

PRODUCTION AND EXPORT PATTERNS FOR  
DURUM WHEAT, 1970-1985\*

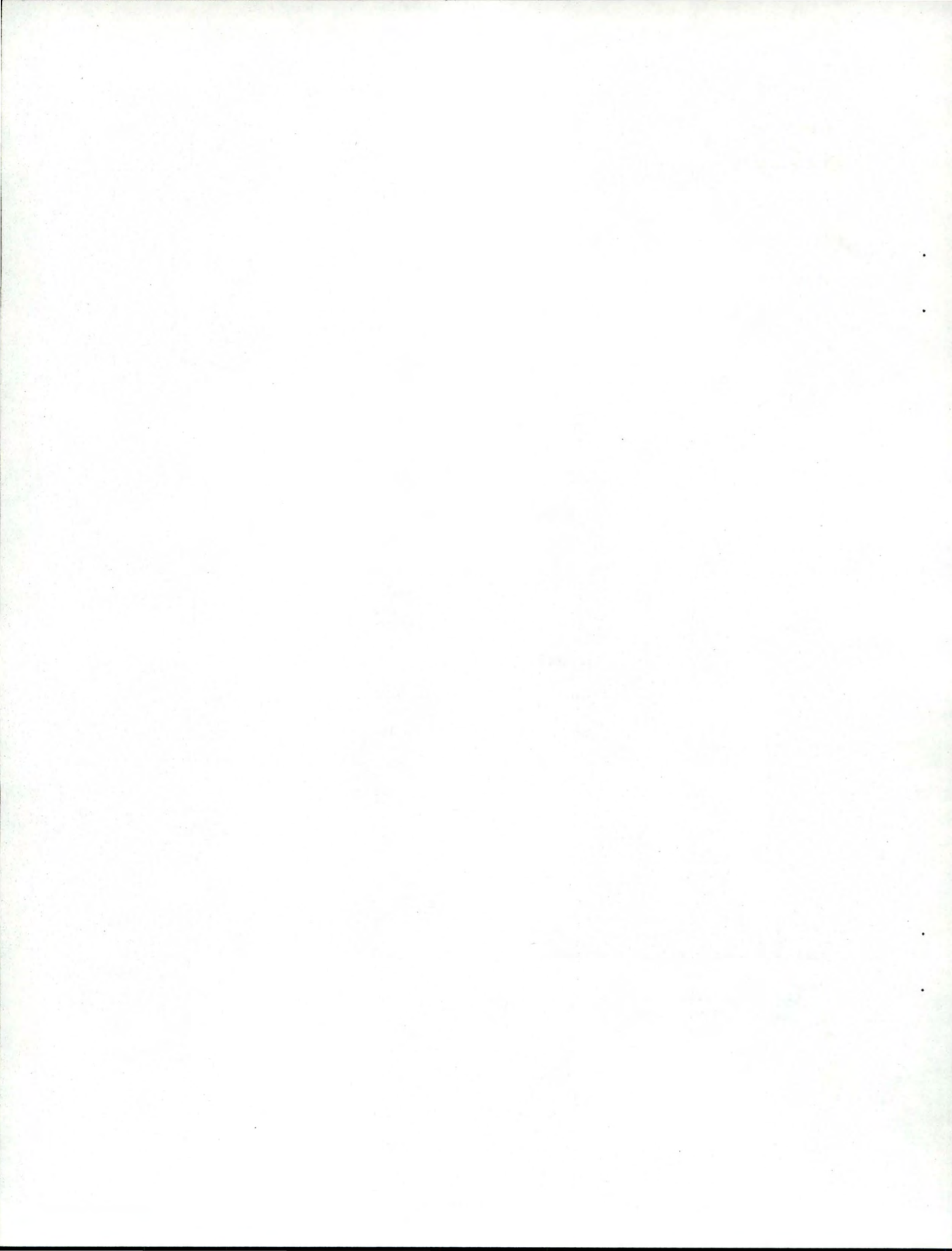
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**Highlights**

Recent declines in wheat exports and related price impacts emphasize the importance of international markets to the U.S. wheat producing and marketing sectors. The current environment strongly suggests U.S. wheat exports will continue to face substantial competition from other major wheat exporting countries. Research effort is needed to assess forces responsible for reduction in shipments to traditional U.S. wheat markets. Additionally, work is needed to help identify export markets with potential for future growth. This paper represents an initial effort to begin the assessment process by analyzing historic export patterns for U.S. durum wheat from 1970 to 1985. Export shipment data for durum wheat by country of destination from Grain and Feed Market News are used in the analysis. This paper is one in a series of papers analyzing export shipment for the five major classes of wheat exported from the United States.

Durum wheat represents a relatively small share of U.S. wheat exports, accounting for just under 5 percent of total export shipments from 1970 to 1985. During this time period, the rate of increase for durum wheat export shipments was 7.1 percent annually. All wheat increased an average of 8.5 percent per year. Thus, durum wheat's share of total U.S. wheat exports declined from 5.3 percent in the early 1970's to 4.0 percent in the early 1980's.

Algeria was the major destination country for U.S. durum wheat export shipments during the entire period. Algeria accounted for about 31 percent of total U.S. durum export shipments. Other major destination countries included Italy, the Netherlands, Tunisia, and Venezuela. These five countries received over two-thirds of total U.S. durum wheat export shipments. Europe was the dominant destination region, followed closely by Africa. Europe accounted for about 43 percent of total shipments, while Africa accounted for about 41 percent. Africa's export share consistently increased, while Europe's share trended downward. During the most recent time period (1980 to 1985), shipments to Africa exceeded shipments to traditional European markets. Latin America's export share also increased steadily, with rapid growth occurring in shipments to South America

Receiving countries were designated according to economic/political status and categorized as developed, less developed, or centrally planned. Countries classified as less developed accounted for over 50 percent of total U.S. durum wheat export shipments during the analyzed period. Export share for the less developed countries increased rapidly throughout the study period. Developed countries accounted for about 40 percent of total shipments, but their share decline consistently. Centrally planned countries received about six percent of total shipments. Their share declined from about 10 percent in the early 1970's to under four percent in the early 1980's.

The increasing importance of less developed countries as receivers of U.S. durum wheat export shipments was clearly established from the



analysis. Historically, growth markets are countries in the less developed category located in Africa and Latin America. Within both regions, almost all the durum receipts were associated with two countries. This result suggests some potential for additional growth may exist within Africa and Latin America. Efforts to increase exports of U.S. durum wheat should consider less developed countries within both regions. The developed category (primarily the EC-10 countries) declined in relative importance, and the decline was generally consistent across countries. The Asian region received small quantities of U.S. durum in the most recent time period. However, two countries within this region (Japan and Syria) received significant quantities in earlier time periods. This result suggests potential may exist to reestablish durum exports to Asia.

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## PRODUCTION AND EXPORT PATTERNS FOR DURUM WHEAT, 1970-1985

### Introduction

Rapid increases in U.S. wheat exports during the 1970's developed into an environment of relying on exports as a primary source of market demand. Recent declines in U.S. wheat exports and the corresponding impact on domestic wheat prices illustrate the importance of international markets to the U.S. wheat producing and marketing sector. An analysis of changes in world trade flow patterns for food grains was recently conducted by Mackie, Hiemstra, and Rosen. Their analysis focuses on examining changes in world trade flow patterns for wheat, wheat flour, and rice to provide basic data necessary to identify market potential for U.S. food grain exports. Mackie, Hiemstra, and Rosen provide excellent data on major wheat importers and exporters. Additionally, the analysis illustrates aggregate changes in world trade flow patterns for food grains.

In addition to identifying major importers and potential growth areas, a need exists to examine existing flow patterns specifically for U.S. wheat exports. Since increased emphasis is being placed on distinguishing wheat by class, analyzing wheat export patterns by class seems additionally useful. The importance of durum wheat to the Northern Plains region and its unique utilization suggests durum wheat is an appropriate class for analysis.

Durum wheat is one of the major classes of wheat produced in the United States. Other major classes include hard red winter (HRW), soft red winter (SRW), hard red spring (HRS), and white. Similar to the other



major classes, durum wheat production in the U.S. varies substantially on an annual basis. However, total production of durum wheat trended upward during the 1970 to 1985 period (Table 1). During this period, total durum wheat production varied from a low of 52.8 million bushels (1970) to a high of 183.0 million bushels (1981). Since 1970, durum wheat production as a percent of total U.S. wheat production varied from a low of 3.0 percent in the 1983 crop year to a high of 7.5 percent in 1978.

The Northern Plains region of the U.S. is the primary producing region for durum wheat. North Dakota is the major producing state and accounts for about 80-90 percent of total U.S. durum production. Montana is also an important producing state. Smaller amounts of durum are also produced in South Dakota, Arizona, Minnesota, and California (Figure 1).

Between 1970 and 1985, annual domestic usage of all wheat ranged from a low of 672 million bushels in the 1974/75 marketing year to a high of 1,154 million bushels in 1984/85 (Table 2). Domestic usage represented from 56.9 to 30.4 percent of annual production for all classes of wheat. Between 1970 and 1980, annual domestic usage of durum wheat varied from a low of 27 million bushels (1971/72) to a high of 61 million bushels (1982/83). Domestic usage of durum wheat as a percent of total durum wheat production varied from a low of 29.4 percent to a high of 69.9 percent during the 1970 to 1985 period. Durum wheat represented from 3.2 to 7.4 percent of total annual domestic wheat usage during the analyzed time period (Table 2).

Durum wheat is a high protein wheat that is generally processed into semolina for domestic use. Semolina is used to produce egg noodles, macaroni, spaghetti, and other pasta products.



Table 1. Production of Wheat by Major Class in Million of Bushels and Percent of Total Production in Each Class, United States, 1970-1985

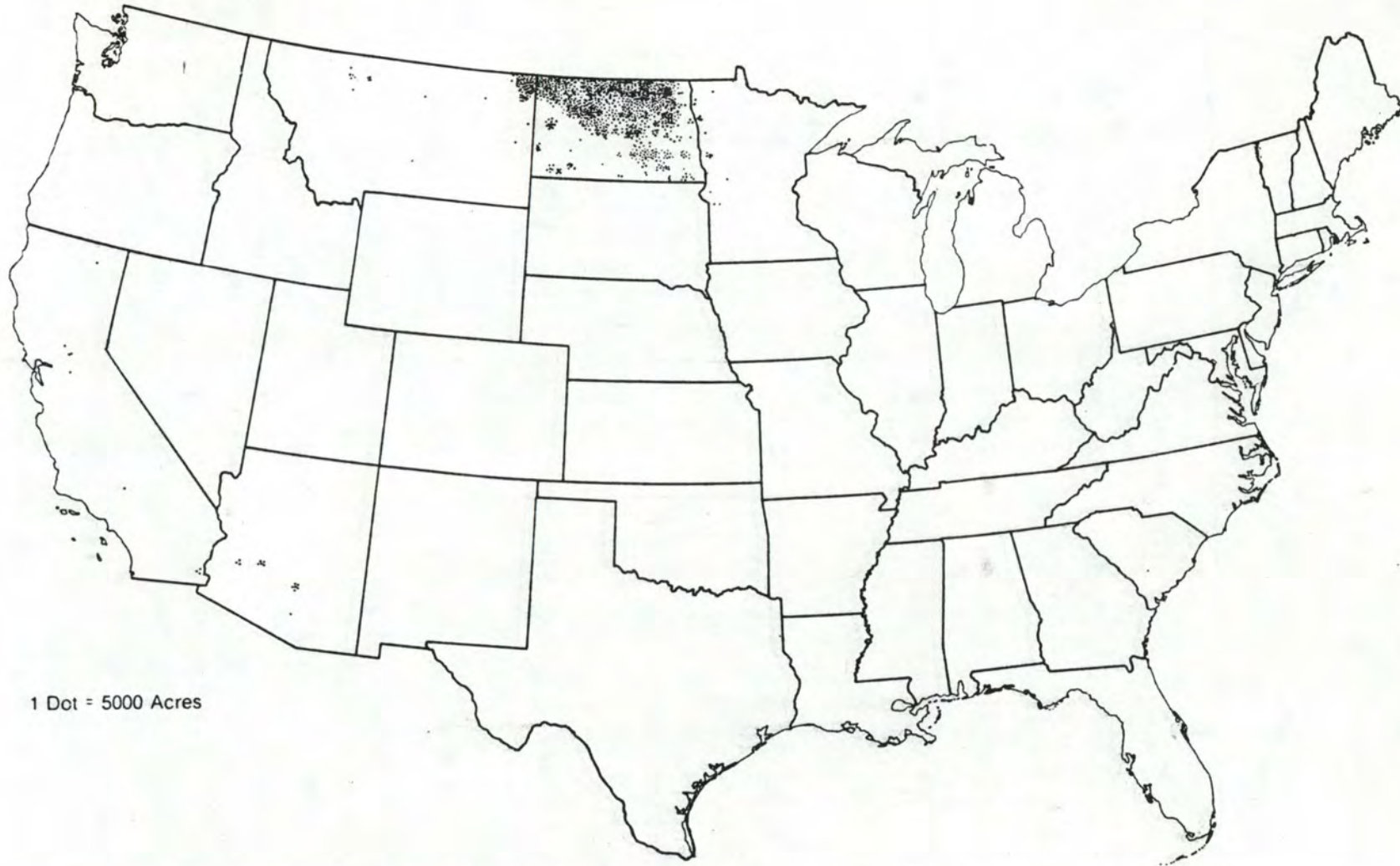
Crop Year	Major Classes of Wheat					All Wheat
	Hard Red Spring	Hard Red Winter	Soft Red Winter	White	Durum	
	million bushels (percent of total)					
1970	197.8 (14.6)	755.1 (55.9)	174.2 (12.9)	171.7 (12.7)	52.8 (3.9)	1,351.6 (100.0)
1971	366.4 (22.6)	747.8 (46.2)	211.9 (13.1)	200.7 (12.4)	91.8 (5.7)	1,618.6 (100.0)
1972	275.9 (17.8)	761.7 (49.3)	226.4 (14.6)	209.3 (13.6)	72.9 (4.7)	1,546.2 (100.0)
1973	328.2 (19.2)	961.2 (56.2)	161.4 (9.4)	181.5 (10.6)	78.5 (4.6)	1,710.8 (100.0)
1974	293.1 (16.4)	882.6 (49.5)	272.7 (15.3)	252.3 (14.2)	81.2 (4.6)	1,781.9 (100.0)
1975	327.3 (15.4)	1,054.8 (49.6)	330.9 (15.5)	290.5 (13.7)	123.4 (5.8)	2,126.9 (100.0)
1976	411.9 (19.2)	977.4 (45.5)	337.4 (15.7)	287.2 (13.4)	134.9 (6.3)	2,148.8 (100.0)
1977	399.0 (19.5)	996.4 (48.7)	349.1 (17.1)	221.0 (10.8)	80.0 (3.9)	2,045.4 (100.0)
1978	379.7 (21.4)	829.9 (46.8)	188.9 (10.6)	243.7 (13.7)	133.3 (7.5)	1,775.5 (100.0)
1979	368.8 (17.3)	1,091.6 (51.1)	309.6 (14.5)	257.4 (12.1)	106.7 (5.0)	2,134.1 (100.0)
1980	311.4 (13.1)	1,181.3 (49.6)	441.8 (18.6)	338.0 (14.2)	108.4 (4.5)	2,380.9 (100.0)
1981	463.7 (16.7)	1,112.1 (39.9)	678.0 (24.3)	348.6 (12.5)	183.0 (6.6)	2,785.3 (100.0)
1982	492.7 (17.8)	1,243.6 (45.0)	588.9 (21.3)	294.0 (10.6)	145.8 (5.3)	2,765.0 (100.0)
1983	322.7 (13.3)	1,197.9 (49.5)	504.2 (20.9)	322.0 (13.3)	73.0 (3.0)	2,419.8 (100.0)
1984	408.8 (15.7)	1,250.6 (48.2)	531.4 (20.5)	301.0 (11.6)	103.4 (4.0)	2,595.2 (100.0)
1985	460.3 (19.0)	1,230.1 (50.7)	368.0 (15.2)	253.9 (10.5)	112.5 (4.6)	2,424.8 (100.0)

Source: U.S. Department of Agriculture, Wheat Outlook and Situation Yearbook, Washington, D.C., Economic Research Service, WS-274, February 1986.

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# Durum Wheat—1979

4,178,187 Acres Seeded



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Figure 1. Location of Production for Durum Wheat in the United States.

Source: Briggie, L.W. et al.



Table 2. Domestic Usage for Durum Wheat and All Classes of Wheat, Marketing Years 70/71 through 84/85.

Marketing Year	DOMESTIC USAGE				
	All Classes of Wheat		Durum Wheat		
	Million Bushels	% of Total Wheat Prod. (All Classes)	Million Bushels	% of Total Durum Wheat Production	% of Total Domestic Use (All Classes)
1970/71	769	56.9	36	67.9	4.7
1971/72	856	52.9	27	29.4	3.2
1972/73	799	51.7	41	56.2	5.1
1973/74	754	44.1	47	59.5	6.2
1974/75 <sup>a</sup>	672	38.7	41	50.6	6.1
1975/76	725	34.1	45	36.6	6.2
1976/77	754	35.1	56	41.5	7.4
1977/78	859	42.0	44	55.0	5.1
1978/79	837	47.2	44	33.1	5.3
1979/80	783	36.7	50	46.7	6.4
1980/81	783	32.9	52	48.1	6.6
1981/82	847	30.4	57	31.2	6.7
1982/83	908	32.8	61	41.8	6.7
1983/84	1,111	45.9	51	69.9	4.6
1984/85	1,154	44.4	46	44.7	4.0

<sup>a</sup>Marketing year beginning 1 July until 1974 and 1 June thereafter. Thus, the 74/75 marketing year includes only 11 months (1 July 74 - 31 May 75).

Source: U.S. Department of Agriculture, Wheat Outlook and Situation Yearbook, Washington, D.C., Economic Research Service, WS-274, February 1986.



Significant amounts of wheat are fed to livestock in the United States, depending on the price of wheat relative to feed grains. However, durum wheat is typically not considered to be a feed wheat. Since 1970, feed usage of wheat varied from a low of 34.9 million bushels in the 1974/75 marketing year to a high of 411 million bushels in 1984/85. Feed usage currently represents about one-third of total domestic wheat usage (U.S. Department of Agriculture, 1986). The soft classes of wheat (soft red winter and white wheat) are more typically used in livestock feed, since soft wheats are generally priced below hard wheats (Heid).

Between 1970 and 1985, exports of durum wheat (including exports in the form of wheat products) ranged from a low of 39 million bushels in the 1970/71 marketing year to a high of 83 million bushels in 1979/80. Exports represented from 30.4 to 91.8 percent of annual durum wheat production between 1970 and 1985 (Table 3). Durum wheat tended to have the greatest fluctuation in share of annual production exported. However, durum wheat has historically had the greatest fluctuation in carryover (Heid). Exports of wheat from all classes ranged from 632 million bushels in 1971/72 to 1,771 million bushels in 1981/82. Durum wheat's percentage of total wheat exports varied from 3.7 to 7.0 percent during the 1970 to 1985 time period (Table 3).

To more closely analyze export patterns for durum wheat in the United States, the specific objectives of this paper are to: 1) examine historic export flow patterns for U.S. durum wheat, 2) identify countries and regions which appear to be potential growth areas, and 3) identify the importance of developed versus less developed and centrally planned countries as importers of U.S. durum wheat. This paper is one in a series of papers looking at production and export patterns for U.S. wheat by major class (Makus and Abdulrazak; Makus, 1986a, 1986b, 1987).

Table 3. Exports of All Classes of Wheat and Durum Wheat, Marketing Years 1970/71 through 1984/85.

Marketing Year	EXPORTS				
	All Classes of Wheat		Durum Wheat		
	Million Bushels	% of Total Wheat Prod. (All Classes)	Million Bushels	% of Total Durum Wheat Production	% of Total Wheat Exports (All Classes)
1970/71	738	54.6	39	73.6	5.3
1971/72	632	39.0	44	47.8	7.0
1972/73	1,135	73.4	67	91.8	5.9
1973/74	1,217	71.1	45	57.0	3.7
1974/75 <sup>a</sup>	1,018	57.1	47	58.0	4.6
1975/76	1,173	55.1	52	42.3	4.4
1976/77	950	44.2	41	30.4	4.3
1977/78	1,124	54.9	62	77.5	5.5
1978/79	1,194	67.3	72	54.1	6.0
1979/80	1,375	64.4	83	77.6	6.0
1980/81	1,514	63.6	59	54.6	3.9
1981/82	1,771	63.6	82	44.8	4.6
1982/83	1,509	54.6	59	40.4	3.9
1983/84	1,429	59.0	62	84.9	4.3
1984/85	1,424	54.9	61	59.2	4.3

<sup>a</sup> Marketing year beginning 1 July until 1974 and 1 June thereafter. Thus, the 74/75 marketing year includes only 11 months (1 July 74 - 31 May 75).

Source: U.S. Department of Agriculture, Wheat Outlook and Situation Yearbook, Washington, D.C., Economic Research Service, WS-274, February 1986.



### Source of Data

The Agricultural Marketing Service (AMS) of the U.S. Department of Agriculture reports federally inspected shipments for export by major class of wheat. These inspections for export are identified by country of destination and published periodically in Grain and Feed Market News. Data for durum wheat export shipments were obtained for fifteen marketing years (1970/71 through 1984/85) by country of destination. These data are summarized into three five-year periods to complete the analysis (Period 1 = 1970/71 - 1974/75, Period 2 = 1975/76 - 1979/80, Period 3 = 1980/81 - 1984/85).

Since data used in this analysis reflect shipments inspected for export during designated periods, they do not correspond directly with data based on export sales. Discrepancies occur when export shipments take place in a marketing year different from the time of sale and when shipments are redirected to an alternative location after leaving the U.S. port. These discrepancies are typically minor and are not expected to substantially alter observed trade flow patterns.

### Results

#### Export Shipments by Major Class

To identify durum wheat export patterns relative to other classes, export shipments for major wheat classes and mixed wheat are summarized in Table 4. This summary also identifies relative share of export shipments (export share) and average annual growth rates for each class during designated periods.

The average annual growth rate for durum wheat export shipments varied between time periods. Export shipments increased an average of 8.2



Table 4. Analysis of Wheat Export Shipments from the U.S. by Major Class of Wheat for Designated Periods.

Wheat Class	Period 1 <sup>a</sup>			Period 2 <sup>a</sup>			Period 3 <sup>a</sup>			All Periods <sup>a</sup>		
	Average Annual Exports Mil. Bu.	Share of Exports (%)	Annual <sup>b</sup> Growth Rate (%)	Average Annual Exports Mil. Bu.	Share of Exports (%)	Annual <sup>b</sup> Growth Rate (%)	Average Annual Exports Mil. Bu.	Share of Exports (%)	Annual <sup>b</sup> Growth Rate (%)	Average Annual Exports Mil. Bu.	Share of Exports (%)	Annual <sup>b</sup> Growth Rate (%)
Hard Red Spring	148.776	16.9	11.5	169.824	15.5	15.5	197.060	13.6	-2.1	171.887	15.1	8.3
Hard Red Winter	493.733	56.2	16.9	532.123	48.6	11.6	657.197	45.3	0.2	561.018	49.1	9.5
Soft Red Winter	55.556	6.3	121.9	148.000	13.5	8.8	303.549	20.9	23.8	169.035	14.8	51.5
White	131.091	14.9	18.8	182.241	16.6	1.2	228.974	15.8	3.5	180.770	15.8	7.8
Durum	46.603	5.3	8.2	58.798	5.4	14.5	58.594	4.0	-1.4	54.665	4.8	7.1
Mixed	3.097	0.4	143.8	4.696	0.4	453.2	5.812	0.4	-8.9	4.535	0.4	196.1
All Wheat	878.856	100.0	15.1	1,095.682	100.0	8.5	1,451.186	100.0	1.9	1,141.910	100.0	8.5

<sup>a</sup>Period 1 = marketing years 70/71-74/75. Period 2 = marketing years 75/76-79/80. Period 3 = marketing years 80/81-84/85. All Periods includes marketing years 70/71-84/85. Marketing year beginning 1 July until 1974 and 1 June thereafter. Thus, the 74/75 marketing year includes only 11 months (1 July 74 - 31 May 75).

<sup>b</sup>The annual growth rate for each period is determined by calculating the annual rates of increase (or decrease) for each year and averaging these rates over the entire period. The growth rate for Period 1 does not include an observation for the 70/71 marketing year, since export shipments for 69/70 were not used in the analysis. The average growth rate was negative even though the average shipment level increased for HRS. This was due to increasing growth earlier in the period and rapid decline late in the current period.

Source: U.S. Department of Agriculture, Grain and Feed Market News, Washington, D.C.: Agricultural Marketing Service, various issues 1971-1985.



percent per year during Period 1, increased 14.5 percent per year during Period 2, and decreased an average of 1.4 percent annually during Period 3. The average annual growth rate for durum during the 1970 to 1985 period was 7.1 percent, compared to the 8.5 percent annual rate of increase in export shipments for all wheat (Table 4).

Durum wheat accounted for 4.8 percent of total U.S. wheat export shipments during the entire time period. The export share for durum wheat held steady from Period 1 to Period 2, at 5.3 percent and 5.4 percent respectively. Durum's export share then dropped to 4.0 percent for Period 3. Durum wheat ranked last in the level of export shipments for major classes of wheat. The only class of wheat exhibiting a consistent increase in export share was soft red winter (SRW). The export share of SRW wheat increased steadily from 6.3 percent in Period 1 to 20.9 percent in Period 3.

In general, export shipments of durum wheat accounted for a fairly small share of U.S. wheat export shipments. Average annual export shipments of durum wheat increased from Period 1 to Period 2, and then declined slightly during Period 3. Durum wheat had the lowest growth rate in export shipments for all major classes of wheat over the entire period analyzed. Both HRW and SRW wheat experienced growth rates above the rate for all classes of wheat for the period analyzed. Hard red winter experienced a growth rate in export shipments slightly above the rate for all wheat. Even though HRW wheat remains in a dominant position relative to total U.S. wheat export shipments, its export share exhibited a declining trend. Additionally, the annual growth rate in HRW wheat export shipments consistently declined between time periods (Table 4). Hard wheats still dominates U.S. wheat export shipments, but the rapid growth in SRW wheat shipments increased the relative importance of soft wheats.

### Geographic Distribution of Durum Wheat Export Shipments

Export shipments of durum wheat are summarized by destination in Table 5. Marketing years 1970/71 through 1984/85 are included and divided into three equal time periods. This summary is used to indicate major geographic markets and identify changes occurring over time. Destinations for export shipments of U.S. durum wheat are divided into five major geographic regions and 12 subregions. Countries within each subregion are listed in the Appendix. A single country may be defined as a subregion in some cases. Average annual export shipments of durum wheat (in millions of bushels) to the five top countries within each subregion are included where applicable.

Algeria was the largest destination country for U.S. durum wheat export shipments during each individual time period. Durum wheat export shipments to Algeria averaged 17.102 million bushels annually over the fifteen year period analyzed. Average annual export shipments to Algeria were variable, increasing substantially from Period 1 to 2, and then declining slightly for Period 3. During Period 1, shipments averaged 13.712 million bushels per year, increased to 19.234 million in Period 2 and declined to 18.359 million bushels annually during Period 3. No other single country had annual average export shipments close to the level associated with Algeria (Table 5).

Other important destination countries over the analyzed period included Italy, the Netherlands, Tunisia, Venezuela, and France. All of these countries averaged over 3.0 million bushels of U.S. durum export shipments per year for the entire time period. The pattern of durum export shipments to the major destination countries mentioned was inconsistent. Export shipments to the European countries trended downward



Table 5. Durum Wheat Export Shipments From the United States to Alternative World Geographic Regions, Annual Average for Designated Periods.

REGION <sup>a</sup> Subregion Major Countries	Period 1 <sup>b</sup> Annual Avg. Mil. Bu.	Period 2 <sup>b</sup> Annual Avg. Mil. Bu.	Period 3 <sup>b</sup> Annual Avg. Mil. Bu.	All Periods <sup>b</sup> Annual Avg. Mil. Bu.
<b>LATIN AMERICA</b>	<b>3.705</b>	<b>6.485</b>	<b>9.887</b>	<b>6.692</b>
South America				
Venezuela	2.381	3.812	6.301	4.165
Chile	0	1.542	2.180	1.241
Peru	0.586	0	0	0.195
Other S. America	0	0	0	0
TOTAL	2.967	5.354	8.481	5.601
Central America				
Guatemala	0.157	0.329	0.277	0.254
Panama	0.124	0.248	0.322	0.231
Costa Rica	0.130	0.191	0.326	0.216
Honduras	0.014	0.161	0.161	0.112
El Salvador	0.016	0.175	0.137	0.109
Other Cen. America	0.005	0.003	0	0.003
TOTAL	0.446	1.107	1.223	0.925
Caribbean and Mexico				
Dominican Republic	0.292	0.015	0.031	0.112
Turk Islands	0	0	0.111	0.037
Bahamas	0	0	0.020	0.007
Haiti	0	0.009	0.009	0.006
Trinidad	0	0	0.012	0.004
Other Car. & Mexico	0	0	0	0
TOTAL	0.292	0.024	0.183	0.166
<b>EUROPE</b>	<b>25.042</b>	<b>26.136</b>	<b>20.024</b>	<b>23.733</b>
European Community (EC-10)				
Italy	4.884	7.513	7.134	6.511
Netherlands	4.851	5.517	4.741	5.036
France	3.443	3.065	2.850	3.119
West Germany	1.302	1.953	0.698	1.318
Belgium	1.915	0.822	0.883	1.207
Other EC-10	2.431	0.285	0.021	0.912
TOTAL	18.826	19.155	16.327	18.103

Table 5. (continued)

REGION <sup>a</sup> Subregion Major Countries	Period 1 <sup>b</sup> Annual Avg. Mil. Bu.	Period 2 <sup>b</sup> Annual Avg. Mil. Bu.	Period 3 <sup>b</sup> Annual Avg. Mil. Bu.	All Periods <sup>b</sup> Annual Avg. Mil. Bu.
<b>EUROPE, continued</b>				
<b>Western Europe (non-EC-10)</b>				
Spain	0.335	3.009	0.566	1.304
Portugal	0.970	0.867	0.774	0.870
Norway	0.221	0.035	0.049	0.101
Austria	0.008	0	0.020	0.009
Finland	0	0	0.024	0.008
Other Western Europe	0.012	0	0	0.004
TOTAL	1.546	3.911	1.433	2.296
Soviet Union				
TOTAL	4.566	0.697	0	1.754
<b>Eastern Europe</b>				
East Germany	0.022	1.340	1.365	0.909
Poland	0	0.989	0.899	0.629
Czechoslovakia	0.060	0	0	0.020
Romania	0	0.044	0	0.015
Yugoslavia	0.022	0	0	0.007
Other Eastern Europe	0	0	0	0
TOTAL	0.104	2.373	2.264	1.580
<b>AFRICA</b>	<b>14.646</b>	<b>24.364</b>	<b>27.761</b>	<b>22.258</b>
<b>North Africa</b>				
Algeria	13.712	19.234	18.359	17.102
Tunisia	0.803	4.537	7.367	4.236
Libya	0.108	0	1.211	0.440
Moroco	0.023	0.406	0.430	0.286
Other North Africa	0	0	0	0
TOTAL	14.646	24.177	27.367	22.064
<b>Africa, Sub-Sahara</b>				
Somalia	0	0.038	0.160	0.066
Nigeria	0	0.117	0	0.039
Liberia	0	0	0.103	0.034
South Africa	0	0	0.080	0.027
Kenya	0	0.032	0.041	0.025
Other Sub-Sah. Africa	0	0	0.010	0.003
TOTAL	0	0.187	0.394	0.194



Table 5. (continued)

REGION <sup>a</sup> Subregion Major Countries	Period 1 <sup>b</sup> Annual Avg. Mil. Bu.	Period 2 <sup>b</sup> Annual Avg. Mil. Bu.	Period 3 <sup>b</sup> Annual Avg. Mil. Bu.	All Periods <sup>b</sup> Annual Avg. Mil. Bu.
<b>ASIA</b>	<b>3.211</b>	<b>1.813</b>	<b>0.806</b>	<b>1.943</b>
East and Southeast Asia				
Japan	1.404	1.779	0.522	1.235
Philippines	0.013	0.008	0	0.007
Other E. & S.E. Asia	0	0	0	0
TOTAL	1.417	1.787	0.522	1.242
Middle East				
Syria	1.052	0	0	0.351
Lebanon	0.704	0	0	0.235
Cyprus	0	0	0.280	0.093
Iran	0.037	0	0	0.012
Israel	0	0.026	0	0.009
Other Middle East	0	0	0.004	0.001
TOTAL	1.794	0.026	0.284	0.701
South Asia	0	0	0	0
<b>OCEANIA</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>DESTINATION UNKNOWN</b>	<b>0</b>	<b>0</b>	<b>0.116</b>	<b>0.039</b>
<b>ALL DESTINATIONS</b>	<b>46.604</b>	<b>58.798</b>	<b>58.594</b>	<b>54.665</b>

<sup>a</sup>All countries associated with each geographic region are listed in the Appendix.

<sup>b</sup>Period 1 = marketing years 70/71-74/75. Period 2 = marketing years 75/76-79/80. Period 3 = marketing years 80/81-84/85. All Periods includes marketing years 70/71-84/85. Marketing year beginning 1 July until 1974 and 1 June thereafter. Thus, the 74/75 marketing year includes only 11 months (1 July 74 - 31 May 75).

Source: U.S. Department of Agriculture, Grain and Feed Market News, Washington, D.C.: Agricultural Marketing Service, various issues 1971-1985.



over time, especially from Period 2 to Period 3. Shipments to Venezuela and Tunisia trended upward, with substantial growth occurring from Period 2 to Period 3.

Europe was the most important geographic region in terms of total shipments for the entire time period, averaging 23.733 million bushels per year. Europe was the dominant region during Periods 1 and 2, but was surpassed by Africa during Period 3. Durum export shipments to Europe averaged 25.042 million bushels in Period 1, increased to 26.136 million in Period 2, and dropped to 20.024 million bushels in Period 3. Almost all of the European receipts went to the EC-10 subregion, except during Period 1 when the Soviet Union received a significant amount.

The African region was also a major receiver of U.S durum wheat during the fifteen year period analyzed, averaging 22.258 million bushels per year. Annual durum shipments to Africa increased steadily from 14.646 million bushels in Period 1 to 27.761 million in Period 3. The North Africa subregion (in particular, Algeria and Tunisia) consistently accounted for over 90 percent of total U.S. durum wheat export shipments to the African region.

Latin America was another important receiving region for U.S. durum wheat shipments, especially in terms of consistent growth. Export shipments to Latin America averaged 6.692 million bushels per year during the 1970 to 1985 time period. Average annual shipments to Latin America increased about three million bushels between each time period. Shipments increased from 3.705 million bushels in Period 1 to 9.887 million in Period 3. South America, dominated by Venezuela and Chile, was the major subregion in Latin America. Several countries in Central America received small quantities of U.S. durum wheat export shipments.

The Asian region was not a major receiver of U.S. durum wheat export shipments. Shipments to Asia declined steadily from 3.211 million bushels per year in Period 1 to 0.806 million in Period 3. Japan was the only country in the Asia region averaging over one million bushels in annual durum receipts during the 1970 to 1985 time period.

Percentage shares of total U.S. durum wheat export shipments to the five major regions and 12 subregions are presented in Table 6. Europe accounted for 43.4 percent of total U.S. durum wheat shipments from 1970 to 1985. Europe's export share declined steadily between the three time periods, going from 53.7 percent in Period 1 to 34.2 percent in Period 3. The EC-10 subregion accounted for most of the European shipments, while each of the other three European subregions accounted for a small share.

The African region ranked second in total share of U.S. durum wheat export shipments for the 1970 to 1985 period. Africa's export share increased steadily between periods, and Africa had the largest export share for Period 3. Beginning with 31.4 percent in Period 1, Africa's export share increased sharply to 41.4 percent in Period 2, and then increased to 47.4 percent in Period 3. For the entire fifteen year period, Africa's export share was 40.7 percent, just below the share associated with Europe.

Latin America accounted for 12.2 percent of total U.S. durum wheat export shipments for the entire time period. Latin America's export share consistently increased, going from 8.0 to 11.0 percent from Period 1 to Period 2, and then increasing to 16.9 percent for Period 3. South America was the most important subregion, accounting for about 84 percent of total durum shipments to Latin America.



Table 6. Durum Wheat Export Shipments From the United States to World Regions and Subregions as a Percentage of Total Shipments During Designated Periods.

REGION <sup>a</sup> Subregion	Percent of Total Durum Wheat Export Shipments			
	Period 1 <sup>b</sup>	Period 2 <sup>b</sup>	Period 3 <sup>b</sup>	All Periods <sup>b</sup>
<b>LATIN AMERICA</b>	<b>8.0</b>	<b>11.0</b>	<b>16.9</b>	<b>12.2</b>
South America	6.4	9.1	14.5	10.2
Central America	1.0	1.9	2.1	1.7
Caribbean and Mexico	0.6	0.0	0.3	0.3
<b>EUROPE</b>	<b>53.7</b>	<b>44.4</b>	<b>34.2</b>	<b>43.4</b>
Eur. Community (EC-10)	40.4	32.6	27.9	33.1
W. Europe (non-EC-10)	3.3	6.6	2.4	4.2
Soviet Union	9.8	1.2	0.0	3.2
Eastern Europe	0.2	4.0	3.9	2.9
<b>AFRICA</b>	<b>31.4</b>	<b>41.4</b>	<b>47.4</b>	<b>40.7</b>
North Africa	31.4	41.1	46.7	40.4
Africa, Sub-Sahara	0.0	0.3	0.7	0.3
<b>ASIA</b>	<b>6.9</b>	<b>3.1</b>	<b>1.3</b>	<b>3.6</b>
East & Southeast Asia	3.0	3.0	0.9	2.3
Middle East	3.9	0.1	0.4	1.3
South Asia	0.0	0.0	0.0	0.0
Oceania	0.0	0.0	0.0	0.0
Destination Unknown	0.0	0.0	0.2	0.1

<sup>a</sup>All countries associated with each geographic region are listed in the Appendix.

<sup>b</sup>Period 1 = marketing years 70/71-74/75. Period 2 = marketing years 75/76-79/80. Period 3 = marketing years 80/81-84/85. All Periods includes marketing years 70/71-84/85. Marketing year beginning 1 July until 1974 and 1 June thereafter. Thus, the 74/75 marketing year includes only 11 months (1 July 74 - 31 May 75).

Source: U.S. Department of Agriculture, Grain and Feed Market News, Washington, D.C.: Agricultural Marketing Service, various issues 1971-1985.

Asia accounted for 3.6 percent of total U.S. durum wheat export shipments during the 1970 to 1985 time period. The Asian export share declined steadily from 6.9 percent in Period 1 to 1.3 percent in Period 3. The East and Southeast Asia subregion had the largest export share in the Asian region for the entire time period. The Middle East was the major subregion in Asia during Period 1.

Three significant geographic shifts occurred in the pattern of export shipments for U.S. durum wheat. First was a consistent decline in the importance of the European region. This decline was reflected by a declining trend in the level of European-destined shipments, most dramatic from Period 2 to Period 3. Europe also experienced a steady decrease in export share between each time period. This declining importance of the European region resulted from a reduction in shipments to the EC-10 countries.

The second major shift was a large increase in shipments to Africa. Africa went from an export share of less than one-third to an export share of almost one-half from Period 1 to Period 3. The African region (specifically North Africa) was the primary destination region for U.S. durum wheat export shipments during Period 3. The African market involved only two major receiving countries; Algeria and Tunisia.

The final geographic shift in U.S. durum wheat export shipments involves the steady growth associated with the Latin American region. Latin America accounted for a small export share relative to Europe and Africa. Shipments to Latin America averaged almost 10 million bushels per year during the most recent period (1980 to 1985). Additionally, Latin America's export share grew rapidly over the time period studied, and the rate of growth consistently increased. Similar to Africa, two countries



in the Latin American region (Venezuela and Chile) accounted for almost all of the region's shipments.

#### Economic and Political Grouping of Durum Wheat Export Shipments

Export shipments of U.S. durum wheat are summarized by grouping each receiving country according to whether it is categorized as a less developed country, centrally planned country, or developed country (see Appendix A). Results are presented in Table 7 for each of the three periods and for the entire fifteen year time period.

Export shipments to countries in the less developed category consistently increased throughout the 1970 to 1985 time period. Export share for less developed countries grew steadily. During Period 1, less developed countries accounted for 43.3 percent of total U.S. durum wheat export shipments (Table 7). Their share increased to 52.5 percent in Period 2, and then increased to 64.8 percent in Period 3. Over the entire time period, countries in the less developed category received an average of 29.661 million bushels of U.S. durum wheat annually, accounting for 54.3 percent of total shipments. Major receivers in the less developed country category were in the Asian and Latin American regions.

Durum wheat export shipments to centrally planned countries declined consistently between each time period. Average annual export shipments declined from 4.670 million bushels in Period 1 to 2.263 million in Period 3. Centrally planned countries received an average of 3.334 million bushels of U.S. durum wheat annually from 1970 to 1985. The export share associated with centrally planned countries declined from 10.0 percent in Period 1 to 3.9 percent in Period 2. Countries in the centrally planned

Table 7. Durum Wheat Export Shipments From the United States to Economic and Political Regions, Annual Average in Millions of Bushels and as a Percentage of Total Shipments During Designated Periods.

Economic and Political Regions <sup>a</sup>	Average Annual Export Shipments			
	Period 1 <sup>b</sup>	Period 2 <sup>b</sup>	Period 3 <sup>b</sup>	All Periods <sup>b</sup>
	Million bushels (percent)			
Less Developed Countries	20.158 (43.3)	30.857 (52.5)	37.968 (64.8)	29.661 (54.3)
Centrally Planned Countries	4.670 (10.0)	3.070 (5.2)	2.263 (3.9)	3.334 (6.1)
Developed Countries	21.776 (46.7)	24.871 (42.3)	18.362 (31.3)	21.670 (39.6)
All Countries	46.604 (100.0)	58.798 (100.0)	58.593 (100.0)	54.665 (100.0)

<sup>a</sup>Countries associated with each geographic region are listed in the Appendix.

<sup>b</sup>Period 1 = marketing years 70/71-74/75. Period 2 = marketing years 75/76-79/80. Period 3 = marketing years 80/81-84/85. All Periods includes marketing years 70/71-84/85. Marketing year beginning 1 July until 1974 and 1 June thereafter. Thus, the 74/75 marketing year includes only 11 months (1 July 74 - 31 May 75).

Source: U.S. Department of Agriculture, Grain and Feed Market News, Washington, D.C.: Agricultural Marketing Service, various issues 1971-1985.



category accounted for 6.1 percent of total U.S. durum export shipments from 1970 to 1985 (Table 7). The Soviet Union and East Germany were the major receiving countries in the centrally planned category.

Average annual durum shipments to developed countries increased about three million bushels from Period 1 to Period 2. Annual shipments then declined by almost six million bushels, averaging 18.362 million bushels during Period 3. Export share for developed countries declined steadily from 46.7 percent in Period 1 to 31.3 percent in Period 3. Export shipments to developed countries averaged 21.670 million bushels annually, and accounted for 39.6 percent of total U.S. durum export shipments during the 1970 to 1985 period. The EC-10 countries were the major receivers categorized as developed. The EC-10 subregion accounted for almost 84 percent of developed country receipts over the entire period.

Analyzing export shipments by grouping destinations according to economic and political status provides additional focus on the increasing importance of developing countries. Developing countries accounted for almost two-thirds of total U.S. durum export shipments during the most current period analyzed (1980 to 1985). These countries accounted for 43.3 percent of total durum shipments during Period 1 (1970 to 1975). Shipments to developing countries averaged just over 20 million bushels per year during Period 1. This compares to average annual shipments of close to 38 million bushels during Period 3. Export shipments to developed countries represented a significant share of total durum exports from the United States. However, the relative importance of developed countries declined rapidly. Additionally, during the most recent period, average annual exports to developed countries actually declined by over 25 percent. Centrally planned countries, in general, are not an important market

for U.S. durum wheat. The level of exports to centrally planned countries declined by over 50 percent from Period 1 to Period 3.

### Summary

Durum wheat is a major class of wheat produced in the U.S. and an important cash crop for the Northern Plains region. During the 1970 to 1985 period, annual U.S. durum production varied from 52.8 million to 183.0 million bushels. Durum represented from 3.0 to 7.5 percent of total U.S. wheat production during the study period. Domestic usage represented between 29.4 and 69.9 percent of total production during the 1970 to 1985 period.

Rapid growth of wheat exports during the 1970's established export demand as a major component of market demand for U.S. wheat, including durum. Recent declines in export levels for wheat suggest a need to further explore existing markets and identify potential growth markets for U.S. wheat exports. Since the major classes of wheat are generally viewed as having different uses, analyzing export patterns for each class is valuable to initially assess market potential for wheat exports.

This paper specifically examines historic export shipments for durum wheat by country of destination for 15 marketing years (1970/71 through 1984/85). This time period is further divided into three five-year periods to complete the analysis (Period 1 = 1970/71 - 1974/75, Period 2 = 1975/76 - 1979/80, Period 3 = 1980/81 - 1984/85). Destination countries are initially grouped into five major geographic regions and 12 subregions. Additionally, countries are categorized as less developed, centrally planned, or developed. Export shipments for each destination category are summarized to assess absolute changes in U.S. durum wheat



flows. Additional analysis is conducted to compare the relative importance of alternative country groupings as receivers of U.S. durum wheat export shipments.

Durum wheat continues to be a significant part of U.S. wheat export shipments, accounting for 4.8 percent of total shipments during the 1970 to 1985 time period. Export shipments of durum wheat increased at a rate slightly below the rate of increase for all U.S. wheat (7.1 and 8.5 percent, respectively). Thus, the share of total wheat export shipments accounted for by durum wheat decreased from 5.3 percent in the early 1970's to 4.0 percent in the early 1980's. All other major wheat classes (SRW, HRW, HRS, and white) had average annual growth rates above the growth rate for durum wheat. However, these relative growth rates varied substantially between periods, especially for SRW wheat. The classes of hard wheat (HRW, HRS, and durum) still dominate U.S. wheat export shipments, but all three have declined in importance relative to the soft wheat classes.

Algeria was the major destination country for durum wheat export shipments over the entire period. No other single country was close to Algeria, which averaged about 27 million bushels per year. Other major countries included Italy, the Netherlands, Tunisia, and Venezuela. These secondary countries averaged from four to six million bushels per year. Europe was the largest destination region for the entire time period, followed closely by Africa. However, Europe reflected a declining trend, while Africa reflected consistent growth. Durum shipments to the African region surpassed European shipments during Period 3. The Latin American region, especially South America, also reflected consistent growth in receipts of U.S. durum wheat export shipments.

Countries categorized as less developed accounted for over one-half of durum wheat export shipments between 1970 and 1985. Export shipments to less developed countries increased steadily throughout the time period. During the most recent time period (Period 3), less developed countries accounted for two-thirds of total shipments. During Period 1, less developed countries accounted for about 43 percent of the total. The most important countries falling in the less developed category were located in Africa and Latin America. Export share associated with developed countries declined from 46.7 percent in the early 1970's (Period 1), to 31.3 percent in the early 1980's (Period 3). All major destination countries in the developed category were located in the EC-10 subregion of Europe. The centrally planned countries accounted for 10.0 percent of total shipments during Period 1. The level of durum exports to centrally planned countries consistently declined. During the most recent time period (1980-85), centrally planned countries accounted for about 6 percent of total U.S. durum export shipments.

Some important patterns for U.S. durum wheat export shipments are identified from the analysis. First, the European region (traditionally the most important destination region) declined in relative importance. The decline in European receipts was primarily due to lower shipments destined for the EC-10 countries. This decline was consistent for all major receiving countries within the EC-10. In contrast, the African region (also an important destination region, but secondary to Europe) increased in relative importance. The increase in Africa's relative importance was related to larger receipts by North African countries.

Another important characteristic of U.S. durum wheat exports involves the dominance of a small number of countries in the major growth markets.



The rapid expansion in North Africa reflects increased shipments destined for two countries (Algeria and Tunisia). A similar pattern was associated with Latin America, the other major growth market. The South American countries of Venezuela and Chile were primarily responsible for higher levels of durum wheat shipments to Latin America. Several other countries within both regions received small quantities of durum, but no major growth occurred.

Durum wheat shipments to the Asian market exhibited an unusual pattern relative to the other classes of wheat. The Asian region is considered to be an important market for U.S. wheat, and a rapidly expanding market. This is generally true for all major wheat classes except durum. Given the unique traditional use of durum wheat, this does not seem unusual. However, certain countries in Asia (Japan and Syria) did receive substantial quantities at some point in time. Shipments to Syria occurred during Period 1, and then dropped off completely. This may reflect either a change in economic or political conditions. However, Japan received substantial quantities during Period 1, increased receipts during Period 2, and then decreased receipts dramatically during Period 3. Since Japan has been a steady growth market for U.S. wheat, this pattern for durum receipts is unusual. It would seem to indicate Japan is either substituting other classes of wheat or obtaining durum from other exporting countries.

In general, countries in the less developed category accounted for a major share of U.S durum wheat export shipments. The relative importance (measured by export share) of countries falling into this category increased rapidly. The important less developed countries are located in Africa and Latin America, and are limited to a small number of countries in each region.

The developed country category is still important for durum wheat exports, but its role is declining. This is particularly true for the EC-10 countries, where receipts tended to decline, especially between Periods 2 and 3. Additional effort is needed to determine the cause of the decline in export shipments to several EC-10 countries. Also, the non-EC-10 countries in western Europe do not receive large quantities of U.S. durum wheat. Since similar consumption patterns may be expected between the two subregions, additional focus on non-EC-10 European countries seems warranted.



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**APPENDIX**

Regional Groupings  
Economic and Political Groupings



## REGIONAL GROUPINGS

The world (excluding North America which does not import U.S. wheat) is divided into five major regions and 12 subregions. The countries included in each region and subregion are as follows:

### A. Latin America

1. South America      Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Falkland Islands, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, and Venezuela
2. Central America      Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama (including Canal Zone)
3. Caribbean and Mexico      Antigua, Bahamas, Barbados, Bermuda, British Virgin Islands, Cayman Islands, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Mexico, Montserrat, Netherland-Antilles, St. Kitts, St. Lucia, St. Vincent, Trinidad and Tobago, and Turks and Caicos Islands

### B. Europe

4. European Community (EC-10)      Belgium-Luxembourg, Denmark, France, Federal Republic of Germany, Greece, Ireland, Italy, Netherlands, and United Kingdom
5. Western Europe (non EC-10)      Andorra, Austria, Faeroe Islands, Finland, Gibraltar, Greenland, Iceland, Malta, Norway, Portugal, Spain, Sweden, and Switzerland
6. Eastern Europe      Albania, Bulgaria, Czechoslovakia, German Democratic Republic, Hungary, Poland, Romania, and Yugoslavia
7. Soviet Union      USSR, Estonia, Latvia, and Lithuania

### C. Africa

8. North Africa      Algeria, Libya, Morocco, Spanish North Africa, Western Sahara, Tunisia, and Egypt

9. Sub-Saharan Africa Angola, Benin, Botswana, British Indian Ocean Territory, Burkina-Faso (Upper Volta), Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Djibouti, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Malwai, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Reunion, Republic of South Africa, Rwanda, Sao Tome, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Togo, Uganda, Zaire, Zambia, and Zimbabwe
- D. Asia
10. E. & S.E. Asia Brunei, Burma, China, Democratic Republic of Campuchea, Democratic Republic of Korea, East Timor, Hong Kong, Indonesia, Japan, Laos, Macao, Malaysia, Mongolia, Philippines, Republic of Korea, Singapore, Taiwan, Thailand, and Vietnam
11. Middle East Bahrain, Cyprus, Gaza Strip, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Democratic Republic of Yemen, Syria, United Arab Emirates, Turkey, and Arab Republic of Yemen
12. South Asia Afghanistan, Bangladesh, Bhutan, India, Sri Lanka, Maldives, Nepal, Pakistan, and Sikkim
- E. Oceania Australia, New Zealand, American Samoa, British Antarctic Territory, Solomon Islands, Christmas Island, Cocos Islands, Cook Islands, Fiji, French Polynesia, French Antarctic Territory, Diribati, Guam, Johnston Island, Midway Islands, Nauru, New Caledonia, Papua New Guinea, Niue, Norfolk Island, Pacific Islands, Ryukyu Islands, Tokelau, Tonga, Tuvalu, Wake Island, Wallis Tutuna, Vanuatu, and West Samoa

#### ECONOMIC AND POLITICAL GROUPINGS

- A. Developed Australia, Israel, Japan, New Zealand, Republic of South Africa, and all countries in subregions 4 and 5
- B. Centrally Planned Mainland China, USSR, Cuba, Mongolia, Vietnam, North Korea, and all countries in subregion 6
- C. Less Developed All countries not included in A or B