

INTERNATIONAL TRADE IN COARSE GRAINS

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INTRODUCTION

WORLD PRODUCTION AND trade of coarse grains have increased considerably since World War II. A principal factor behind this increase has been the rapid development of the livestock industry in developed countries. Annual trade of world coarse grains reached approximately 42 million tons in 1966-70, more than 80 per cent of which was imported by Western Europe and Japan.

In most developing countries, however, coarse grains are staple foods produced by small-scale subsistence farms and are consumed within the limited traditional economic spheres. Exceptions are Argentina, Brazil, Mexico, and Thailand, all of which enjoy expanding international feed grains markets through increasing production for export. Although there are continuing pressures of oversupply of cereals in Western Europe and the United States, many developing countries have been suffering acute shortages of food due to poor harvests in recent years. In the developing countries however, there still remain large areas suitable for production of coarse grains which could serve to relieve their food shortages, as well as to reduce balance of payment difficulties through expansion of coarse grains export.

TABLE
WORLD PRODUCTION

		1952-56 A	(B-A)/A (%)	1956-60 B
Barley	{Production	73.1	+16.1	84.9
	{Area	58.7	+ 4.6	61.4
Maize	{Production	154.9	+24.9	193.5
	{Area	91.2	+10.0	100.3
Millet & sorghum	{Production	57.2	+17.3	67.1
	{Area	103.0	- 2.2	100.7
Oats	{Production	61.7	- 2.3	60.3
	{Area	51.7	-10.4	46.3
Rye	{Production	35.6	+ 2.2	36.4
	{Area	34.6	- 9.5	31.3
Coarse grains total	{Production	382.5	+15.6	442.2
	{Area	339.2	+ 0.2	340.0
Wheat	{Production	207.9	+14.6	238.3
	{Area	192.3	+ 6.2	204.3
Rice (paddy)	{Production	200.8	+12.5	225.8
	{Area	110.2	+ 6.7	117.6

Sources: [4, 1966-71] [9].

This article attempts to clarify the changes, and the backgrounds for these changes, of world production, consumption, and trade of coarse grains in the postwar era, with special emphasis on comparison of the different conditions between developed and developing countries.

I. CHARACTERISTIC FEATURES IN PRODUCTION AND CONSUMPTION

A. Increase of Production

In comparison with other cereals, such as wheat and rice, coarse grains, taken together, are the most popular crops in terms of both production figures and areas under cultivation throughout the world. This is due to the flexibility of coarse grains in adapting to various soil and meteorological conditions, making their production possible even in areas where no other cereals can be raised. It should be noted in this connection that their harvest may vary greatly from year to year, since they are grown in areas of unfavorable natural environment.

Postwar world production of coarse grains as a whole has shown an approximately 3 per cent annual rise, which is a little lower than the increase rate of wheat but a little higher than that of rice (Table I). Among coarse grains themselves, barley has shown the highest rate of increase, followed by maize, and then by millet and sorghum. These items all show higher increase rates than wheat. But both oats and rye are declining in production.

As is commonly acknowledged, the principal factor for the postwar production increase on the physical side has been technological progress, which manifests itself in increase in yields. Most striking increases in yield during the past fifteen years

I
OF COARSE GRAINS (Annual averages for periods in million tons and million hectares)

(C-B)/B (%)	1961-65 C	(D-C)/C (%)	1966-70 D	(D-A)/A (%)
+17.2	99.5	+26.8	126.2	+73
+10.9	68.1	+ 9.3	74.4	+27
+11.8	216.4	+19.1	257.8	+67
- 1.0	99.3	+ 6.7	106.0	+16
+12.4	75.4	+17.5	88.6	+55
+ 7.6	108.4	+ 1.7	110.2	+ 7
-20.7	47.8	+ 9.4	52.3	-15
-27.9	33.4	- 4.8	31.8	-39
- 7.1	33.8	- 7.7	31.2	-12
-11.2	27.8	-22.3	21.6	-38
+10.7	472.9	+17.6	556.1	+45
- 1.0	337.4	+ 2.0	344.1	+ 1.4
+ 6.7	254.3	+23.3	313.6	+51
+ 3.2	210.8	+ 4.3	219.8	+14
+12.0	253.0	+12.2	283.9	+41
+ 5.5	124.1	+ 6.0	131.6	+19

Note: Figures include China.

have been observed in the production of rye, millet and sorghum, and maize (increases of 60, 46, and 44 per cent, respectively), followed by oats, barley, and wheat (increases of 41, 36, and 35 per cent, respectively), with rice showing the lowest rate in this respect (up by 22 per cent).

Among coarse grains the principal items are maize and barley, amounting to 46 per cent and 23 per cent of the entire coarse grains production, respectively, in 1966-70. These and millet and sorghum together occupy as much as 85 per cent of the world total coarse grains production. These three items then can be taken as determining the general world coarse grains production.

Such a general picture naturally does not explain individual cases of certain regions or countries. One of the objectives of this article lies precisely here: to point out various problem areas from this perspective and seek possible solutions. In other words, the world coarse grains economy is grasped as a complex whole of various patterns and their interrelations, among which the pattern for the developed countries and that for developing nations stand out, deserving close observations each in its own ways.

Let us first divide the world into nine regions or countries, and see their trends

TABLE
COARSE GRAINS PRODUCTION

		1952-56 A	(B-A)/A (%)	1956-60 B
Western Europe	{Production	45.9	+13	51.7
	{Area	24.7	+ 1	24.9
Eastern Europe	{Production	28.5	+13	32.2
	{Area	19.4	+ 1	19.5
USSR	{Production	46.7	+21	56.7
	{Area	56.2	- 3	54.8
North America	{Production	117.5	+19	139.5
	{Area	60.4	- 1	59.8
United States	{Production	104.6	+22	127.9
	{Area	52.0	+—	52.2
Latin America	{Production	22.2	+17	26.0
	{Area	21.0	+12	23.6
Argentina, Brazil, and Mexico	{Production	17.3	+21	20.9
	{Area	15.9	+14	18.1
Near East	{Production	12.8	+ 5	13.4
	{Area	11.3	+ 5	11.9
Far East	{Production	31.2	+ 6	33.2
	{Area	53.7	+ 1	54.4
Thailand	{Production	0.07	+271	0.26
	{Area	0.06	+167	0.16
Africa	{Production	26.4	+ 3	27.3
	{Area	39.5	- 3	38.3
South Africa	{Production	3.7	+11	4.1
	{Area	4.3	-12	3.8
Oceania	{Production	1.9	+37	2.6
	{Area	2.0	+25	2.5
World total	{Production	382.5	+16	442.2
	{Area	339.2	+—	340.0

Source: See Table I.

and patterns of coarse grains production (Table II).

(1) In all the regions and countries the trend was for increasing production of coarse grains during the past fifteen years, with Western Europe, North America, and Oceania (all developed regions), and Latin America claiming the highest rates of increase (43 to 105 per cent, amounting to 2.5 to 5 per cent annual rise).

(2) Relatively low rates of increase are observable in Near East, Far East, and Africa (20 to 50 per cent rise, or 1.2 to 2.7 per cent annually). Eastern Europe and USSR are placed in intermediary position and claim moderate rise.

(3) Africa may be taken as belonging to areas with higher growth rate, but its rate of increase during the fifteen years goes down to as low as 40 per cent if South Africa (as a developed nation) is excluded in the calculation. Latin America's growth rate also goes down to 85 per cent if the three countries of Argentina, Brazil, and Mexico are excluded, but it still retains its position among the fast growing areas in terms of coarse grains production.

From the above observations we may derive a general conclusion that coarse grains production increased most rapidly in developed regions and slowly in

II

TRENDS BY REGIONS

(Annual averages for periods in million tons and million hectares)

(C-B)/B (%)	1961-65 C	(D-C)/C (%)	1966-70 D	(D-A)/A (%)
+16	60.1	+25	74.9	+63
--	24.8	+ 4	25.9	+ 5
+ 3	33.0	+15	37.9	+33
-11	17.4	- 6	16.4	-15
+ 1	57.3	+16	66.4	+42
- 6	51.6	- 7	47.7	-15
+ 3	143.9	+16	167.6	+43
-20	48.0	- 1	47.5	-21
+ 4	132.7	+15	152.4	+46
-20	41.6	- 3	40.2	-23
+24	32.2	+33	42.9	+93
+13	26.7	+18	31.5	+50
+20	25.1	+35	33.8	+95
+10	20.0	+20	23.9	+50
+10	14.7	+ 4	15.3	+20
+ 5	12.5	- 2	12.3	+ 9
+12	37.2	+12	41.7	+34
+ 4	56.3	+ 6	59.4	+11
+223	0.84	+79	1.5	+2040
+169	0.43	+63	0.7	+1070
+29	35.3	+12	39.5	+50
+12	42.8	+ 9	46.6	+18
+39	5.7	+23	7.0	+89
+29	4.9	+20	5.9	+37
+ 8	2.8	+39	3.9	+105
+ 4	2.6	+35	3.5	+ 75
+ 7	472.9	+18	556.1	+45
- 2	333.7	+ 3	344.1	+ 1

Note: China is included in the "world total," but excluded from "Far East."

developing regions (except Latin America). The place of Near East, Far East, and Africa (except South Africa) in the world coarse grains production declined slightly from 1952-56 to the latter half of the 1960s. On the other hand, the place of developed regions and countries (Western Europe, North America, Oceania, and South Africa) rose, to 46 per cent of the world total production.

Let us then turn to factors of production increases—rise in areas under cultivation and the yield—and carry out region-wise analysis.

(1) High rates of increase in coarse grains production in Western Europe, North America, USSR, and Eastern Europe depended almost solely on marked increases in the yield.

(2) In Near East, Far East, and Africa rises in production—rather mild—were dependent equally on yield improvement and on increased areas under cultivation for coarse grains.

(3) Latin America and Oceania present a reversed picture: rapid production increases were achieved through extended areas under cultivation. Yield rise in these regions is not grossly larger than that in Near East, Far East, and Africa.

(4) In comparison with Western Europe and North America, the yield in Near East, Far East, and Africa, as well as in Latin America, was rather low in 1952-56, with no accelerating rate of increases for ensuing years.

We thus see that postwar production increases of coarse grains have shown great regional differences. This not only brought about changes in demand and supply relationships within each region or country but also exerted profound influences in international demand and supply relationships and created various problems.

B. *Preconditions of Production Increase*

High rates of increase supported by good yield in developed countries and the contrary phenomenon in developing regions further suggest that in developing regions of the world (especially in Near East, Far East, and Africa) there is much room for improvement in their low and stagnating yields, and that only new technological development and its promulgation would greatly accelerate production increases in these areas. But we must also note that postwar increases of production in developed regions—and adoption of new technologies as a means—were based on then existing favorable conditions to bring about such good results. It is difficult to imagine that new technologies be introduced and production rises accomplished at any place at any time, irrespective of whether these prerequisite conditions exist or not. Differences in these conditions between developed and developing regions will not only give at least partial explanation for slow production increases in postwar developing nations but also point to possible future policy measures.

1. *Increase of demand*

What served as the stimulant for more coarse grains production in postwar developed countries was rapid rise in demand. In West European and North American countries in particular sharp increases in demand for coarse grains as

feed, along with increasing livestock consumption, brought about greater total demand for coarse grains.¹ Since most coarse grains, except rye, are produced and consumed as feed in developed countries in Europe and America,² big post-war rises in livestock consumption contributed to increased demand for coarse grains much more than increases in their direct consumption (for food).

On the contrary, up to two-thirds of coarse grains consumption is for food in developing countries. Allowing some diversification depending on natural and other conditions, staple foods in developing countries mainly consist of roots and tubers, coarse grains, wheat, and rice. Since wheat and rice, termed "superior cereals," are consumed only by high income populations or in urban areas, the more common staple food is either coarse grains or roots and tubers, taken individually or in combination, which together supplies 60 to 80 per cent of the total calory intake [8, p. 11]. As income level rises, staple food consumption may shift first from roots and tubers to coarse grains, and further to wheat and rice. But coarse grains are not always superior foods that can substitute for roots and tubers. Diets often shift from roots and tubers directly to wheat and rice, as well as from coarse grains into wheat and rice. Although there are a few cases in developing countries of marked increases in demand for coarse grains as food [3, p. 19 ff.], generally direct consumption increases less rapidly than population rise.

Consumption of coarse grains as feed in developing countries is almost negligible when compared with that as food (except in Latin America) [12, p. 21, Table 14]. Numbers of livestock in developing countries far exceed those in developed countries, but coarse grains are rarely used as feed for livestock in former countries, with a few exceptions. Even in the developing countries, however, demand for livestock has been rising in the postwar era, particularly during the past several years, but most of it has been met by imports. Neither is rapid development of domestic livestock industry expected in developing countries. It then is not reasonable to forecast sharp rises in the domestic demand for feed in these countries in near future.

2. *Facilities for distribution*

Production of coarse grains in developed countries has been carried out either by livestock farmers to feed their own livestock or by farming units who raise coarse grains for the purpose of selling their product to either domestic or international grain markets. In developing countries, however, coarse grains production generally is for subsistence and by small-scale farming units, with little relations with livestock raising.

Farming units in developed countries are equipped with far superior capital

¹ Coarse grains consumption in developed countries, including nations of Western Europe and North America, Japan, Australia, and South Africa, increased by approximately 35 per cent during the decade of 1956-57 to 1965-67. During the same period coarse grains consumption as feed in the EC showed a 43 per cent increase [12, pp. 7, 23, Tables 1 and 17].

² About 85 per cent of coarse grains consumption in developed countries is as feed for livestock (estimates by FAO for 1961-63) [8, p. 11].

and technological and managerial capabilities for meeting expanding demand for feed. With considerable volume of the grains marketed, facilities and organizations for transportation and distribution are superb.

In developing countries whatever coarse grains that are sold are in extremely small quantities, which also vary greatly seasonally and annually, although such characteristics may only be natural in a way because of their subsistence production of coarse grains. (We also note that supplies have much closer relationship to fluctuations of harvests than with market price.) Sales are almost entirely limited to neighboring local markets, with meager transportation and distribution facilities and poor marketing organizations to deal with supplies for the entire domestic market (or export markets for that matter). Distribution costs mount, and neither can emergency needs be met. Demands in major urban areas thus are more often met by imports than by domestic supplies.

In order to stimulate subsistence farmers to greater coarse grains production responding to greater demand for food in non-agricultural sectors of the domestic economy and newly arising demands from abroad, such measures as improvement of transportation and distribution facilities and better organization of marketing are necessary prerequisites. Furthermore, in the process of adopting new technologies and management, there are many difficulties to be solved such as their application in real practice, financing, land system, and so on. Only after these difficulties are conquered, greater effective demand would lead to greater production of coarse grains.

Among developing countries, Thailand and Argentina have achieved ever increasing coarse grains production. These countries are equipped with relatively superior marketing organizations and transportation and distribution facilities, through which ever increasing overseas demands have been conveyed to producers to achieve such successes.³

3. *Policy measures for cereals*

Postwar cereals policies of various nations dealing with production, pricing, and trade have exerted great influence not only on their respective domestic production but also on production and trade at the international level. Developed countries of Western Europe (especially EC nations) and North America achieved remarkable production increases of grains, such as wheat, by adoption of price support policies for grains and new technologies, until overproduction occurred in the middle of the 1950s. None of the countries, however, could afford to bring about drastic changes in price support, while the yield continued to rise as

³ In Thailand production of maize by small farming units geared for export have grown very rapidly in the postwar era, especially after 1960. Collecting, purchasing, and exporting of maize has been carried out and promoted through use of the organizations and facilities of rice-handling overseas Chinese merchants. New roads in the northeast of the country and the canal network (which has long been used for rice transportation) also have played large roles.

In Argentina we see remarkable progress in the production of maize and millet and sorghum. They are raised in the outskirts of wheat area, in which inland transportation and storage and marketing organizations are well established.

technology improved. With the continuing trend for greater production and ever mounting stocks of grains, all the exporting countries had recourse to export subsidies and non-commercial export (for example, export of grains through P.L. 480). Importer countries, on the other hand, adopted various restrictive policies in order to protect domestic production (for instance, variable import levies of the EC), and to raise their degree of self-sufficiency. These policies were applied for coarse grains during the 1960s, as well as wheat, if not to the same extent.

Faced with continuous food shortages, developing countries made concentrated efforts to increase foodgrains production in the postwar period. However, wheat and rice received primary attention on the policy level, putting coarse grains in the secondary position in spite of their serving as food in these countries. Contrary to the practice in developed countries, protection of poor consumers was emphasized in developing parts of the world, leading to the tendency to suppress grains prices to a low level. Policy measures to stimulate production by greatly raising prices came rather late to the fore.

Due partly to the fact that price policies can not be expected to function effectively because of subsistence food production, the main production promotion policies in developing countries consist of improving agricultural infrastructure (such as irrigation), subsidies for productive materials (such as farm machinery, fertilizer, and chemicals), and agricultural extension services. It should also be noted that in many developing countries urban food demand was met to a great extent by cheap imported wheat, most of which was provided by the United States under P.L. 480.

These policy lines were adopted rather early in those developing countries which suffered severe food shortages, but were not so enthusiastically carried out where surplus grains existed for export. There are quite a number of cases where governmental efforts were directed not toward agricultural improvement but more for industrialization.

Thus, we cannot say that developing countries have made consistent positive policy efforts for greater production of coarse grains, although some improvement has been made in the yield in developing countries, which can be attributed to agricultural extension programs carried out mainly by the government.

C. *Trends in Future*

We have discussed postwar coarse grains production trends from the viewpoint of comparative observations for developed and developing countries. We may now proceed to some thoughts of what the future holds in coarse grains production.

In the case of developed countries the immediate issue has been how to obtain balance between demand and overproduction. Problems of overproduction are already well known concerning wheat, but the same trend was observable for coarse grains throughout the 1960s. Drastically increasing production of barley and maize, particularly in Western Europe during recent years leading to subsidized export, is sufficient proof for such a trend. Increasing amounts of surplus wheat (soft wheat in particular) in Western Europe and the United States which

were used as feed further aggravated the problems of coarse grains oversupply. In spite of repeated calls for international coordination of grains policies among developed countries, few countries have taken effective measures to adjust production to demand. When compared with developing countries, policy measures could be much more effective for production adjustment (either for greater or smaller production) in developed nations. But overproduction of coarse grains in these countries can be expected to continue in the future, putting aside sudden changes of general conditions, such as caused by recent natural calamities.

In developing countries most coarse grains consumption accrues as staple food of the people. It is not appropriate to expect that wheat and/or rice will take the place of coarse grains on a meaningful scale rapidly enough, except in rice producing areas or big urban centers. We may thus forecast rising coarse grains production stimulated by rising demand for food (from increasing population and shifting of demand from roots and tubers) for a middle-range consideration. But demand for food alone will not greatly accelerate the pace of production; neither will there be need for such a change.⁴ What can be expected to grow sharply among domestic demands for coarse grains, at least latently, is again demand for feed. With a few exceptions, livestock raising in developing countries has no close relation with production of coarse grains (India is a typical case).⁵ Most of the necessary feed comes from pasture and various residues, while coarse grains are consumed as food. But more recently there have been not a few instances of increased poultry and hog raising in suburban areas as urbanization progresses. These developments create new demands for coarse grains as feed, although numerically at a low level, yet.

Those developing countries which greatly expanded coarse grains production in the postwar era received their principal impetus from rising demand from abroad. Thailand and Argentina are the best examples.

Such being the characteristic points of demand and consumption, developing countries must depend heavily on foreign demand and domestic feed demand to accelerate the growth of coarse grains production. In order for these two types of demand to serve as effective stimulants for greater production, efficient market organizations and systems to connect urban centers and ports with production areas, as well as transportation and communications facilities, will be prerequisite conditions. These will also serve to integrate scattered local markets into a unified domestic market.

Besides these factors of demand and consumption, the future coarse grains production in developing countries will be naturally restrained by various conditions on the part of producers themselves. Although coarse grains production is carried out primarily for the producers' own use in both developing and developed countries, we must notice different attitudes of producers in each group. That is, peasants in the former countries produce for their own subsistence (for food), while farmers in the latter raise coarse grains as feed for their livestock for

⁴ Particularly so in cases in which demand for rice and wheat in rice-producing areas and in urban centers is cut off from areas where coarse grains are produced (and consumed).

⁵ A detailed analysis of this relationship as applying to India can be found in [16].

commercial purposes. Furthermore, general socioeconomic and natural conditions surrounding producers, as well as technological and managerial aspects of production, are grossly different between developing and developed countries.

In many developing countries, as a fact, there still remains a great amount of unused land that is fit for coarse grains production. However, in a great number of cases, social and economic conditions serve to obstruct rapid extension of cultivation, adoption of new technologies, and, in the end, greater production, even if no technological or financial difficulties exist. Neglecting these factors, some claim that since productivity discrepancies with developed countries arise solely from differences in inputs, seeds, and managerial techniques, adoption of new techniques and inputs to close the gaps should suffice on the policy level. Such policy measures are certainly important essentials for production increases, but one can hardly expect significant improvement in the immediate future from such measures alone, at least judging from the postwar experiences of developing countries. Gains in production of coarse grains will not greatly exceed population growth in developing countries, at least in the short- or middle-run, though countries which produce for export will naturally be exceptions.⁶

II. TRADE: REGIONAL CHARACTERISTICS

A. *General Trends and Regional Features*

World coarse grains trade showed nearly a threefold increase from about 15 million tons in the first half of the 1950s to about 42 million tons in the latter half of the 1960s (Table III). The rising trend was sharp until the first half of the 1960s, then became milder in ensuing years. During the same period of time wheat trade registered about a twofold increase from 26 million to 47 million tons, while rice trade stagnated at about 5 million tons. Thus the increase in trade in coarse grains was the highest among cereals. In addition, the increases in coarse grains trade were almost totally accounted for by expanded private trade on commercial basis, with little dependence on trade promotion policies such as export subsidies. On the other hand, greater wheat trade was largely a result of noncommercial trade based on P.L. 480 of the United States.

The rise in coarse grains trade was much greater than the corresponding rise in production which was only 45 per cent during the same period. As a result, the ratio of trade of production, i.e., the ratio of international movements of coarse grains to total world production, grew from 4 per cent to approximately 8 per cent. The trade/production ratio for wheat increased from 12.6 per cent to 16.4 per cent, and that for rice declined slightly, but remained close to 5 per cent.

Among coarse grains, maize showed the greatest rate of increase in trade (5.4-fold), followed by millet and sorghum (4-fold) and barley (1.2-fold), while trade in both rye and oats shrank. Trade structures and performances in regional

⁶ A recent FAO forecast makes following estimates in concrete terms: 3.1 per cent as the annual rate of increase for coarse grains during 1970-80 for the developed countries, and 3.0 per cent for the developing countries [2, p. 18].

TABLE
WORLD TRADE IN COARSE

		1952-56	Trade/Production Ratio (%)	1956-60
World total	{ 1. production	382.5		442.2
	{ 2. import	14.6		20.4
	{ 3. export	14.9	3.9	20.6
Western Europe	{ 1. production	45.9		51.7
	{ 2. import	10.6	23.1	15.5
	{ 3. export	0.9	2.0	2.1
Eastern Europe	{ 1. production	28.5		32.2
	{ 2. import	0.2	0.7	0.4
	{ 3. export	0.3	1.1	0.3
USSR	{ 1. production	46.7		56.7
	{ 2. import
	{ 3. export	0.6	1.3	0.6
North America	{ 1. production	117.5		139.5
	{ 2. import	1.5	1.3	1.0
	{ 3. export	7.8	6.6	11.2
Latin America	{ 1. production	22.2		26.0
	{ 2. import	0.2	0.9	0.7
	{ 3. export	2.2	10.0	3.0
Near East	{ 1. production	12.8		13.4
	{ 2. import	0.2	1.7	0.4
	{ 3. export	0.9	7.0	0.4
Far East	{ 1. production	31.2		33.2
	{ 2. import	1.7	5.4	2.0
	{ 3. export	0.3	1.0	0.4
Africa	{ 1. production	26.4		27.3
	{ 2. import	0.2	0.8	0.3
	{ 3. export	1.3	4.9	1.6
Oceania	{ 1. production	1.9		2.6
	{ 2. import	—		—
	{ 3. export	0.7	36.8	0.9

Sources: [10, 1965/66 and 1969/70] and see Table I.

Note: Trade among East European countries, USSR, and other socialist countries is

terms reveal the following features.

(1) Western Europe and North America dominate in world coarse grains trade. Countries in Western Europe have received 60 to 70 per cent of the total world import of coarse grains, and have played a leading role in the postwar expansion of import demand for coarse grains. But during the second half of the 1960s Western Europe's imports ceased to expand, and even declined. Meanwhile, West European exports of coarse grains increased sharply, to 19 per cent of the world total export in the latter part of the 1960s. The two countries of North America together have supplied about 50 per cent of the total world export of coarse grains, playing principal roles in the postwar export market, while they both import very little. Countries in Western Europe and North America dominate the international trend of trade, as well as accounting for more than 40 per cent of the world total production.

(2) Among developed countries, Japan far exceeds the others in coarse grains imports in postwar years. Japan purchased more than 20 per cent of the world total imports in the second half of the 1960s, and now is the world biggest single

III
GRAINS BY REGIONS

(Annual averages for periods in million tons)

Trade/Production Ratio (%)	1961-65	Trade/Production Ratio (%)	1966-70	Trade/Production Ratio (%)
	472.9		556.1	
	33.0		41.4	
4.7	33.7	7.1	41.6	7.5
	60.1		74.9	
30.0	23.2	38.6	25.9	34.6
4.1	4.3	7.2	7.9	10.5
	33.0		37.9	
1.2	1.0	3.0	1.3	3.4
0.9	0.8	2.4	0.7	1.8
	57.3		66.4	
	
1.1	0.5	0.9	0.2	0.3
	143.9		167.6	
0.7	0.9	0.6	1.0	0.6
8.0	18.8	13.1	20.1	12.0
	32.2		42.9	
2.7	0.8	2.5	1.0	2.3
11.5	4.7	14.6	7.6	17.7
	14.7		15.3	
3.0	0.7	4.8	1.0	6.5
3.0	0.5	3.4	0.2	1.3
	37.2		41.7	
6.0	4.9	13.2	10.6	25.4
1.2	1.0	2.7	1.5	3.6
	35.3		39.5	
1.1	0.8	2.3	0.6	1.5
5.9	2.2	6.2	2.5	6.3
	2.8		3.9	
	—		—	
34.6	0.7	25.0	0.8	20.5

excluded.

import market of coarse grains, with her imports still on the rise (Table IV).

(3) The developed countries together (add Australia, South Africa, and Israel to the above mentioned) take about 90 per cent of the world total coarse grains imports, and supply about two-thirds to three-fourths of the world total coarse grains exports (latter half of the 1960s).

(4) Livestock industry occupies the central place in Soviet and East European agriculture and their coarse grains production amounts to roughly 20 per cent of the world total, although their weight in coarse grains trade is of minimum importance.⁷ However, these countries' severe climatic conditions and lack of

⁷ One should note the following point, however. Table III figures as applying to USSR and Eastern Europe do not include trade among Socialist countries themselves. But USSR's coarse grains export (mainly to Eastern Europe) amounted to about 1.2 million tons in the second half of the 1960s, and the ensuing trend has been for less and less trade in this route for more recent years. On the contrary, USSR's wheat export (to Socialist countries) has been increasing from 5 million tons in the beginning of the 1960s to 6 to 7 million tons more recently (out of which about 4 to 5 million tons is meant for Eastern Europe). Feed grains to Eastern Europe are supplied in greater quantities from Western Europe, while USSR sells less and less [11, pp. 59-60].

TABLE
TRADE IN COARSE GRAINS

		1952-56	Trade/Production Ratio (%)	1956-60
U.S.A.	{1. production	104.6		127.9
	{2. import	1.4	1.3	1.0
	{3. export	4.9	4.7	11.2
Argentina	{1. production	17.3		20.9
	{2. import	0.2	1.2	0.4
	{3. export	2.2	12.7	3.0
Brazil	{1. production	3.7		4.1
	{2. import	0.06	1.6	0.01
	{3. export	0.4	10.8	0.8
Mexico	{1. production	0.07		0.3
	{2. import	—		—
	{3. export	0.02	28.6	0.2
South Africa	{1. production	2.7		2.6
	{2. import	1.0	37.0	1.5
	{3. export	...		—
Thailand	{1. production	0.1		0.1
	{2. import	0.1		0.3
	{3. export	—		—

Source: See Table III.

Notes: Production figures are based on the calendar year, and trade figures on the year beginning in July and ending in next June (the figures for 1956-60 thus show the average

sufficient grain storage facilities produce big yearly fluctuations in their trade, at times plunging demand and supply relations in the world market into confusion. Policy considerations sometimes bring about similar results.

(5) The developing countries of Africa, Near East, Far East, and Latin America can be classified into two categories, first, those who produce coarse grains for export, or those where export is the principal stimulant for production, such as Thailand, Argentina, Brazil, and Mexico, and, second, those who produce coarse grains for domestic use.

(a) All the developing countries together supply about one-fourth of the total world coarse grains exports and take less than 10 per cent of imports (in the second half of the 1960s). But roughly 90 per cent of the developing countries' share of the world export is accounted for by the above-mentioned coarse grains exporting countries, Thailand, Argentina, Brazil, and Mexico. Their exports have been expanding throughout the postwar years, particularly during the most recent decade, mostly because of the United States' Feed Grain Programs, under which production adjustments were made with the four countries substituting a part of coarse grains export by the United States. Their exports are mostly directed to developed countries and not at adjacent developing countries.

(b) The other developing countries carry on very little trade in coarse grains (amounting only to less than 10 per cent of the world total when all their figures are combined), and there are no observable changes in the postwar period (their export slightly declined and their import slightly increased). By individual countries, trade figures abound in big yearly fluctuations (e.g., [7, p. 14]). Most of

IV
BY SELECTED COUNTRIES

(Annual averages for periods in million tons)

Trade/Production Ratio (%)	1961-65	Trade/Production Ratio (%)	1966-70	Trade/Production Ratio (%)
0.8	132.7	0.2	152.4	0.2
8.8	0.3	13.3	0.3	12.4
	17.7		18.9	
	25.1		33.8	
1.9	0.3	1.2	0.2	0.6
14.4	4.7	18.7	7.5	22.2
	5.7		7.0	
0.2	0.04	0.7	0.05	0.7
19.5	1.5	26.3	1.9	27.1
	0.9		1.5	
	—		—	
66.7	0.9	100.0	1.4	93.3
	1.7		1.1	
57.7	4.0	235.0	8.5	773.0
	—		—	
	0.1		0.05	
	0.4		0.7	
	—		—	

figures for 1956/57 to 1960/61). Note, however, that the 1966-70 trade figures are the average of 1966/67 to 1969/70 due to the available statistics, and that the 1952-56 figures are the average of 1951/52 to 1955/56.

their trade is carried on with neighboring countries, and very little trade is seen with remote developed countries [15, pp. 50-64]. We perceive from these observations that coarse grains trade of developing countries is only a continuation of traditional trade among several countries in the neighborhood. Demand and supply relations, as well as price relations, are limited within such small neighboring commercial areas with little relationship to more remote markets, or the world market. Such coarse grains trade is, in a sense, merely an adjustment of marginal surpluses or deficits in domestic food supplies within the respective narrow economic spheres. Stagnant trade in these countries coincides with slowly increasing production which lags behind population growth. The change of tastes has been caused by advancing urbanization and rising income. Consumption of coarse grains as food has been suppressed and, conversely, that of wheat and rice increased. Most of the increased demand for such "superior cereals" has been supplied by exports from developed countries.

Coarse grains trade of developing countries—and the production and consumption patterns behind it—should thus be taken as an aspect of their food problems. Their relations with the world food grain markets, especially wheat, have deepened as a result of their continuing postwar food problems. Looking at their coarse grains trade only in terms of world demand and supply of feed grains may prove quite misleading.

B. *Trends in the World Market*

It thus is more realistic to grasp the world coarse grains market not as a

unified entity but as a complex of mutual relations among a number of markets with various characteristics. These markets can be classified into two groups according to the characteristics of their market structures: the group exporting to developed countries and the group supplying to developing countries. The former constitutes the West European and North American countries, Japan, South Africa, Australia, and New Zealand, plus the four developing countries mentioned above, which produce coarse grains for export. The latter group does not constitute one unified market, but contains many small-scale markets isolated from each other.

The two categories have little meaning in geographical terms, but the group exporting to developed countries has more characteristics of a single unified market, and since it occupies 90 per cent of the world total coarse grains trade, it well deserves to be taken as one global market. The other category still retains greater influences of various factors within individual developing countries' domestic markets, although relations with the first group are becoming closer.

The group exporting to the developed countries has shown the following characteristic features and problems in its postwar trade of coarse grains (presented in summary form). The postwar rapid expansion of trade was mainly due to booming demand for coarse grains as feed from countries in Western Europe in excess of their domestic production increases. At least until the middle of the 1960s greater imports by Western Europe lead the way for greater production of coarse grains. But as the decade of the 1960s opened, Japan's feed demand started to expand greatly, and come to occupy a considerable share in quantitative terms. When demand from Western Europe started to wane in the latter half of the decade, increases in the demand from Japan more than compensated for the loss. While importing more, West European countries (especially France) began to export greater quantities of coarse grains from about the beginning of the 1960s, mainly due to greater domestic production of barley and maize, until such exports came to occupy significant share in world trade in the latter half of the same decade. Western Europe and Japan became the two pillars of the world import market.

This expanding demand for coarse grains imports was met by rapidly rising U.S. production and exports. During the first half of the 1950s the United States supplied only one-third of the total world exports, but during the following ten years she provided over half of the world exports. In the second half of the 1960s, however, her exports fell back to half of the world total. Taking the place of the United States during the 1960s as coarse grains suppliers were the very four developing countries which we have mentioned above. Western Europe (France in particular), South Africa, Australia, and Canada followed suit.

The position of the United States as a coarse grains supplier clearly declined as the 1960s advanced. Along with this trend the problems of disposal of surplus coarse grains resulting from continuously growing production on the other hand, became important policy issues in the United States after the 1950s.

Among major factors causing such changes in the market are the following. Corresponding to increases in both domestic and foreign demands for coarse

grains since the beginning of World War II, technological development in U.S. agriculture has been remarkable, resulting in sharp rises in yields, particularly of maize and millet and sorghum. This is what raised the position of the United States in the export market until about the beginning of the 1960s. Although waves of technological progress were propagated to Europe following the end of the war (especially to EC countries) and raised their production greatly, there still remained enough room for greater imports. But during the 1960s, especially during the second half of the decade, production increases in Western Europe picked up speed and at the same time growth of demand for livestock products slowed slightly, resulting in less import of feed and more surplus available for export. Faced with this complete turnover of the trend of West European countries, then the greatest import markets of the world, the United States adopted policy measures to curb production rises through restriction of areas under cultivation around 1960. Effects of this new policy were not very conspicuous, so that the falling rate of export rises resulted in increasing surpluses in the end-of-year stocks.

Waves of technological progress advanced to other countries, if rather belatedly. The effect of this propagation was an important factor in enabling the four export-oriented developing countries rapidly to increase export during the 1960s, particularly during the second half of the decade.

Great influences on trade patterns were exerted by the policies of individual countries, and by spreading technological changes. Policies to protect domestic agriculture, such as high price supports for grains and variable levies adopted by EC and other West European countries, not only stimulated greater domestic production of coarse grains, but also restrained imports, and, in not a few cases, forced the countries to dispose of their surplus in the international market with export subsidies. This affected exporting countries (the United States in particular) not only in their coarse grains export to Western Europe directly, but also in their export to other markets. But exporting countries among developed nations had also adopted price support policies, although to lesser degrees, and this also brought about rapid increases of production, independently of the demand and supply situation in the world market, resulting in ever accumulating stocks of coarse grains. All of this greatly affected trade, and ultimately production. Although the need for adjusting individual countries' grain policies to the global demand and supply situations is widely recognized, the sole case of this recognition being put into effect so far has been the American Feed Program concerning coarse grains. Even this measure was less effective than had been expected, because it only placed limitations on areas under cultivation and could not control yield per acre. In stark contrast to the intentions of the U.S. Feed Program, exporting developing countries, such as Argentina and Thailand, positively promoted greater production.

Another factor which cast a shadow over coarse grains trade in recent years is worthy of note, the propagation of wheat surpluses. The global wheat surplus and falling wheat price rapidly raised utilization of soft and lower-grade wheat for feed in Western Europe and the United States. In the EC and Spain, as

well as in Australia and Canada, policies have been implemented to reduce wheat production and promote greater feed grains production. This accelerated coarse grains production in Western Europe during the second half of the 1960s, and contributed much to their falling import and rising export. Problems of surplus wheat, which were accentuated by greater production and export expansion of Australia and Canada in recent years, are much more serious than those for coarse grains. Unless they are properly handled, measures to control wheat may well cause confusion in the world market for coarse grains.⁸ It is also quite conceivable that conspicuous effects of the "green revolution," mainly in South and Southeast Asian countries will greatly influence the world coarse grains market, either directly or indirectly through the world wheat or rice markets.

We have taken a long-term view on the market of developed countries. Now let us point out some aspects in short-range observation. Yearly ups and downs in coarse grains trade for the 1960s were roughly 10 per cent (35 per cent at maximum) in quantitative terms and less in price terms,⁹ although if we take a still shorter view of the matter, changes should be more violent due to factors of speculation. These ranges of yearly fluctuations lie between those of rice and wheat.

Judging from annual production fluctuations which amounted only to 3.2 per cent during the 1960s taking the world as a whole, trade fluctuations were considerable. This probably was due to the fact that the trade had only the marginal importance in terms of the entire production. Smaller price fluctuations than those in quantity traded are indicative of a considerable substitutability among various coarse grains, making demand for individual coarse grains sensitive to relative price changes.¹⁰

Annual fluctuations of trade may not seem very great if we take such a global view, but the fluctuations are considerably bigger if we examine them by region or country. For instance, exporting countries in the Southern hemisphere, Argentina, Australia, and South Africa, underwent bigger fluctuations in their exports due to bigger harvest changes for climatic reasons. For the same reason USSR's import have changed greatly, seriously affecting pricing in the world market.

Prices of individual coarse grains have been shown to change in parallel manners to each other, except for barley, whose price moves are influenced by the big demand for malt. Price differences among various coarse grains reflect the differences in their feed-value under normal conditions.¹¹

⁸ For concrete analysis and future prospect, see [6, pp. 11-14].

⁹ Annual fluctuation ratios of price are calculated as follows for 1963-69: 5.8 per cent for American maize, 4 per cent for American sorghum, 10 per cent for Argentine maize, and 6.6 per cent for Canadian barley (annual fluctuation ratios of average export prices from FAO statistics).

¹⁰ Close relationship (of substitutability) with wheat (lower grade and soft) may also have some influences in this connection [5]. Neither can one ignore the fact that the United States retains huge stocks at the Commodity Credit Corporation and maintains her price support arrangement in discussing world market price stability [13, pp. 93-102].

¹¹ Detailed analyses can be found in [5].

III. CONCLUSION: SOME POLICY IMPLICATIONS

We have so far examined processes, problems, and some future prospects for each of the two categories of world grain markets, from the viewpoint of structures of production and consumption (utilization) in relation to the postwar development of world coarse grains trade.¹²

The author has suggested that the trend of the market serving developed countries (nearly equivalent to the world market) will remain overproduction in the near future, and that the problems of the markets serving developing countries should be considered as a more important aspect of human food problems, rather than as part of the world feed grain trade.

If the above holds true, what could be policy implications in future?

(1) The trend for oversupply in the market exporting to developed countries and the trend toward diversification of supplying countries and for more diversified stocks among the exporting countries would affect the supply and price stabilization policies of the United States in negative ways, if not very drastically. And it is quite foreseeable that wheat overproduction will have increasing influence on the coarse grains market (the same applies to rice also, although more uncertain factors operate here, including natural vagaries in all cases).

It is greatly feared that all of these phenomena will lead to a less stable world market situation for coarse grains. There may arise a need even to consider in concrete terms stabilization policies on the world level for coarse grains. The control of international markets is generally desirable from the standpoint of exporting countries, but international commodity agreements would tend to be of little advantage to newly arising exporters (such as Thailand, Argentina, Australia, and South Africa among others). For importing countries, the effects of international commodity agreements would not be as favorable as for exporters, particularly under conditions of oversupply. Japan, as the biggest importer, would be capable to exert great influence in the international negotiations, and it is not inconceivable for her to act in favor of the newly arising exporters, if Japan could take account of its relationships with these countries in an economic-cum-sociopolitical sense. Also, Japan has less difficulties with domestic coarse grains production than is the case in West European countries.

Putting stabilization policies into effect on the international level for coarse grains, however, will face difficult technical problems.¹³ Also, considering a rising need for stabilization policies for all grains, international adjustment policies should be applied first for wheat, which has played the most influential role in the world grain trade. Stabilization of coarse grains would come second, as they

¹² For a summary description of future prospects on region- and country-wise basis, see [6, pp. 11-14].

¹³ Stabilizing measures on the international level for coarse grains themselves were already discussed at the beginning of the 1960s by FAO. The 1967 International Grains Agreement originally was planned to include coarse grains in its scope but ended up embracing only wheat. At the present moment this agreement has no price clause and remains only in formality as the International Wheat Agreement deprived of practical effects for stabilization. See [14] for a closer discussion of this point.

play a complementary role.

(2) It is difficult to think of coarse grains from developing countries (except for the export-oriented ones) playing important roles in the world market in the near future. A more practical and realistic challenge is how to develop regional markets of neighboring countries, as well as the domestic markets. We have already dealt with desirable policies for this purpose.

Although coarse grains are a very important staple food in developing countries, a rapid increase of consumption as the staple food would be hard to expect. As we have pointed out, coarse grains production in developing countries rises rather slowly contrasted with these countries' rapid rise in import and consumption of wheat (or rice). This phenomenon suggests that the governments of developing countries have adopted the policy of promoting greater domestic production of rice and wheat as staple foods (or promoting greater imports of these superior cereals if domestic production seems difficult to increase). Further, it is noticeable that short supplies of protein, especially of animal protein, prevail in developing countries. With the characteristics of production and consumption patterns in these countries (as well as slow growth of income), I cannot help but believe that coarse grains should serve as their most important staple food for a long time to come. However, it is equally important to notice that policy measures should promote the utilization of coarse grains as feed, particularly from the long-run point of view.

To develop the use of coarse grains as feed does not necessarily mean promotion of exports, but policies should aim at a steady, even though slow, rise in production, mainly to serve domestic livestock industries. These policies should accompany strenuous efforts to develop the domestic livestock industries. Of course, these are not short- or medium-term policy objectives.¹⁴

Since consumption of coarse grains as the staple food can be expected to grow considerably if domestic marketing and distribution facilities are improved, it would be more appropriate for the increase of production to select and improve varieties rather than to concentrate efforts on export-oriented new high-yielding varieties. High-yielding varieties are often more vulnerable to natural vagaries, pests, and diseases. The new varieties need more inputs (which increase costs), in contrast with the traditional local ones, which are usually better fitted to local conditions and tastes, and can be more easily cultivated, with less inputs.

Transformation of the staple food from coarse grains to wheat and/or rice has been a noticeable trend in most of the developing countries. In this connection it could be suggested that imports of wheat and rice be continued as required, especially for consumers in urban areas, but that policy efforts should be shifted to the promotion of coarse grains production instead of the emphasis on wheat and rice. There remains much land exploitable and suitable for the cultivation of coarse grains, but this is not true for rice or wheat, at least under present conditions in most developing countries (Africa, the Near East, and India, for

¹⁴ FAO itself emphasizes need for improvement and development of livestock industries. Also see [1].

example).¹⁵

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¹⁵ Since late summer of 1972 the world grains situation has drastically changed. But I consider that the change is a short-run swing, and that the long-run trend and problems are not much changed.