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## **WORLD MARKET CONDITIONS FOR GRAINS: PROSPECTS AND PROBLEMS WITH SPECIAL REFERENCE TO THE DEVELOPING COUNTRIES**

by

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WORLD MARKET CONDITIONS FOR GRAINS: PROSPECTS AND PROBLEMS  
WITH SPECIAL REFERENCE TO THE DEVELOPING COUNTRIES\*

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I. Introduction

The dramatic changes in world grain prices since 1972 have raised serious questions about the level and stability of future grain prices. While all countries are concerned with these questions, they are especially important to a large number of developing countries. Some developing countries are important grain exporters, and future world market conditions bear directly on prospects for foreign exchange earnings and the ability of these nations to finance development. Many other developing countries are net grain importers. The behavior of grain prices in the future will have much to do with the ability of these countries to import grain, insure domestic food price stability, and protect the nutritional well-being of large segments of the population.

There is a good chance that world market conditions for grains during the next five to ten years will be highly uncertain, compared with conditions that prevailed in the 1950's and 1960's. This paper focuses on the policy

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options that may be open to countries, individually or collectively, for dealing with uncertain market conditions. We first discuss the evolution of the current world market situation for grains, the patterns of international trade in grains, and the basic problems that the current situation generates for different types of countries. Next, we look at the future prospects for grain production, consumption, and trade and then examine the policy options for dealing with the future. Finally, we look at alternative mechanisms for implementing a variety of policy options.

Our focus is on grains because these represent the basic category of food, worldwide, and are the most important form in which food is transferred among countries.

## II. The Current Situation and Its Origins

### A. Evolution of the Current Situation

Once again the spectre of a Malthusian catastrophe has captured the headlines. The relatively tight food situation since 1972 is the sixth time in the last two centuries that there has been widespread concern about food shortages and famine.<sup>1/</sup>

The world food situation in the 1950's and 1960's was reasonably comfortable. There was excess production capacity in the developed countries reflected in combinations of surplus stocks of grain and land withheld from

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<sup>1/</sup> See Martin E. Abel, "Food Production Possibilities in the High-Food-Drain Economies," American Journal of Agricultural Economics, Vol. 50, No. 5, December 1968, pp. 1273-82, for a brief historical review. During this same period there were numerous, localized famines, some of considerable magnitude. These were generally considered to be isolated, transitory events and did not influence global views about the growth of food supplies relative to the growth of the demand for food.

production under governmental programs. Food production in the less developed countries kept slightly ahead of population growth. The increased production in the less developed countries together with increased grain imports, a significant portion of it being food aid, resulted in a modest but fairly steady increase in average levels of per capita food consumption in the less developed countries. Except for the severe droughts in South Asia during 1965 and 1966, the world food situation looked promising over a period of about two decades.

But starting in 1970, the world food situation began to change. As concern grew over mounting surpluses, grain production and stocks in the United States and Canada were reduced as a matter of government policy. Poor weather reduced grain production in Australia. The demand for grain continued to grow at rapid and predictable rates in the industrialized countries. However, the sudden emergence of the USSR in 1972 as a massive purchaser of grain was not predictable. Soviet grain purchases placed great stress on existing grain supplies and reduced reserve stocks to extremely low levels, "setting off the greatest price boom, first in grains and then in animal products, in modern times."<sup>2/</sup> (Tables 1-3.)

As Cochrane states:

The general surplus condition in the grains which existed in 1970 was gone by the summer of 1972. Depending upon the point of view, the world was, in June 1972: (a) in an economic balance with regard to grain production and utilization; or

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<sup>2/</sup> Willard W. Cochrane, Feast or Famine: The Uncertain World of Food and Agriculture and Its Policy Implications for the United States, National Planning Association, Washington, D. C., February 1974, p. 2. This reference also contains an excellent summary of the numerous specific forces that gave rise to the price boom of 1972.

Table 1. World Prices of Wheat, Corn, and Rice, 1955-74

Year	Wheat <sup>a/</sup>	Corn <sup>b/</sup>	Rice <sup>c/</sup>
(U.S. \$/metric ton)			
1955	63	71	141
1956	64	77	138
1957	62	64	139
1958	63	57	148
1959	64	59	133
1960	62	57	125
1961	66	55	137
1962	67	54	153
1963	69	61	144
1964	67	61	137
1965	68	65	137
1966	71	65	166
1967	66	62	220
1968	65	56	203
1969	62	61	187
1970	65	71	143
1971	62	68	129
1972	96	66	148
1973	205	115	299
1974	207	155	542

<sup>a/</sup> Canadian Export Price: No. 1 Northern through July 1971; from Aug. 1971, Canadian Western Red Spring; through July 1973, 14% protein; from Aug. 1973, 13.5% protein; export price through July 1969 - Canadian Wheat Board selling price (class II); from Aug. 1969 export price according to International Grain Agreement; through May 1970, basis in store Fort William - Port Arthur; from June 1970, basis in store, Thunder Bay 1955-1972, FAO Production Yearbook, 1968, 1973, 1973-74 FAO Monthly Bulletin of Agricultural Economics and Statistics, Vol. 24, Feb. 1975.

<sup>b/</sup> U.K. Import Price: U.S. yellow, nearest forward shipment C.I.F. through 1962, No. 2, from 1963, No. 3, from 1968 resellers 1955-1972 FAO Production Yearbook 1967, 1972, 1973, 1973-74 FAO Monthly Bulletin of Agricultural Economics and Statistics, Vol. 24, Feb. 1975.

<sup>c/</sup> Thailand Export Price: white, government standards, F.O.B.; through 1969, 5-7% brokens, from 1970 - 5%, 1955-1972 FAO Production Yearbook, 1971, 1972, 1973, 1973-74 FAO Monthly Bulletin of Agricultural Economics and Statistics, Vol. 24, Feb. 1975.

Table 2. Reserve Stocks of Wheat, by Country, 1960-73

Year	U.S.A.	Canada	EEC-6	Australia	U.K.	Japan
(1000 metric tons)						
1960	35,747	16,318	5,444	1,652	1,106	650
1961	38,411	16,556	6,542	664	1,177	775
1962	35,980	10,643	6,348	482	1,206	1,080
1963	32,529	13,261	8,190	634	1,204	900
1964	24,532	12,504	6,162	555	1,235	1,000
1965	22,242	13,962	5,605	664	1,125	1,000
1966	14,565	11,434	6,780	449	1,287	975
1967	11,551	15,561	5,474	2,191	1,205	1,215
1968	14,657	18,112	5,418	1,412	1,286	1,050
1969	22,226	23,183	7,460	7,261	1,258	1,000
1970	24,077	27,452	4,112	7,220	1,129	860
1971	19,867	19,980	4,454	3,665	1,174	950
1972	23,487	15,887	6,133	1,584	1,100	1,000
1973	11,920	9,960	4,571	865	951	1,170

Table 3. Reserve Stocks of Coarse Grains, by Country, 1960-73

Year	U.S.A.	Canada	EEC-6	Australia	U.K.	Japan	S. Africa
(1000 metric tons)							
1960	67,936	4,580	13,828	35	741	492	675
1961	77,423	4,523	12,169	35	398	514	1,113
1962	65,674	2,787	13,539	40	752	578	1,092
1963	58,615	4,470	13,629	40	906	533	900
1964	63,054	5,621	14,954	35	851	535	605
1965	50,008	4,309	11,817	35	866	571	355
1966	38,678	4,504	13,081	20	1,058	641	743
1967	34,225	4,921	15,349	40	949	545	3,292
1968	4,440	4,338	15,660	367	1,129	702	903
1969	45,966	6,701	15,207	1,272	969	793	915
1970	44,631	7,124	13,999	1,384	1,093	1,004	810
1971	30,702	5,454	16,292	1,617	972	1,042	1,698
1972	45,028	6,214	16,139	1,060	1,099	941	2,058
1973	30,209	5,868	16,920	381	1,318	1,008	179

(b) teetering on a razor's edge with respect to surplus or shortage, feast or famine.<sup>3/</sup>

The "economic balance" or "razor's edge" in grains has prevailed into 1976 and is likely to continue into the near future. Poor weather in various places, including the United States in 1974, has prevented world grain production from increasing faster than demand and either reducing prices or allowing grain stocks to be rebuilt in any significant amount.

In addition, the costs of agricultural inputs have risen significantly. The rise in input prices has been due partly to the sharp rise in petroleum products, which sharply escalated the price of fuel and nitrogen fertilizers, and partly to inflation, which has been widespread.

The price boom in agricultural commodities in the early 1970's represented a substantial increase in real prices. There are powerful forces at work to increase further the nominal prices of food in world markets. The demand for food will continue to grow as a result of increasing population and rising per capita income. Continued general inflation and increases in prices of key agricultural inputs, such as for fuel and fertilizer, will work towards increasing production costs and product prices. Bringing additional land into production can be done profitably only at higher product prices because of the substantial investments required and the lower productivity of the additional land. It appears that only an accelerated rate of technological advance would dampen increases in nominal prices and ensure that the real price of food does not continue to rise.<sup>4/</sup>

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<sup>3/</sup> Ibid., p. 2.

<sup>4/</sup> This assessment assumes that climatic conditions remain normal. If, as some climatologists are predicting, there is a rapid deterioration in climatic conditions, food production could be adversely affected and food prices could soar.

It is useful to consider some of the basic, long-term changes that have taken place on the world food and agricultural scene as they relate to the world food situation.

One important change has been the humanitarian revolution, largely a post-World War II development, which resulted in large groups of people feeling some obligation for the welfare of other peoples. As a minimum, starvation on a large scale has become morally intolerable. Thus, we observe the fairly new phenomenon that people who face starvation because of acts of nature such as drought, earthquakes, pests, etc., and because of acts of man against man, such as war, have a rightful claim on the world's food supplies. Furthermore, this universal humanitarian revolution has succeeded, as it should, in divorcing food needs from effective purchasing power. In this respect, there is an element of worldwide food needs that is relatively insensitive to food prices and national purchasing power as the mechanisms for allocating food supplies.

A second change in the world food picture has been the rapid acceleration in rates of population growth, especially in the developing countries, which occurred in the 1950's and 1960's. Annual rates of population growth in the range of 2.5 to 3.5 percent are now commonplace. The increased rates of population growth reflect substantial declines in death rates brought about by successful, large-scale public health programs, and improved systems of food distribution.

Another important dimension of the world food situation is the rapid growth of incomes in the developed countries and in an increasing number of less developed countries, which has resulted in a rapid expansion of (a) demand for agricultural products and (b) agricultural trade. The rapid

rates of growth in incomes are in part due to a growing rationalization of trade and production policies and are not, therefore, a completely exogenous factor in explaining the growth in world agricultural trade. Even though growth in trade based on growth in income and population, particularly in the developed countries, is predictable with a reasonable degree of accuracy, the results, nevertheless, can be spectacular. For example, U.S. agricultural exports to Japan increased from \$1.2 billion in 1969 to \$3.5 billion in 1974.<sup>5/</sup>

A fourth change is the recent slowing of the rate of growth of agricultural output in a number of less developed countries. During the late 1960's food production in a number of developing countries received a significant fillip from the introduction of the new high-yielding varieties of wheat and rice. The adoption of these new varieties was especially rapid in those areas where there were adequate water supplies, abundant fertilizer, and favorable prices. Once this production potential was exploited, the rate of adoption of the new varieties slowed.<sup>6/</sup> Their further spread will be conditioned by the rates at which (a) the quantity and quality of irrigation can be expanded, (b) the new varieties can be adapted to local conditions, (c) fertilizer supplies can be increased, and (d) product-input price relations can be improved.

Finally, an important, but not fully appreciated, change in the world food picture is the decision by a large number of countries to rely on

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<sup>5/</sup> Foreign Agricultural Trade of the United States, Economic Research Service, U.S. Department of Agriculture, Washington, D. C., June 1975.

<sup>6/</sup> Dana G. Dalrymple, Development and Spread of High-Yielding Varieties of Wheat and Rice in the Less Developed Nations, Foreign Agricultural Economic Report No. 95, Economic Research Service, U.S. Department of Agriculture, Washington, D. C., July 1974.

world markets for their food supplies beyond what can be explained merely by growth in income and population. These are decisions which move countries, sometimes suddenly, away from autarchic national agricultural policies toward greater reliance on international trade. It is not always clear whether these moves are for rational economic reasons which recognize the benefits of trade, or for domestic and international political reasons. But even though we may not be sure of the motives, the impact on the world food situation is clear and sometimes very pronounced. The entry in a big way of the Soviet Union into world grain markets in 1972 illustrates this point. One can find numerous other, though less dramatic, instances where the decisions of countries to follow less autarchic agricultural and general economic policies have had a sudden impact on the demand for food in world markets.<sup>7/</sup>

Each of these changes in the world food scene has resulted in a greater interdependence among nations with respect to food supplies and food prices. It has become increasingly difficult for countries to insulate their food positions from events in other countries.

Some major changes in the demand for and supply of food occur on a systematic basis and can be predicted with a considerable degree of certainty. The systematic changes are generally not overly disruptive of the world food situation. Among the main forces producing regular growth are income and population on the demand side and sustained productivity growth on the supply side. But many other large changes--those resulting from

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<sup>7/</sup> For example, the decisions of both Taiwan and Korea to increase livestock production on the basis of a modern feed industry led to rapid and historically discontinuous increases in feed grain imports during the 1960's and 1970's.

national calamities or sudden changes in economic policies--are unpredictable and can cause serious dislocation in the world picture. Thus, the benefits to be derived from expanded and, hopefully, more economically rational trade can be accompanied by greater uncertainties concerning supply, demand, and the price of food in world markets, unless random fluctuations are offset or reserve stocks of commodities exist to cushion the price effects of unpredicted changes in supply or demand.

Until quite recently, variations in world food prices have been kept within reasonable limits. This has been due in large measure to the ability of the United States to expand agricultural production and to maintain large food reserves in the 1950's and 1960's. These reserves were in the form of grain stocks or idle production capacity. The ability to draw on these stocks and reserve production capacity enabled the United States to meet unpredictable food shortages and to maintain a reasonable degree of price stability in domestic and world markets.

The demand for grains tends to be highly price inelastic; i.e. a given percentage change in supplies results in a much larger percentage change in price. When the supply of grain is quite elastic and does not fluctuate much, as was the case when large grain reserves existed, market prices can remain quite stable. However, in the absence of reserves, an inelastic and fluctuating supply can cause large price swings. The latter situation has prevailed in world markets since 1973.

In summary, the current world food situation, conditioned by economic and demographic forces; national and international food, agricultural, and trade policies; and natural forces, namely unfavorable weather, can be characterized in the following way:

1. The demand for food continues to increase at a fairly rapid pace primarily because of growth in incomes in the industrial and more rapidly developing less developed countries and continued, rapid rates of population growth in most less developed countries.
2. Food production has been unstable and has not kept pace with the growth in demand because of unfavorable weather conditions<sup>8/</sup> in various parts of the world and uneven rates of technological advance.
3. Reserve stocks of food (grains) have been depleted and currently there does not exist a buffer against instability in production.
4. Major areas of the world are more dependent than ever on world markets as a means of achieving their food and agricultural policy goals.
5. Nominal world food prices are high and unstable, by historical standards, and there is a distinct possibility that nominal and real food prices might continue to rise for at least several years. This possibility results from an unstable supply of grain interacting with a growing, but very price inelastic demand for grain.
6. For developed countries, high and unstable food prices have contributed to inflation and instability in the overall level of prices.
7. For less developed countries that are net food exporters, high food prices have made a positive contribution to foreign exchange earnings and have helped to offset increased prices of nonagricultural imports, particularly petroleum.
8. In the case of less developed countries that are net food importers,

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<sup>8/</sup> Examples in 1975 are the USSR, Western Europe, and substantial parts of the corn belt of the United States.

the current food situation has aggravated seriously the shortage of foreign exchange and has pushed up domestic food prices as well. These developments have led to deterioration in the average diets in many of the poorer nations.

#### B. International Grain Production and Marketing Patterns

In this section we look at the changes in production and trade of grains among countries or regions of the world between 1958 and 1972. The data for these years are three-year averages for the periods 1957-59 and 1971-73, respectively.

Total world grain production increased by 51 percent over the period 1958 to 1972 (table 4). The increases in total world production of wheat, coarse grains, and rice were 51, 60 and 31 percent, respectively. Thus, coarse grains gained and rice lost in relative importance in world production.

In the developed countries, total grain production increased by 42 percent, wheat by 40 percent, coarse grains by 44 percent, and rice by 12 percent. In the centrally planned countries total grain production increased by 53 percent, wheat by 48 percent, coarse grains by 90 percent, and rice by 9 percent. With respect to the developing countries, total grain production increased by 63 percent, wheat by 83 percent, coarse grains by 58 percent, and rice by 56 percent. Overall, grain production increased at a faster rate in the developing than in either the developed or centrally planned countries.

Changes in the levels and distribution of grain trade among countries (table 5) follow considerably different patterns than those for production. These differences are accounted for by differences in rates of growth in population and income, and in trade policies. Between 1958 and 1972 the developed countries became the major exporters of grain while the developing

Table 4. Production of Wheat, Coarse Grains, and Rice, by Country or Region, 1957-59 and 1971-73 Averages, 1000 Metric Tons

	Wheat		Coarse Grains		Rice	
	1957-59 Average	: 1971-73 Average	1957-59 Average	: 1971-73 Average	1957-59 Average	: 1971-73 Average
<u>Developed</u>	87,115	121,984	191,742	275,508	12,143	13,630
U.S.A.	32,120	44,128	126,781	163,966	1,380	2,595
Canada	10,621	15,346	12,122	19,832	-	-
EEC-9	28,416	40,937	34,266	59,788	536	609
Other W. Europe	9,080	10,057	10,271	19,734	394	396
South Africa	728	1,708	3,756	7,671	-	2
Japan	1,350	309	2,473	425	9,738	9,828
Australia/ New Zealand	4,800	9,409	2,073	4,092	95	200
<u>Centrally Planned</u>	110,449	163,342	97,719	185,896	69,367	75,156
East Europe	16,222	30,688	39,033	53,491	121	149
Soviet Union	67,927	98,144	51,473	79,199	139	1,048
China	26,300	34,397	7,147	51,697	65,163	70,362
Other Asia	-	113	66	1,509	3,944	3,597
<u>Developing</u>	40,829	74,585	54,516	87,309	72,211	112,065
Mexico	1,378	1,890	5,373	9,746	155	268
Central America/ Caribbean	21	39	1,546	2,156	437	686
Argentina	6,122	6,693	7,453	10,270	123	182
Brazil	720	1,644	7,665	14,603	2,665	4,737
Other S. America	1,913	1,714	2,810	3,998	852	1,617
North Africa	4,157	5,945	4,275	5,632	955	1,595
Central Africa	178	1,100	5,175	6,843	1,171	2,909
East Africa	120	369	691	5,836	771	224
Middle East	13,265	19,770	8,559	8,220	575	1,068
South Asia	12,792	35,112	6,641	11,311	37,851	56,617
Southeast Asia	6	36	365	2,095	12,422	21,548
East Asia	157	273	3,963	6,599	14,234	20,614
<b>Total World</b>	<b>238,393</b>	<b>359,911</b>	<b>343,977</b>	<b>548,413</b>	<b>153,721</b>	<b>200,851</b>

Source: FAO Production Yearbooks, 1960 and 1973.

Table 5. Net Trade in Wheat and Flour, Coarse Grains, and Rice, by Country or Region, 1957-59 and 1971-73 Averages, 1000 Metric Tons

	Wheat		Coarse grains		Rice	
	1957-59 Average	1971-73 Average	1957-59 Average	1971-73 Average	1957-59 Average	1971-73 Average
<u>Developed</u>						
U.S.A.	10,928	40,169	-2,803	7,363	376	1,870
Canada	12,033	26,192	6,917	24,632	684	1,680
EEC-9	7,980	13,656	1,563	3,837	-34	-64
Other W. Europe	-7,322	-1,760	-9,738	-12,554	-202	-170
South Africa	-1,200	-661	-1,830	-4,492	-24	-72
Japan	-122	90	836	2,027	-40	-85
Australia/ New Zealand	-2,380	-5,093	-1,383	-7,672	-18	531
<u>Centrally Planned</u>						
East Europe	-474	-13,214	531	-10,168	520	1,099
Soviet Union	-5,345	-4,154	-727	-3,108	-214	-246
China	4,897	-2,933	1,183	-4,841	-441	-235
Other Asia	1	-5,214	47	-2,162	1,087	2,628
	-27	-913	28	-7	88	-1,048
<u>Developing</u>						
Mexico	-9,243	-26,827	2,926	3,245	-265	-2,941
Central America/ Caribbean	-1	-475	-596	-231	8	-6
Argentina	-804	-1,861	-40	-509	-292	-387
Brazil	2,419	1,979	2,644	5,256	13	49
Other S. America	-1,617	-2,189	-79	439	21	55
North Africa	-901	-2,809	315	-624	32	144
Central Africa	-1,258	-4,049	187	-297	175	393
East Africa	-593	-1,603	98	-125	-340	-753
Middle East	-157	-4,793	194	70	-15	-17
South Asia	-849	-3,242	273	-1,004	-277	-673
Southeast Asia	-4,074	-4,793	-53	0	-1,308	-429
East Asia	-154	-378	280	1,517	3,271	1,643
	-1,254	-2,614	-297	-1,262	-1,553	-2,960
<u>Total World</u>						
Exports	29,269	49,662	15,370	39,363	5,389	7,173
Imports	29,058	49,534	14,743	38,882	4,758	7,145

Source: FAO Trade Yearbooks, 1960 and 1973.

and centrally planned countries became major importers. However, there was considerable variation among groups of countries with respect to the different types of grain.

Total wheat exports increased by about 70 percent, from 29.3 to 49.7 million metric tons. The major wheat exporting countries are the United States, Canada, Australia, and Argentina. The Soviet Union switched from being an exporter of wheat in 1958 to an importer in 1972.

All the other countries or regions were net importers of wheat. Among the developed country importers, only Japan increased imports significantly. The centrally planned countries went from a negligible level of net imports in 1958 to 13.2 million metric tons in 1972. All the developing countries or regions, except Argentina, were net importers of wheat, and total imports by these countries increased from 9.2 to 26.8 million metric tons, or by nearly 200 percent.

The situation for world trade in coarse grains is quite different than that for wheat. The major exporters in 1972 were the United States (with 63 percent of total exports), Canada, South Africa, Australia, Argentina, and Thailand in Southeast Asia. Brazil and East Africa exported small amounts of coarse grains. The major importers were the western European countries, Japan, and the centrally planned countries. The developing countries other than those mentioned above accounted for a small part of world trade in coarse grains. Clearly, the bulk of world trade in coarse grains is among developed and centrally planned countries. This reflects the high income levels of these nations and concomitant levels or growth of livestock consumption.

World trade in rice is small by comparison with either wheat or coarse grains. Further, the growth in world trade of rice has been slower than

that for the other two classes of grain. The major rice exporters are China, Southeast Asia, and the United States. Several other regions of the world have small amounts of rice exports. (Exports from Japan in 1972 represent a temporary situation in which surplus stocks of rice were being disposed of on world markets.) Numerous countries or regions are net importers of rice, the largest being East Asia, centrally planned other Asia, Central Africa, and the Middle East.

### C. Trading Systems and Agricultural Policies

The structure of world trade in grains--distribution among countries, and the level and stability of prices--is strongly conditioned by the effects of different types of trading systems and agricultural policies.

Many developed countries have maintained domestic prices above world levels in order to provide price and income protection for producers.<sup>9/</sup> Such protective agricultural policies cost consumers substantial amounts in the form of higher food prices and inefficient allocations of resources in agricultural production. They may also have substantial drains on national treasuries.

One effect of protectionistic policies is to depress world market prices. Countries reduce their imports by maintaining excess resources in grain production. The EEC-9 is a case in point. By using protectionistic

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<sup>9/</sup> For more detailed discussions of this point, see Agricultural Policies in 1966: Europe, North America, Japan, Organization for Economic Cooperation and Development, Paris, 1967; D. Gale Johnson, World Agriculture in Disarray (London: Fontana, 1973); D. Gale Johnson and John A. Schnittker, eds., U.S. Agriculture in a World Context: Policies and Approaches for the Next Decade (New York: Praeger Publishers, 1974); A Future for European Agriculture, The Atlantic Papers No. 4, The Atlantic Institute, Paris, 1970; and John S. Marsh, European Agriculture in an Uncertain World, The Atlantic Institute, Paris, 1975.

policies it has reduced its annual average net imports of total grains from 17.3 million metric tons in the 1957-59 period to 14.5 million metric tons in the 1971-73 period, or by 16 percent. Meanwhile, EEC-9 production increased from 63.2 to 101.3 million metric tons or by 60 percent.

The disparity between agricultural prices in the EEC (the original 6 members) and world markets is illustrated in table 6 for 1966/67. These data reflect market conditions which prevailed throughout the 1960's and early 1970's; i.e., prior to the surge in world agricultural prices that occurred after 1972. For grains, the extent to which EEC prices were above world prices ranged from 17 percent for rice to 185 percent for soft wheat.

The EEC countries are not the only ones that maintain high agricultural prices. The data on producer prices for wheat presented in table 7 illustrate the extent of agricultural price supports and the wide range in price levels. The producer price of wheat in 1968/69 ranged from less than U.S. \$4 per 100 kg. in Argentina to over \$14 in Finland, Japan, Norway, and Switzerland. A similar pattern holds for many other commodities.

Among the developed countries, reduced imports by net importing countries placed downward pressure on the demand for exports. This meant that prices received by producers and production were depressed in those countries that did not insulate their domestic markets from the world market. Those developed exporting countries that did insulate domestic markets, such as the United States, were faced either with an accumulation of surpluses or the need to purposely withhold resources, mainly land, from production. There have been three "safety valves" for the excess production in the developed exporting countries; one was subsidized food consumption for the domestic poor, another was food aid to the less developed countries, and

Table 6. European Economic Community and World  
Prices for Agricultural Commodities, 1966/67

Commodity	EEC price	World price	EEC price
			as a percent of world price
		U.S. \$ per ton	Percent
Soft wheat	107.30	57.90	185
Durum wheat	126.64	80.70	157
Corn and sorghum	90.10	56.30	160
Barley	80.28	56.70	142
Rye	93.75	57.48	163
Rice	179.60	153.40	117
Sugar	223.50	78.00	287
Eggs	511.40	387.50	132
Poultry	723.30	550.00	132
Pork	567.10	387.10	146
Beef and veal	680.00	388.20	175
Butter	1874.40	708.50	265
Non-fat dry milk	412.48	165.34	249
Whole dry milk	863.10	443.12	195
Cheese	865.00	632.50	137
Olive oil	806.20	698.40	115

Source: G. R. Kruer and B. Bernstein, "Cost of the Common Agricultural Policy of the European Economic Community," Foreign Agricultural Trade of the United States, U.S. Department of Agriculture, Washington, D. C., 1969.

Table 7. Producer prices for farm products, 1968 or 1968/69,  
U.S. \$ per 100 kg.

	Wheat	Whole milk
\$4 or less	Argentina	-
4-6	Canada	-
6-8	Denmark, U.K., U.S.A.	-
8-10	Ireland, Greece, Sweden, Austria, Spain, Turkey, France, Netherlands	-
10-12	Italy, Portugal, USSR	-
12-14	-	-
Over 14	Finland, Japan, Norway, Switzerland	-

Source: Compiled by D. Gale Johnson, World Agriculture in Disarray (London: Fontana, 1973), pp. 56-57.

a third was export subsidies. The latter two measures worked also to depress world grain prices.

The depressing influence on world market prices of protectionistic agricultural policies in the developed countries has had serious repercussions for the less developed countries, all leading, in general to reduced incentives to develop agriculture and increase agricultural output at faster rates.<sup>10/</sup> Those developing countries bent on keeping domestic consumer prices low were able to do so as a result of relatively low world prices and

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<sup>10/</sup> For a detailed discussion of the effects of U.S. agricultural policies on less developed countries see Martin E. Abel, "The Developing Countries and U.S. Agriculture," in D. Gale Johnson and John A. Schnittker, eds., U.S. Agriculture in World Context: Policies and Approaches for the Next Decade (New York: Praeger Publishers, 1974), pp. 138-181.

a ready supply of food aid. In the process, producer prices were also kept low and incentives to increase production were weakened by varying degrees.<sup>11/</sup> The situation was further compounded in those countries where investments in agricultural development were neglected because of the perception that there was an abundant supply of food at low prices available in world markets.

Those developed countries that depend heavily on agricultural exports for foreign exchange and development resources were also penalized. Incentives to increase agricultural output and exports were weak, given the levels of world prices and the limited export opportunities. And, the foreign exchange earnings from agricultural exports were also depressed, thereby limiting the resources available to finance development.

As already mentioned, some developing countries made a relatively bad situation worse by imposing their own domestic policies which worked against

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<sup>11/</sup> Some of the more pertinent literature on this subject includes T. W. Schultz, "Value of U.S. Farm Surpluses to Underdeveloped Countries," Journal of Farm Economics, Vol. XLII, No. 5, December 1960, pp. 1019-1030; S. R. Sen, "Impact and Implications of Foreign Surplus Disposal on Underdeveloped Economies--The Indian Perspective," Journal of Farm Economics, Vol. XLII, No. 5, December 1960, pp. 1031-1042; Franklin M. Fischer, "A Theoretical Analysis of the Impact of Food Surplus Disposal on Agricultural Production in Recipient Countries," Journal of Farm Economics, Vol. 45, No. 4, November 1963, pp. 863-875; Jitendar S. Mann, "The Impact of Public Law 480 Imports on Prices and Domestic Supply of Cereals in India," Journal of Farm Economics, Vol. 49, No. 1, Part I, February 1967, pp. 131-146; Gary L. Seevers, "An Evaluation of the Disincentive Effect Caused by P.L. 480 Shipments," American Journal of Agricultural Economics, Vol. 50, No. 3, August 1968, pp. 630-642; Per Pinstrup-Anderson and Luther G. Tweeten, "The Value, Cost, and Efficiency of American Food Aid," American Journal of Agricultural Economics, Vol. 53, No. 3, August 1971, pp. 431-440; Peter Greenston, The Food for Peace Program and Brazil: Valuation and the Effects of the Commodity Inflow, Ph.D. Dissertation, Department of Economics, University of Minnesota, 1972; and Leonard Dudley and Roger J. Sandilands, "The Side Effects of Foreign Aid: The Case of Public Law 480 Wheat in Colombia," Economic Development and Cultural Change, Vol. 23, No. 2, January 1975, pp. 325-336.

agricultural development. On the other hand, some other countries did well in spite of world market conditions by emphasizing agricultural development and, in some cases, emphasizing production of those agricultural commodities for which world demand has been growing rapidly, e.g., fruits, vegetables, and beef.

Another important feature of world grain trade is the large and growing importance of state trading. Countries with state trading systems may be able to influence world market prices and the distribution of grain trade among countries through control over the timing and amounts of purchases or sales. This can be done by withholding information from world markets about purchase or sales intentions.

State trading countries can be broken arbitrarily into two major categories. In the first category, all buying, selling, handling, storing, and shipping is done exclusively by the government. The centrally planned countries belong to this category.

The second category cannot be described so succinctly. In many countries there exists a monopoly with sole responsibility for exports, imports, or domestic distribution of one or more commodities of interest. The monopoly agency may be a governmental organization, a purely producer group that is granted monopoly power by government, or a mixture of the two. Commodities under the control of the monopoly agencies also vary from just a few economically important ones to many traded commodities. Some of these monopoly agencies may rely on the private sector for storage, transportation, and other functions.

In Canada, the Canadian Wheat Board has a monopoly position in the export of wheat and coarse grains. Australia has export monopolies for

wheat and feed barley where the Australian Wheat Board and the Barley Board control international marketing in much the same way as the Canadian Wheat Board does in Canada. In both Canada and Australia, the above mentioned marketing boards are primarily producer-controlled organizations who have been granted monopoly power by the respective governments. The only other developed country with a marketing system of this type is Japan. The Japanese Food Agency, a totally governmental agency, determines the import quantities of wheat and feed barley.

In contrast to these two types of state trading countries are those where trade is carried out by the private sector with many private export and import firms allowed to trade. Generally, the governments use only indirect controls such as tariffs, quotas, and subsidies to achieve policy goals. Examples of this type of trading system are the United States and Europe.

The developing countries have a mixture of trading systems. The large number of developing countries and the great diversity of trading systems that exist among them make it difficult to generalize about the importance of state trading in this group of countries. Therefore, we will focus the rest of our discussion on state trading in the centrally planned and developed countries.

The changing share of world trade for state trading countries is calculated on the basis of gross trade; i.e., imports plus exports. This is a measure of the gross movement of commodities into and out of a country. It enables us to handle conveniently the problem of a country such as the Soviet Union switching from a net exporter of wheat in 1958 to a net importer in 1972. We can focus on the relative importance of such a country in world

trade without regard to whether it is an importer or an exporter.

1. Wheat

Gross world trade in wheat (imports plus exports) increased from 57.4 to 99.3 million metric tons between 1958 and 1972. Gross trade in wheat by the centrally planned countries went from 10.2 to 13.4 million metric tons or from 18 to 13 percent of gross world trade. Thus, the centrally planned countries' share of world trade in wheat actually declined. The big change with respect to these countries was not so much in their total trade, but in changes of the position of individual countries. The major changes were China's growing imports and the Soviet Union's switch from being a significant exporter in 1958 (4.9 million metric tons) to an importer in 1972 of 2.9 million metric tons.

The wheat trade monopolies of Canada, Australia, and Japan have increased in importance. Their combined share of gross world trade in wheat went from 21 percent in 1958 to 27 percent in 1972.

Taking these two groups of countries together, their total gross trade in wheat increased from 22.5 to 39.9 million metric tons while their share of world trade changed hardly at all--39 percent in 1958 compared with 40 percent in 1972. Thus, trade in wheat by the principal state trading countries has not increased in relative importance. Yet, they account for 2 out of every 5 tons of wheat traded in world markets.

2. Coarse Grains

In the centrally planned countries all coarse grains are state traded. Gross trade in coarse grains went from 2.0 million metric tons in 1958 to 10.1 million metric tons in 1972 while the share of world trade went from 7 to 13 percent. During this period, Eastern Europe and China increased

their imports of coarse grains significantly while the Soviet Union switched from being an exporter to an importer.

Canada's and Australia's<sup>12/</sup> share of gross world trade declined slightly from 8 to 7 percent. While the Food Agency in Japan has a monopoly on barley imports, we choose to ignore Japan in our calculation because of the unimportance of barley in Japan's total coarse grain imports in recent years. Barley made up about 50 percent of coarse grain trade in 1958 but dropped to 14 percent in 1972. In 1972, corn made up the bulk of Japan's trade in coarse grains and corn is not subject to state trading.

The amount of gross world trade in coarse grains accounted for by state trading countries or those with trade monopolies increased rapidly as did total world trade. The share of world trade covered by state trading in the centrally planned countries, Canada and Australia increased modestly from 15 percent in 1958 to 20 percent in 1972. Thus, unlike wheat, state trading in coarse grains does appear to have increased somewhat in relative importance. And the principal state trading nations account for one-fifth of gross world trade.

### 3. Rice

The centrally planned countries represent the major state trading countries in rice. Total gross trade accounted for by these countries went from 1.8 million metric tons in 1958 to 4.2 million metric tons in 1972, or from 18 to 29 percent of total gross world trade in rice. The large changes that occurred within this group of countries were a 142-percent increase in

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<sup>12/</sup> Data are for all coarse grains. While barley is the only coarse grain which is state traded in Australia by the Australian Barley Board, it constitutes nearly 80 percent of total coarse grain exports.

rice exports by China and other Asia moving from a small export basis of 88 thousand metric tons in 1958 to significant importers of 1.0 million metric tons in 1972.

### III. Future World Grain Situation

#### A. Long-term Trends

Two studies,<sup>13/</sup> one by FAO and one by the U.S. Department of Agriculture, project to 1985 world demand and supply of grains, by groups of countries.<sup>14/</sup> These projections are summarized in tables 8 and 9. The assumptions underlying both the FAO and USDA projections are contained in the USDA study. The four alternatives represent the following scenarios:

Alternative I assumes that economic growth has been temporarily slowed, but resumes strong expansion in the late 1970's and early 1980's. However, under this alternative, continued high internal prices limit expansion of world trade.

Alternative II is a high world import demand situation. Under this alternative, income grows at a faster rate in both the developing and developed countries than under Alternative I. In addition, there is progress toward removing barriers to trade in the developed world, and the centrally planned economies increase their efforts to improve diets.

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<sup>13/</sup> Reproduced in The World Food Conference: Selected Materials for the Use of the U.S. Congressional Delegation to the World Food Conference, Rome, Italy, November 5-16, 1974, Committee on Agriculture and Forestry, United States Senate, Washington, D. C., October 30, 1974; and The World Food Situation and Prospects to 1985, Foreign Agricultural Economic Report No. 98, Economic Research Service, U.S. Department of Agriculture, Washington, D. C., December 1974.

<sup>14/</sup> A recent study by the International Food Policy Research Institute, Meeting Food Needs in the Developing World: The Location and Magnitude of the Task in the Next Decade, views the future food import needs even more pessimistically than the FAO or USDA studies, implying that the need to accelerate growth of food production in the developing countries is even more essential than previously thought.

Table 8. Comparison of Cereal Projections to 1985<sup>a</sup>

Item	FAO base (1969-71)	FAO 1985	USDA base (1969-71)	USDA-I 1985	USDA-II 1985	USDA-III 1985	USDA-IV 1985
million metric tons							
World							
Demand	1,207	1,725	1,062.6	1,548.5	1,618.7	1,501.8	1,643.9
Production	1,239	NS	1,081.8	1,550.4	1,620.1	1,503.6	1,645.7
Balance <sup>b</sup>	+32	NS	19.2	1.9	1.9	1.9	1.9
Developing countries							
Demand	590	929	466.6	691.2	726.2	678.6	743.5
Production	585	853	443.1	632.4	648.7	626.2	721.0
Balance	-5	-76	-23.5	-58.8	-77.5	-52.4	-22.5
Developing market economies							
Demand	386	629	299.7	479.4	512.6	466.7	529.1
Production	370	544	279.2	424.7	441.0	418.7	513.3
Balance	-16	-85	-20.5	-54.7	-71.6	-48.0	-15.8
Asian centrally planned countries <sup>c</sup>							
Demand	204	300	166.9	211.8	213.6	211.9	214.4
Production	215	309	163.9	207.7	207.7	207.7	207.7
Balance	+11	+9	-3.0	-4.1	-5.9	-4.2	-6.7
Developed countries <sup>d</sup>							
Demand	617	796	596.0	857.3	892.5	823.2	900.4
Production	654	NS	638.7	918.0	971.9	877.4	924.7
Balance	+37	NS	42.7	60.7	79.4	54.2	24.3

Source: The World Food Situation and Prospects to 1985, Foreign Agricultural Economic Report No. 98, Economic Research Service, U.S. Department of Agriculture, Washington, D. C., December 1974.

<sup>a</sup>The data for FAO and USDA are not comparable because FAO carries rice as paddy, USDA carries rice as milled. <sup>b</sup>Imbalances for USDA between demand and production in base are due to stock buildup, timing of shipments, and missing data on a number of small importers. Projected equilibrium does not allow for building or reducing stocks. <sup>c</sup>FAO Asian centrally planned includes the People's Republic of China and other Asian centrally planned countries (North Korea, North Vietnam, etc.), while USDA includes only the People's Republic of China. <sup>d</sup>Includes the USSR and Eastern Europe.

Note: Detail may not sum to total because of rounding.

NS = not shown.

Table 9. Comparison of Rates of Growth of Production and Demand for Cereals from 1969-71 to 1985<sup>a</sup>

Item	Total				Per capita			
	FAO	USDA-I	USDA-II	USDA-IV	FAO	USDA-I	USDA-II	USDA-IV
Percent								
World								
Demand	2.4	2.5	2.8	2.3	3.0	.4	.6	.9
Production	NS	2.4	2.7	2.2	2.8	NS	.5	.7
Developing countries								
Demand	3.1	2.7	3.0	2.5	3.1	.7	.3	.6
Production	2.5	2.4	2.6	2.3	3.3	.2	.02	.2
Developing market economies								
Demand	3.3	3.2	3.6	3.0	3.9	.6	.5	.9
Production	2.6	2.8	3.1	2.7	4.1	-.1	.1	.4
Asian centrally planned countries <sup>b</sup>								
Demand	2.6	1.6	1.7	1.6	1.7	1.0	.05	.1
Production	2.4	1.6	1.6	1.6	1.6	.8	.03	.03
Developed countries <sup>c</sup>								
Demand	1.7	2.4	2.7	2.2	2.8	.8	1.5	1.8
Production	NS	2.4	2.8	2.1	2.5	NS	1.5	1.9

Source: See table 8.

<sup>a</sup>Based on data in table 16. <sup>b</sup>FAO Asian centrally planned includes the People's Republic of China and other Asian centrally planned countries (North Korea, North Vietnam, etc.), while USDA includes only the People's Republic of China. <sup>c</sup>Includes the USSR and Eastern Europe.

Alternative III is a low demand situation that assumes economic stagnation would continue in the late 1970's and recovery does not occur until the 1980's.

Alternative IV reduces the developing countries' import needs by assuming that they increase their investments in food production by embarking on a policy of increasing the bundle of inputs used to produce food.<sup>15/</sup>

There is a fairly close congruence between the FAO and the USDA-II projections with respect to the trade balances in grains for the different types of countries. The trade balances are arrived at, however, by differences in underlying assumptions, as can be seen in table 8. For the developing countries as a whole, the assumed rates of growth in production and demand are essentially the same under the FAO and USDA-II projections. This close association results from offsetting assumptions as between the developing market economies and the Asian centrally planned countries.

FAO projections assume a lower rate of growth in demand and production for the developing market economies and higher rates of growth in demand and production for the Asian centrally planned economies than the USDA-II alternative.

In both projections, grain imports by the developing countries are projected to increase to over 75 million metric tons by 1985. In fact, grain imports by the developing countries are projected to increase substantially under all the alternatives except USDA-IV, the latter alternative assuming that the rate of growth in grain production in the developing countries increases significantly between 1970 and 1985--from about 2.5 to 3.3 percent a year.

One point stands out very clearly: Unless the developing countries

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<sup>15/</sup> The World Food Situation and Prospects to 1985, op. cit., p. 37.

accelerate the rate of growth in their production of grains, they will become increasingly dependent on grain supplies from the developed countries.  
Furthermore, to the extent that the developing countries are unable to finance rapidly expanding grain imports, growth in per capita supplies will not keep pace with growth in demand, food prices will rise, and the nutritional status of larger groups of people with little purchasing power will probably decline since they do not have the purchasing power to cope with rising food prices.

#### B. Instability

There are basically two factors that account for most of the short-term grain price instability in world markets. They are (a) fluctuations in production due primarily to weather conditions, and (b) government policies that prevent many countries from sharing in consumption adjustments to a price change.

Data on cereal production since 1955 for several regions of the world are presented in figure 1. These data clearly show the magnitude of annual variations in cereal production for the different regions. Most striking are the large annual variations in the USSR. Entry of the USSR into world grain trade on a regular basis introduces a degree of instability into world markets which dwarfs the variations in cereal production one saw in South Asia in 1965 and 1966 or were seen in any other region of the world.

A great deal of the annual fluctuations one observes in North America resulted from conscious production control efforts, with the exception of 1970 when there was a sharp decline in corn production in the United States due to the corn blight.

South Asia is the other area of the world which periodically experiences

Figure 1. Cereal Production in Major Regions of the World, 1955 to 1974

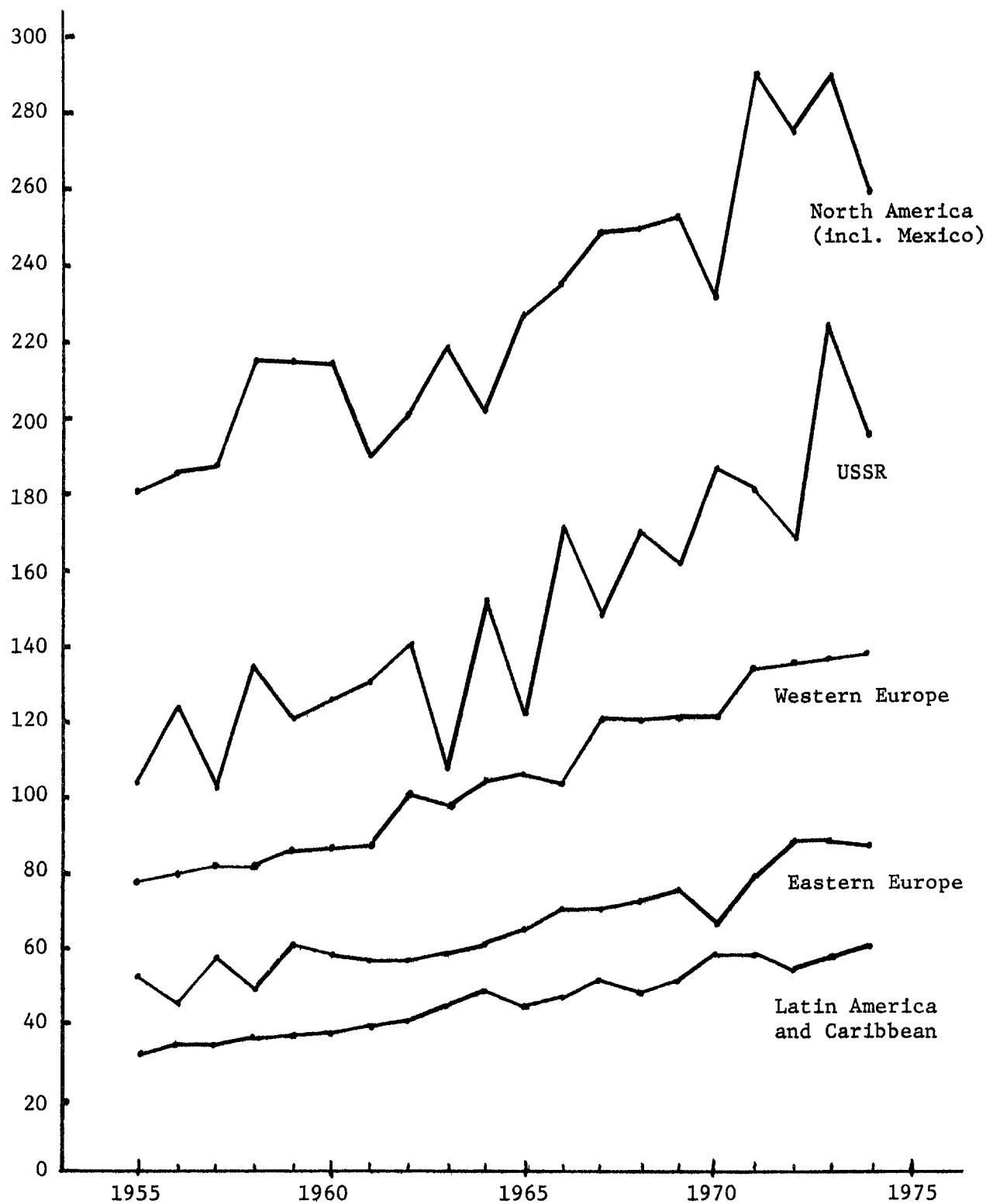
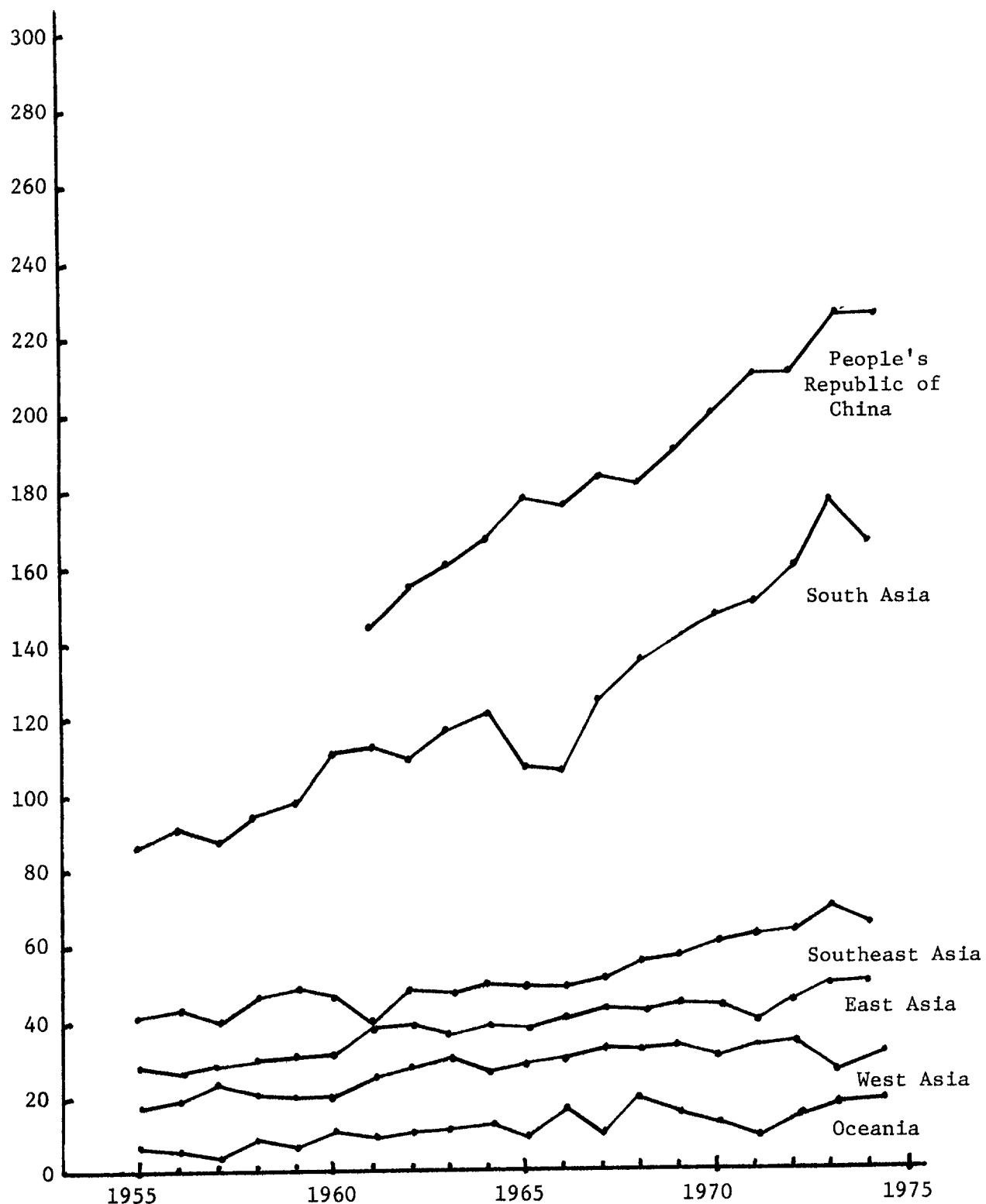


Figure 1. (continued)



large fluctuations in grain production. The fluctuations have exerted their influence on world grain prices.

There are basically three ways in which policies have contributed to instability in world prices of agricultural products. They have reduced the price elasticity of import demand or export supply relations, reduced stocks of agricultural products, and changed suddenly the reliance of some countries on world markets enough to affect the behavior of world market prices. We are concerned with short-term movements in prices and will not consider policies which result in longer-term secular or cyclical movements in prices.

The way in which some countries have intervened in agricultural trade has reduced the price elasticity of import demand and increased price variability resulting from a given change in supplies on world markets. Much of the intervention has been through the use of a variety of non-tariff barriers that tend to make the import demand curve more price inelastic. In the case of quotas or minimum import price schemes, such as the variable levy system of the EEC, the import demand curve is perfectly price inelastic over the range of prices (usually wide) for which these mechanisms are operative.<sup>16/</sup> The increased price inelasticity of import demand relations will add to instability in world prices of commodities unless there are compensating increases in the price elasticity of the supply of exports. Recent examples of temporary government interventions that kept domestic prices below world prices and contributed to world market price instability

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<sup>16/</sup> Martin E. Abel, "Price Discrimination in the World Trade of Agricultural Commodities," Journal of Farm Economics, Vol. 48, No. 2, May 1966, pp. 194-208.

are the export embargo on soybeans imposed by the United States in 1973 and the variable export tax on grains and sugar used by the EEC in recent years.

The existence of substantial stocks of agricultural commodities can help stabilize prices if they are used to achieve that end. The United States worked diligently to reduce U.S. government-owned stocks of major commodities, notably grains. There has not been a compensatory increase in privately held stocks. Since 1972, there have been insufficient stocks to cushion the price swings that have resulted from variations in U.S. production and foreign demand.

Policies to reestablish reserve stocks of grain were promoted at the World Food Conference held in November 1974. Little movement has occurred in this area because of disagreements among countries as to who should carry these stocks and how they are to be managed.

Another source of instability is the sudden shifts in food and agricultural policies of countries that are large enough to significantly affect world prices by their actions. The most recent and notable example of such a shift was the change in the food and agricultural policies of the USSR which thrust them upon the world market in a large and unpredictable way. It is not the policy change per se, but the suddenness of it which is important. The formation of a common agricultural policy by the EEC represented a major agricultural policy change for a large trading bloc. However, this change occurred gradually and in a predictable manner. Other countries had time to adjust to the EEC actions. This was certainly not the case with the Soviet Union in 1972.

#### IV. Policies that Matter

##### A. Reasons for Different Types of Policies

A distinctive feature of food and agricultural policies around the world is the close interrelationship between domestic and trade policies. In fact, mechanisms for interfering with the flow of agricultural products in international trade are usually an integral part of domestic agricultural policies and programs. Many of these domestic efforts result in substantial deviations between domestic and international prices of agricultural products. These price distortions bring about misallocations of resources that contribute either positively or negatively to the total world supply of food and its allocation among countries.

It is a legitimate activity of governments to implement social and economic policies for the benefit of either agricultural producers or consumers. Political pressures to do so have been historically strong and likely will continue to be. It is naive to expect countries to follow a laissez faire policy with respect to food and agriculture. What can be hoped for is that countries will choose mechanisms for implementing their policies that lead to improvement rather than deterioration in the global food situation.

In general terms, the objectives of domestic agricultural policies may be either to support farm prices and incomes above levels that would prevail under free market conditions, or to maintain consumer prices of food and fiber below free market levels. In market economies support to producers is found predominantly in the developed countries and support to nonfarm consumers in less developed countries.

In the industrialized countries the reasons for supporting agricultural

prices are basically twofold. One is to eliminate wide fluctuations in prices which can result from relatively small shifts in very inelastic supply and demand schedules for agricultural products. Another reason is to deal with the low income problem in agriculture reflected by numerous small producers with inadequate resources to generate earnings from farming comparable to earnings in the nonfarm sector. (Some countries, such as Norway and Sweden, have explicit policies of maintaining a certain proportion of their population in agriculture or in certain rural areas.) The tendency toward low incomes stems from the inability of resources to shift rapidly enough from agriculture to other sectors of the economy. The income problem is exacerbated when the agricultural sector is experiencing rapid technological change, as in the United States during the 1950's and 1960's.

A typical response to the problem of low and unstable prices and incomes is for governments to implement price support programs for major commodities that maintain prices to farmers and consumers above equilibrium levels. This was done in the United States in the 1950's and currently prevails in the European Community under its Common Agricultural Policy. For a net exporting country it means the use of export subsidies to be competitive in world markets. Even these subsidies (and substantial food aid) did not prevent the accumulation of sizable surpluses. For importers like the European Community it means protective barriers against imports like the variable levy system (and export subsidies when exports are called for). The combined effect of high price supports in both importing and exporting countries is to increase domestic levels of production, reduce consumption, and depress world market prices. The latter effect tends to

reduce production in countries that compete at world prices; e.g., Canada and Australia in the case of grains.

Less severe are agricultural policies which provide support to producers but allow market prices to seek world levels. Consumption is not reduced as a result of maintaining artificially high prices to consumers. Production may or may not be stimulated, depending on whether the support to producers is provided by price supports or by income payments that have a minimal effect on increasing production.

Experience has demonstrated that high price supports will not in and of themselves solve the problem of low incomes in agriculture. The income problem will have to be dealt with by a combination of direct welfare measures, assistance for resource adjustment, and expanded opportunities for nonfarm employment. The disenchantment with the farm income maintenance characteristics of price support programs led the United States away from them in the 1960's.<sup>17/</sup> Proposals have also been made for the European Community to find ways other than high price supports for dealing with the problem of low incomes in agriculture,<sup>18/</sup> although as yet no significant moves have been made in this direction.

The situation in many developing countries is quite different from what one finds in industrialized nations. There is a strong desire in many developing countries to keep the price of food to urban consumers below world market levels. To the extent that this is accomplished,

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<sup>17/</sup> U.S. Agriculture in a World Context: Policies and Approaches for the Next Decade, The Atlantic Council of the United States, Washington, D. C., July 24, 1973.

<sup>18/</sup> See A Future for European Agriculture, The Atlantic Papers No. 4, The Atlantic Institute, Paris, 1970.

producer prices are also depressed. This has been done with a variety of mechanisms. Food exporting countries have used export tax mechanisms. Examples where domestic prices to both consumers and producers have been depressed below world market levels, and at times substantially below, are rice in Thailand and wheat and corn in Argentina. Food importing countries have used imports, which were sold at subsidized prices in domestic markets, to keep domestic consumer and producer prices low. The direct financial costs of such policies depend on the level of imports and their unit costs. Food aid programs, such as P.L. 480, historically provided developing countries with a cheap source of imports, and consequently, the budgetary costs of maintaining low domestic food prices were not high. The budgetary cost can be substantial when imports are obtained at world market prices and the domestic subsidy is large. There are a great many countries which have had cheap food policies. A few examples are Indonesia, India, and Pakistan.

The general effect of low food price policies is to depress returns to and discourage investments in agriculture, thus depressing the rate of growth in output. At the same time, consumption is stimulated.

We now turn to a discussion of specific sets of policies which bear directly on the current world food situation. The policy sets that will be discussed are (1) policies that lead to underinvestment in technological and resource development in many less developed countries; (2) trade and price policies in less developed countries that discourage the adoption of known technologies and the use of modern inputs; (3) protectionistic policies in the developed countries that depress world market prices and limit export markets for less developed countries; (4) policies that contribute to the

instability of world prices; and (5) national and international development programs designed to increase food production in developing countries.

B. Underinvestment in Agriculture

It is no great secret that many countries, particularly the less developed ones, do not assign high priority to agricultural development. This is true even when the bulk of their gross domestic product comes from agriculture and a high proportion of the population is employed in agriculture. To the extent that any development is emphasized, it is generally industrial development that is emphasized and not agricultural development.

In a study of 26 selected developing countries<sup>19/</sup> for the period 1958-63, only 12 had compound rates of growth in agricultural output of 4 percent a year or more. Of the remaining 14 countries, 5 had rates of growth of agricultural output lower than those for population. The study concludes that:

Rapid rates of increase in crop output have not happened as a consequence of normal economic and social processes in societies organized on a laissez-faire basis. Rather, they have been undergirded by aggressive group action, generally national in scope, directed specifically to improving agricultural production conditions. (p. v)

Behind the overall picture of a relative lack of interest in agricultural development are numerous details. Two very important components of more rapid growth in agricultural output are the development of land and water resources and the development of new technology. With the exception

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<sup>19/</sup> Changes in Agriculture in 26 Developing Countries, 1948-63, Foreign Agricultural Economic Report No. 27, Economic Research Service, U.S. Department of Agriculture, Washington, D. C., November 1965.

of countries that have been able to exploit large amounts of unused land, rates of growth in agricultural output are closely related to rates of resource development and the capacity to generate new technology. (Of course, other aspects, such as infrastructure markets, credit, and price policies, are also important.) In a comprehensive study of agriculture in Asia,<sup>20/</sup> these two areas receive high priority. Countries whose progress in agricultural development has been rapid, such as Japan, Korea, Taiwan, Israel, etc., have placed heavy emphasis on land and water resource development and on technological change.

#### C. Trade and Price Policies

Trade and price policies that shift the terms of trade against the agricultural sector discourage the use of known technology and modern production inputs as well as retard longer-term investments in resource and technological development. Policies repressive to the agricultural sector are widespread among developing countries. Little, Scitovsky, and Scott conclude, "the bias has been excessive: that in several of the countries [studied] the effect on agricultural production has been damaging, and that agricultural exports earned less than they should have done in most of the countries."<sup>21/</sup>

Several studies deal with the strong effect that trade and price policies have on the adoption of new technology and the use of modern

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<sup>20/</sup> Asian Agricultural Survey, Asian Development Bank, Manila, Philippines, 1969. For an excellent discussion of the importance of new technology, see Yuijiro Hayami and Vernon W. Ruttan, Agricultural Development: An International Perspective (Baltimore: The Johns Hopkins Press, 1971).

<sup>21/</sup> Ian Little, Tibor Scitovsky, and Maurice Scott, Industry and Trade in Some Developing Countries (London: Oxford University Press, 1970), p. 178.

inputs. The results of some of these are worth summarizing.

Ardila, Hertford, Rocha, and Trujillo<sup>22/</sup> concluded that the slow rate of adoption of improved varieties of wheat in Colombia was the result of low domestic prices resulting from substantial imports of wheat under the P.L. 480 program. De Janvry's study<sup>23/</sup> of the use of fertilizer in cereal production in Argentina concludes that high fertilizer prices resulting from import tariffs and restrictions that protect a monopolistic and technologically obsolete fertilizer industry greatly inhibit its use. The development of new technologies to increase grain yields based on fertilizer are also retarded. He concludes that Argentina "is losing its international comparative advantages which have been resource based by not participating in the Green Revolution when it could in fact be one of the greatest beneficiaries." A final example is rice production in Thailand where the combination of an export tax on rice and a highly protected domestic fertilizer industry have made expanded use of fertilizer unprofitable and resulted in a lower level of rice production and exports than would have prevailed under product and factor prices approaching international levels.<sup>24/</sup> These examples should serve to illustrate that unfavorable trade and price policies

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<sup>22/</sup> Jorge Ardila, Reed Hertford, Andres Rocha, and Carlos Trujillo, "Returns to Agricultural Research in Colombia," paper presented at the Conference on Resource Allocation and Productivity in International Agricultural Research, Airlie House, Virginia, January 26-29, 1975.

<sup>23/</sup> Alain De Janvry, "Optimal Levels of Fertilization under Risk: The Potential for Corn and Wheat Fertilization under Alternative Price Policies in Argentina," American Journal of Agricultural Economics, Vol. 54, No. 1, February 1972, pp. 1-10.

<sup>24/</sup> Delane E. Welsch and Sopin Tongpan, "Background to the Introduction of High Yielding Varieties of Rice in Thailand," Staff Paper P72-6, Department of Agricultural and Applied Economics, University of Minnesota, St. Paul, Minnesota, February 1972.

in many less developed countries retard growth in agricultural production and contribute to a world food situation characterized by strong demand relative to supply and high prices.

D. Development Assistance Programs

Since World War II, the development assistance programs of national governments, international agencies, and private organizations have had a major impact on the world food and population scene. These programs have been directed at improving living conditions in the less developed countries by promoting economic growth, increasing agricultural output, reducing death rates, reducing rates of population growth, and improving the distribution of income and wealth.

The numerous development assistance efforts have had uneven rates of success in achieving all of these objectives in all developing countries. Some countries were either unreceptive to outside assistance or used it inefficiently. At times the development assistance programs of some countries and some international organizations, aided and abetted by national policies in recipient countries, were directed toward activities that contributed little to improving the food situation in developing countries, e.g., military assistance, heavy emphasis on industrialization and the neglect of agricultural development, and rapid reduction of death rates, which resulted in a population explosion. And, development assistance programs did not always recognize the complexity of the problems which they were trying to solve.

Few would deny, however, that the development assistance programs of the last 30 years were a grand and noble effort that improved the lives of countless millions of people in the less developed world. Per capita food

supplies have been increased through the development and adoption of better farming practices; increasing the yield potential of crops and livestock; expanding irrigated area and reclaiming land; increasing the availability of modern agricultural inputs; and bringing more and more people into the process of agricultural modernization through extension efforts, development of transportation and marketing facilities, etc. Health conditions have been improved through the reduction or elimination of ravaging diseases and increasing the availability of medical services. Education levels have been increased substantially, particularly with respect to skills required for development. Institutional capacity has been built so that many countries are better able to deal with their development problems. And, we have learned a great deal about the complexity of the issues involved and how to deal with them; e.g., we have learned that agricultural technology cannot be effectively transferred from developed to developing countries but must be developed to fit the ecological, factor, and cultural endowments of the developing countries; that land reform is easier to write about than to actually achieve; that problems of income distribution and poverty are strongly rooted in political and cultural characteristics of nations; that changing economic policies has its opponents as well as its proponents; and that changing these and other aspects of societies and economies is a slow, difficult process requiring wise and sustained efforts.

The capacity to assist developing countries is greater than it has ever been. The collective talents and resources involved in national development assistance programs, the World Bank, the regional development banks, the various United Nations development agencies, and private organizations is substantial. And, increasingly, the priorities of these various organizations is shifting toward solving problems of food, agriculture, population,

and income distribution. These efforts can yield substantial improvements in the world food situation if they are sustained, if developing countries cooperate in realigning their policies to improve the efficiency and productivity of development assistance resources, and if other countries refrain from following policies that lead to immiseration in the developing regions of the world--such as unduly high prices of petroleum and overly restrictive trade practices.

#### E. The Net Effect of Policies

What can we say about the net effect on the current world food situation of all the policies discussed? It is doubtful that one can make precise quantitative estimates of the effect of policies on the level of world food production, its distribution among and within nations, and the stability of production, prices, and trade flows. However, some judgments can be made about the direction of the effects of different policies on the world food situation.

The first judgment is that a great many developing countries are not producing nearly as much food as they could. Partly this is due to their own policies, some which lead to a neglect of investments in the agricultural sector--research, extension, infrastructure, development of soil and water resources, etc., and some which shift the terms of trade against the agricultural sector. Consequently, known ways to increase productivity and output are not adopted and there is little incentive to develop new sources of productivity growth. It is also true that the restrictive trade policies of the developed countries create distortions in world market prices which generally reduce prices of agricultural products (and other primary and labor-intensive manufactured products as well) and the incentives to increase

output in the developing countries. There are a sufficient number of developing countries representing a wide range of resource endowments that have emphasized agricultural development and have made notable strides in increasing agricultural output to support our judgment that more can be done to increase agricultural production in other developing countries.

It is less clear what the net effect on world food supplies would be if the developed countries followed agricultural policies that resulted in less distortion of world market prices. Movement of more of the developed countries toward policies that meet income and social objectives without maintaining excessive resources in agricultural production would undoubtedly lead to lower levels or rates of growth of production in many importing countries and to higher levels of production in many exporting countries. But it is not clear if "rationalization" of agricultural policies among the developed countries will lead to greater, less, or about the same level of total production among these countries or to lower, higher, or about the same levels of world market prices for various commodities. We do not yet have an adequate empirical base for drawing unambiguous conclusions about the effects of agricultural policy liberalization in the developed countries.

Much could be done by the developed countries, and the less developed ones as well, to reduce short-term price instability in world markets. One step would be the establishment of reserves for major commodities, such as grains, managed in ways that maintain price fluctuations within certain bounds. The World Food Conference proposed establishment of an international reserve for grains. Many countries, especially the United States, are wary of international efforts. They fear that international reserves will be managed in ways contrary to national policy interests. An alternative might

be for several of the major producing and consuming nations--U.S., Canada, Australia, Japan, EEC(9), USSR, and PRC--to maintain reserves and informally coordinate their management. This approach might circumvent some issues related to loss of national sovereignty.

Other steps that could be taken to lessen short-run price instability in world markets center on the redesign of national agricultural policies that increase the price elasticity of export supply and import demand. The price effects of short-term fluctuations in demand or supply would be shared by a larger number of countries and would be less concentrated on policy-restricted world markets.

Countries which engage in major changes in food and agricultural policies should be encouraged to do so on an orderly basis, giving markets and policies in other countries time to adjust in a nondisruptive fashion.

Finally, development assistance activities will have to be accelerated and focused more sharply on food, agriculture, population, and income distribution problems. Ways will have to be found to achieve closer coordination between national development priorities and foreign development assistance efforts in order to improve the effectiveness of such assistance. The difficult and long-term nature of agricultural and economic development should be more widely recognized and incorporated into development assistance programs of national governments and international agencies.

#### V. Policy Options

In this section we will focus attention on some of the policy options which may be open to countries individually and collectively. We will distinguish between those policies related to long-run supply-demand balances

in the world and those concerning short-run variability in production, consumption, and prices about the long-run trends. Also, we will distinguish among different types of countries--namely, developed grain exporters, developed grain importers, less developed grain exporters and less developed grain importers. There may be either competitive or complementary interests among different types of countries with respect to individual policy issues. It may not always be possible to reach widespread, let alone global, agreement on specific issues.

#### A. Increasing Production

There is broad-based agreement that long-term improvements in the world food situation require more rapid increases in per capita grain production in the less developed countries, particularly in many of the grain importing ones. To achieve this objective will require combined efforts to (a) slow the rate of population growth, and (b) increase the growth rate of total food production. Continued increases in per capita grain production in the developed countries will also be required, but this in itself will not be enough to meet the rapidly growing food needs of the developing countries.

A recent study by the International Food Policy Research Institute summarizes the future food demand-supply prospects.

Unless the trend of production in the DME [Developing Market Economies] countries improves in the future, production of cereals, the major food in most developing countries, will fall short of meeting food demand in food deficit countries by 95-108 million tons in 1985/86 depending on the rate of economic growth. This compares with shortfalls of 45 million tons in the food crisis year, 1974/75, and an average of 28 million tons in the relatively good production period, 1969/71. Asia accounts for some 50 percent of the total projected deficits, North Africa/Middle East about 20 percent, and Sub-Saharan Africa and Latin America about 15 percent each.

A total cereal deficit of about 100 million tons in DME food deficit countries could well prove conservative. It is based on projection of the production trend of 1960-74, an average increase of 2.5 percent a year, to 1985. During the last half of that period, 1967-74, the rate has slowed to 1.7 percent. This is too short a period and subject to too much variation from year to year to serve as a reliable base for projecting the future. Nevertheless, the pervasiveness of the slackening in production for all regions and cereal crops (except for wheat in Asia, the most visible evidence of the "Green Revolution") suggests that it may well be difficult for DME food deficit countries to maintain their longer term production trends. In the event performance in the future reflects the more recent trend, cereal production could fall short an additional 100 million tons. Such a large transfer of food, largely from developed countries, could well be unmanageable physically or financially. 25/

There are basically two policy directions which have to be pursued vigorously to bring about improvement in the per capita world food situation, particularly in the less developed grain importing countries. One is for national and international agencies providing development assistance to less developed countries to place even higher priority on agricultural development. The other is for many developing countries to devote more resources to agricultural development.

Evidence indicates that food production and agricultural development have received increasing attention in foreign aid efforts in recent years. International leading agencies have strongly emphasized agricultural development. There has been a marked expansion of international agricultural research as demonstrated by the rapid expansion of activities in international agricultural research efforts. And, the foreign assistance activities of the United States have given high priority to food and

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25/ Meeting Food Needs in the Developing World: The Location and Magnitude of the Task in the Next Decade, Research Report No. 1, International Food Policy Research Institute, Washington, D. C., February 1976, p. 2.

population problems. High priority for food and agriculture in development assistance efforts will have to be continued for many years since long-run trends in food production can only be changed slowly and as a result of intensive and sustained effort.

The effectiveness of assistance to the less developed countries to increase food production and achieve agricultural development is conditioned by the efforts that the developing countries themselves make. Developing countries that follow policies and programs conducive to agricultural development, will, in general, benefit more from outside assistance than those who do not. Thus, it is important for many developing countries to reorder their development priorities more in favor of agricultural development.

The need to intensify agricultural development efforts arises not only because the demand for food is growing rapidly, but also because future gains in production will be harder to achieve. This is so for several reasons.

First, most of the world's land that could easily and inexpensively be brought into production is now being utilized. Additional land can be used only at sharply increased social and private costs. This additional land currently has low productivity. High product prices will be required over a long period of time to make the use of marginal lands profitable; i.e., to generate an adequate return for the use of land with low productivity or to pay for large investments in drainage, land reclamation, etc. required to increase the productivity of marginal lands.<sup>26/</sup>

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<sup>26/</sup> Another cost is increased soil erosion as more and more marginal land is brought into production. These costs manifest themselves through the loss of top soil and, therefore, soil productivity, siltation of irrigation systems and navigable waterways, and increased incidence of flooding.

Second, expansion of irrigated area will also come at progressively higher costs. Many of the easily developed irrigation sites have been utilized. Additional irrigation systems can be built only at progressively higher costs. However, improving the productivity of existing systems may be highly profitable.<sup>27/</sup>

Third, energy costs are likely to remain high and even increase in the years ahead. The direct and indirect effects of high energy costs will be to raise agricultural production costs.

The list of things to do in individual countries is relatively well known. It includes such items as less distorted price and trade policies, more attention to agricultural research and extension, development of land and water resources, improvements in marketing and transportation infrastructure, improving the availability and price of basic production inputs, etc. Of course, it is much easier to develop a list of general prescriptions than to develop workable policies and programs in specific country situations. Nevertheless, the latter desperately needs doing, as the numbers concerning the future food situation indicate.

All this does not mean that each and every country should pursue blindly the objective of self-sufficiency in food. What is a reasonable agricultural development effort in any particular country can be judged in light of that country's resource endowments and agricultural production potential relative to the rest of the economy, and its perceived comparative advantage in a world market context. Overemphasis on agricultural production can be just as costly to a nation as an equivalent amount of neglect.

A reordering of development priorities in less developed grain exporting countries as well as developed countries (both grain importers and exporters)

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<sup>27/</sup> See K. William Easter, "Field Channels: A Key to Better Indian Irrigation," Water Resources Research, Vol. 11, No. 3, June 1975.

is also called for. As discussed earlier, there are several nations, particularly less developed grain exporters, that could substantially increase production if they followed policies more favorable to their agricultural sectors. Positive actions on their part would contribute to increasing the total world food supply and lowering prices of grain in world markets.

And there are many who argue that many developed countries are not paying sufficient attention to increasing their own output. They argue that even in the United States, a showcase of agricultural productivity growth, expenditures on agricultural research have been declining in real terms.<sup>28/</sup>

There arises inevitably a conflict between the interests of exporters and importers. The former would, in general, prefer "high" world market prices while the latter group would prefer "low" world prices. If we were dealing with a long-term outlook that indicated an overabundance of production and depressed world prices, then the concerns of exporting countries about expanded, competitive production in other countries would carry some credence. But if that were the prognosis, we would not be nearly as concerned about the future world food situation. Rather, we are faced with large shortages, or, put differently, high world food prices. In such a world, achieving lower world food prices should be welcomed generally and tolerated considerably well by exporting countries.<sup>29/</sup>

#### B. Grain Reserves

As discussed earlier, there is considerable year-to-year variation in

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<sup>28/</sup> See for example, Agricultural Production Efficiency, National Academy of Sciences, Washington, D. C., 1975, and World Food and Nutrition Study: Enhancement of Food Production for the United States, Report of the Board of Agriculture and Renewable Resources, National Academy of Sciences, Washington, D. C., 1975.

<sup>29/</sup> This does not mean that governments of food grain exporting countries would not get a considerable amount of political heat from their producers.

grain production in many parts of the world, especially the Soviet Union and South Asia. If these variations are allowed to influence world markets, they can cause considerable variation in grain prices because of the price inelasticity of the demand for grain.

World market price instability can be reduced if there exist reserve stocks of grains that are managed in ways designed to reduce price instability.<sup>30/</sup> The topic of grain reserves has received a lot of attention in both national and international circles. As an outgrowth of the World Food Conference in 1974, the possibility of establishing an international grain reserve is being discussed.

The importance of maintaining a reasonable degree of world price stability in grains is important to almost all nations. For developed countries, wildly fluctuating grain prices can be an important source of general price instability. And, this instability can be inflationary to the extent that fluctuating grain prices have an asymmetric effect on the general price level, i.e., rising grain prices contribute to increases in wages and non-food prices, but falling grain prices do not lead to reductions in wages and nonfood prices, thus exerting a ratchet effect on the general price level.

For developing countries, wide fluctuations in world grain prices introduce two types of hardships. First, both exporting and importing countries are faced with destabilization of foreign exchange available for imports of nonagricultural goods--grain importers through fluctuations in expenditures on grain imports and exporters through fluctuation in foreign

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<sup>30/</sup> There are other measures which can also reduce price instability. One is for countries to follow less insular agricultural policies and for the consumption adjustments to price changes to be spread over more countries.

exchange earnings. Thus, developing countries are faced with uncertainty concerning availability of funds to finance development. Second, large numbers of the poorer segments of the population in some less developed grain importing countries may face acute hunger in times when these countries cannot import sufficient grain because high world prices exhaust foreign exchange reserves and food aid efforts are inadequate.

Cochrane and Danin,<sup>31/</sup> in an excellent study of the grain reserve issue, point out that (a) the quantity of grain required to keep world prices within a reasonable range of variation during most years would not be excessive, but (b) achieving agreement as to appropriate principles for managing grain reserves would not be easy.

There are two types of problems associated with the establishment of grain reserves to stabilize price. One has to do with obtaining a consensus that reserves are desirable. As Cochrane and Danin point out:

The grain reserve issue is a thorny issue. This is true both within countries and among countries. Producer interests currently are wary of price stabilizing schemes and are reluctant to consider them seriously unless they involve price floors but no ceilings. Consumer interests, on the other hand, currently seek stable grain and food prices and are anxious to implement reserve stock programs to achieve stable grain prices at levels that seem reasonable to them. Consumers tend to believe, and perhaps rightly in these days of resource scarcity, that they have much to gain from the stabilization of producer prices. Whether these opposing interests can be reconciled in an effective international grain reserve stock program remains to be seen. But if they are reconciled and if an effective international reserve stock program is brought into being, it will occur only because of extraordinarily wise and strong leadership on the part of one, or a few, key trading nations (for example, the United States) in the world market. <sup>32/</sup>

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<sup>31/</sup> Willard W. Cochrane and Yigal Danin, Reserve Stock Grain Models: The World and the United States, 1975-85, Technical Bulletin No. 305, Agricultural Experiment Station, University of Minnesota, 1976.

<sup>32/</sup> Ibid., p. 3.

But if there is the political will to establish grain reserves, there remains the problem of how to get agreement on principles for managing reserves so that the reserve program remains viable. Since one is concerned about stabilization of prices about some trend, wherever that trend might go, one has to reach agreement on measuring the trend in grain prices. Further, agreement will have to be reached on the degree to which prices are allowed to fluctuate about the trend. The more one constrains the degree of price variability, the larger the quantity of reserve stocks required and the greater the cost. It will not be easy to obtain broad agreement on these issues. Yet, experience has shown that price stabilization schemes without explicit pricing rules are likely to fail.

### C. Market Information and Transactions

In the absence of effective grain reserve and world market price stabilization schemes, one is inevitably faced with the question of how best to live with price instability. Accurate and timely information about current and future supplies, demands, and prices of grains becomes important for countries to operate in world markets at minimum costs. Timely and accurate information on the world grain situation is inadequate. This is so because (a) many countries have poor information systems and do not know with any reasonable degree of accuracy what their current domestic food situation is like, and (b) some countries are reluctant to share information about their current food situation with other nations. Strenuous efforts should be made to improve national and international information systems as an important step towards coping with instability in world grain markets.<sup>33/</sup> This is especially important for many less developed countries

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<sup>33/</sup> For discussions of this point, see Martin E. Abel, Food, Agriculture,

who have poor domestic food information systems and less experience than many developed countries in operating in commercial world grain markets.

Another alternative for coping with price instability might be the use of long-term contractual arrangements among countries for the purchase or sale of grain. Countries could contract for at least some portion of their future grain import needs. This would provide a certain degree of assurance to both importers and exporters about the availability of import supplies and export markets, respectively. But since future grain needs or world market conditions cannot be predicted with accuracy, there could be a significant cost associated with long-term contractual arrangements. One or more of the contracting parties might be worse off financially than under a noncontractual regime. Each country would have to weigh the benefits of assuring its supply of or market for grains against the cost of such arrangements.

Another issue concerning long-term contractual grain sales or purchase agreements concerns their distribution among countries. Such arrangements do not automatically ensure that countries have equal access to world grain supplies. Those countries with contractual arrangements may be in a position to preempt grain supplies and leave other countries without effective access to world grain markets, especially in years of global shortages. This is an

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(footnote 33/ continued)

and Nutrition Information Systems, presented to the Office of Technology Assessment Board, Congress of the United States, February 4, 1976; Food, Agriculture and Nutrition Information Systems: Assessment and Recommendations, Report of the Food Advisory Committee, Congress of the United States, June 1975; Dale E. Hathaway, A Statement of World Food Information Systems: Progress and Problems, presented to the Technology Assessment Board, Congress of the United States, September 24, 1975; and Howard W. Hjort, World Agricultural Information System: A Critical Evaluation, a report submitted to the Office of Technology Assessment, Congress of the United States, September 1975.

important consideration for developing countries if the distribution of contractual arrangements favors grain trade among the developed countries.

#### D. Financial Considerations

We have already discussed the effects of unstable world grain prices on export earnings or import expenditures, especially for the poorer countries. Many less developed grain importing countries are faced with chronic shortages of foreign exchange made worse in times of extremely high world grain prices. These problems are mitigated by the flow of financial and food aid to them. However, the flow of aid is never enough and is especially constraining in periods of high world prices.

The financial constraints faced by many developing countries results of an imbalance of food purchasing power among rich and poor nations in favor of the rich ones. An inevitable result is that in periods of grain (and other basic commodity) shortages the rich countries bid available supplies away from the poor ones.

Consideration should be given to mechanisms to rectify this imbalance of purchasing power. A partial alternative (or supplement) to world grain reserves might be a world food fund which would provide poor grain importing countries with compensatory financial assistance with which to maintain food imports in periods of sharply rising prices. Under this approach, food purchasing power rather than food per se is redistributed from rich to poor countries. Such a redistributive mechanism would attempt to maintain some form of food purchasing price parity among nations in unstable world markets. It is a mechanism under which rich countries would share scarce food supplies with poor countries.

As with all specific redistributive schemes, a world food fund would

face many difficulties in its establishment and operation. It is a form of aid and the aid-weary developed nations would probably be reluctant to provide still more financial assistance to the poor countries. Further, it may be very difficult to tie such assistance to food purchases. After all, poor countries with foreign exchange constraints are short of money to import many types of goods, not just food. It may be difficult to prevent financial assistance for food imports from "leaking" into purchases of nonfood items.

But the fact remains that an imbalance of food purchasing power between rich and poor nations results in an unbalanced distribution of world food supplies. Unless something is done to redress this imbalance more in favor of the poor countries, they will continue to come up short in periods of tight world food supplies and high prices.

#### VI. Conclusions

This paper has presented a global characterization of the world market situation for grains as it now exists and as it is likely to exist over the next five to ten years. It is difficult to make specific global recommendations for how to deal with the problems inherent in the world grain situation. The interests of individual countries vary widely. Each country will have to assess its own interests and pursue courses of action to improve its situation.

Until significant progress has been made to build grain reserve stocks and increase the growth rate of food production, world grain prices are likely to be high and unstable. A corollary to the high price situation is that increases in agricultural production based on conventional inputs such as land, water and fertilizer will be more costly in the future than they

have been in the past. It would be prudent for each country to evaluate its agricultural policies and development strategies in terms of these conditions.

The returns to increasing agricultural production, particularly in the developing countries, should be quite high in most instances. Reformulation of agricultural and investment policies to be more conducive to growth in agricultural output would be a major step toward dealing with a tight world food situation. In many countries, the policy thrust should be primarily in the direction of improving output per hectare since expansion of agricultural area will be difficult and costly. Greater emphasis will have to be given to developing indigenous research capability, to increasing the efficiency of land and water use, and to building institutions that foster rapid adoption of modern agricultural technology and inputs. Expanded emphasis on agricultural development is relevant for both food importing and exporting countries. Importers would reduce their food import costs while exporters would capitalize on strong world market conditions.

Efforts on the part of developing countries to reform policies and stimulate agricultural development should be supported strongly by national and international development assistance programs. Also, it is in the interest of developed and developing countries to liberalize trade. Such liberalization would provide developing countries with an important source of revenue and strength incentives to expand agricultural production. The developed countries could benefit from improved utilization of their reserves as well as more buoyant markets for their products in developing countries.

There are several actions that countries will have to take in order to better cope with world grain price instability or its causes. First,

both national and international efforts to build and manage grain reserves are essential if world grain prices are to be contained within some reasonable range. Countries should evaluate the combination of national and international grain reserves and management rules that best meet their needs. In spite of differences in country interests and the difficulties involved in establishing and managing grain reserves, one thing is clear: It will be impossible to avoid wide swings in world grain prices without adequate grain reserves.

Second, countries should pay more attention to developing better agricultural information systems both nationally and internationally as a way to cope with an uncertain world market. It is especially important for developing countries to have accurate and timely estimates of their own food production in order to determine either import needs or export availabilities. It is also important for world markets to have similar information in order to assess accurately future price levels, needs of various countries, and the distribution of grain supplies among countries on commercial and noncommercial terms.

An uncertain world grain market means an uncertain financial situation for most countries, particularly developing countries. Attention should be paid to development of mechanisms that contribute to stabilizing the food purchasing power of poor countries. There would then be a better alignment between food needs and the ability to meet these needs from world markets.