timely arrival and distribution of seed and fertilizer.
3. Seed was of excellent quality.
4. Seed price was fair.
5. Turkish representative selected the wheat in Mexico.
6. Provided excellent opportunity for extension service to put on a program.
7. Turkish Government people including Prime Minister and Minister of Agriculture showed excellent interest.
8. Province governors were very interested.
9. Program was taken to villages - a good educational approach - made excellent village contacts.
10. Participation of Mission F&A Division very good.
11. Radio generally very good - most village people listen.
12. Advance work (before team arrival) to obtain farmer sign up was good. Used actual contacts and information media.
13. A tremendous number of village meetings were held.
14. Attitude of Extension Directors prior to team arrival was good in getting program started.
15. Change of attitude by banks on giving credit was good in most areas - resulted in improved credit policy.
16. Enthusiasm generally was outstanding - not always the best organized but very eager.
17. Climate and soil of Turkey very suitable to wheat - moisture in winter. Soils workable after rains without too much delay.
18. Technical material furnished very good - bulletins, flip charts.
19. Mission support good.
20. Lack of technical background with extension service was not an insurmountable problem.

21. The fact that not all seed was planted with a drill was not a limiting factor.

Some general comments from the team were made that should be noted.

1. Start out with half the amount and distribute to every county. This statement was made by one of the team but generally not shared by the others. They claimed had not heavy stress been placed upon full distribution, weak points of extension would never have fully developed and later corrected.
2. Team should have been brought over 2 months earlier - this would have permitted them to become better acquainted with villagers before having to promote program.
3. When asked as to whether 4 months was adequate there were many responses - some said 6, others 8 and 12 months but when discussed further 4 months seemed not too bad.
4. Don't give a person 6 provinces as in the case at Marmara.
5. Chief of Party should have been stationed in Ankara and permitted to roam in all areas, rather than having an area for himself as well.
6. Campus backstopping was not felt necessary.
7. Arda chiefs should have been assigned one province and not held responsible for general supervision of other provinces in area - this should be the responsibility of Chief of Party.
8. Interpreters should be hired by AID and not left as the responsibility of the host country. It is very important to have full control of interpreters and avoid divided loyalty as is often the case when a member of extension staff serves as interpreter. Vehicles also should be under direct control of the team members.
9. Team members were very pleased to have had a part in this program and expressed themselves very sincerely on this point. They consider the program an outstanding success.

The Oregon Team performed an outstanding service in the wheat introduction. They put in long hours, participated in hundreds of village meetings, put on demonstrations and closely supervised the availability and distribution of seed and fertilizer. The impact they made on the extension service is near revolutionary for such a short four month period. They have been well received in their various areas of influence. Turkish extension service personnel now recognize what can be done in giving service to the farmer given a good product

to sell and the background information to do so.

December 22 - An added plus for the wheat program which had not been anticipated was the sub-soiling project in the Manisa Province. Two members of the Oregon Team, Hindes and Hokanson were responsible for promoting sub-soiling interest in an area of good annual rainfall (over 500 mm.) but where grain was grown every other year, alternately with summer fallow. They found an impervious soil structure at plow sole depth which varied from 6 to 14 inches in thickness. Below this hard pan soil layer was more friable soil. It was obvious there had been no water penetration for several decades. A total of 220 decares have now been tilled to a depth of 24 to 30 inches. The hard soil layer shattered very well. It is expected that there will be no runoff this year as experienced heretofore. All of the land that was sub soiled was planted to Mexican wheat. Records of production will be kept on treated and untreated fields.

The cost of this operation, as estimated now by some Turkish experts, may be as low as 30 T.L. per decare. This perhaps is on the low side but if adjacent land holdings can be handled in one operation the costs should be such as to permit crop returns far in excess of the sub-soiling cost in the first year. It should also permit annual cropping rather than having land lie idle for a year. The farmer interest in this program is very good.

The Commodity Imports Division is seeking availability from excess property sources of large tractor units capable of handling sub-soiling.

December 26 - Temperatures on the Anatolian Plateau and Western coastal area were very low during the period December 22 thru 24. The exact temperatures are unknown presently. The snow cover along the Marmara area protected the Mexican wheat plantings. Ministry of Agriculture personnel advise us there was no injury. It appears that the Mexican wheats as a group have more cold resistance than anticipated.

Two questions were often asked during the entire year: 1. Will it withstand the cold and wet conditions and 2. Will it be acceptable to the bakers and consumers in general. The answer to the first question is that these varieties did have far greater resistance to cold than we had been led to believe providing recommended planting instructions had been followed, such as good seed bed preparation, adequate fertilizer application and proper depth of planting. Temperatures went down as low as -22° C. and the wheat survived. Mexican wheat also withstood winter moisture well - one area was reported under water for eighteen days and the wheat survived. As for the second point, bakers liked Mexican wheats and were known to have paid premium prices for it. This may have been due in part to the early availability of wheat in a time when supply was short, but the fact remains breads made from Mexican wheats have been well received.

CONFIDENTIAL

Results from 1967 Introduction

The recording of day by day events was concluded as of the end of the 1967 calendar year since by that time there had been considerable reporting done by Dr. Humphrey and others which type of reporting was programmed to continue. Nevertheless, it is appropriate at this juncture to point out some of the important results of this large introduction which became known following the harvest in June 1968.

Of the 22,100 tons imported our best estimate is that 16,875 tons were planted during the fall planting campaign. The Government of Turkey has used the figure 170,000 hectares as the land that was planted. This source, together with the estimate from the Oregon Team, placed the average yield at 350 kilograms per decare (52.1 bushels per acre). Multiplying the two, one obtains a total Mexican wheat production of 595,000 metric tons, a very commendable first year accomplishment.

The five varieties of Mexican wheat out-yielded the native varieties by as much as four to one. These varieties demonstrated wide adaptability when taking into consideration firstly that they were grown by inexperienced farmers (roughly 60,000 of them) most of whom had never seen Mexican wheat before and secondly were subjected to a wide range of soils in a year when weather was unfavorable. Many fields produced 500, 600 and even 800 kgs. per decare (75, 90 and 120 bushels per acre).

Farmers who grew Mexican wheat were pleased and those who did not, later wanted in. The extension personnel who performed so well could see the benefit of bringing the education program to the villages. The cooperation of various government agencies serving the farmer was accomplished in a much greater degree than had ever been done before nor expected. In short it was a real success program.

Recommendations

The question is asked what should be done differently if such a program becomes necessary in some other country. Certainly no two sets of conditions will ever be alike so what worked in Turkey may be difficult elsewhere and vice versa. Some factors are worthy of mention, however, as they can be helpful in planning. They are:

1. A large program can and will bring into play greater concentration of effort at all levels of command. Some have stated the Turkey program was too large and give us proof the shortfall in planning. Such an argument does not recognize the tremendous pressure that was placed on the Turkish extension service to get the job done. Shortcomings were uncovered because of this that would not have been under a small program. For most of us who dealt with the day to day problems the shortfall was not

an embarrassment nor an indication of misjudgment.

2. Cooperation from the top in the host government is invaluable. The Minister of Agriculture was determined that this program should be successful and conveyed that determination to all steps below him.
3. Cooperation from Mission personnel is a must. The support given the program was whole hearted. This was considered as a program that had to succeed and the fine cooperation given it by the various Mission departments added greatly to its success.
4. Leave nothing to chance almost became a slogan. Follow through on details again and again became very important. Even with this care, seed for the Anatolian Plateau was slow in arriving and other events did not fall in line as planned.
5. The decision to use extension personnel from U.S. to work with the host country extension personnel was a decisive key to success. It would have been a grave error had this input been omitted.
6. Holding firm on heavy fertilizer recommendations proved helpful. Farmers were reluctant in some cases claiming they had more fertile soil than the average but in the end they were thankful to have followed instructions. Some have stated they should have used more fertilizer.
7. Seed pricing was good. The host government used good judgment in including all costs in the price of seed. This was not a subsidy program. Farmers recognized this and gave the crop their best attention.
8. Taking the education program to the village was effective. This type of extension work had not been common to Turkish farmers heretofore. They liked it, recognized it must be an important program and entered into it with good determination.
9. The wide spread use of radio both at the onset of the program and during the intense educational period was helpful.
10. The directed effort to unite the various government agencies like the Agricultural Bank, Donatim, TMO, State Farms, the Extension Service and others into a working unit to help the Mexican wheat program paid off.
11. A weakness encountered was the lack of planning for maintaining varieties for future years. With the use of several varieties, which in itself was not an error, there is tendency to end up with just Mexican wheat rather than pure lines which do have area adaptability.
12. Gathering in technical data from as many sources as possible is useful but it can likewise be confusing. Careful evaluations must be taken at the onset but error too often can come from requiring an answer for too many details before striking forth on a program.