

U.S. Agriculture and World Economic Development

WORLD AGRICULTURE presents the two contrasting problems mentioned earlier: An agricultural problem which arises because of rapid march of the food supply function, with its resultant depression of farm prices and factor returns; and a consumer problem and a high real price for food growing out of tardy progress in the supply function. The United States has been an example in the first extreme and India in the second. If food were scarce in the United States, as wealthy as it is, the demand price of food would be great and rewards to resources in agriculture would be high. But the converse would not hold true in the sense that food abundance in India would immediately make all cultivators rich; at least, not with the quantity of resources owned and managed by the typical Indian farmer.

If the Martian from our first chapter returned and viewed these consumer and farm problems side by side, he might ask the "naive" question: "Why can't the problem of deficit in food supply be solved by the problem of surplus in supply?" This isn't a strange question. It is asked by many "men on the street," both in food-surplus and food-deficit countries. But the question is naive in extent to which it does not recognize complicated international economic and political relationships. The problem is much more than a physical one, or a transportation model, involving the simple matching of bushels and tons in one country against consumption requirements in another. Countries which are potential recipients of aid in food, just as those which may provide it, have

particular value moorings which tend to resist pure charity; or have reservations on the purposes underlying aid. Underdeveloped countries are more concerned with aid as it serves to a means in economic growth and income improvement, rather than as an altruistic end, or as a means to solving surplus problems of particular advanced countries.¹

AGRICULTURAL POLICY AND FOREIGN POLICY

To obtain a perspective of agricultural policy in relation to foreign policy, we need to review the roles which food supply in the United States has had in filling world food demand. Early food exports were important in acquisition of foreign exchange and capital to promote industrial growth of the nation. Foreign demand allowed U.S. agriculture to expand profitably at a rapid rate over much of the nineteenth century, but world economic development and global summation of food supplies caused this export demand to shrink. Farmers were encouraged to turn to a "protectionist" policy, providing part of the political force leading to high tariff schedules. But with great export demand and rapid supply growth in food during World War II, the potential of the "world stomach" in absorbing U.S. food output has been reappraised by agriculture since 1940.

Growth in export markets helped allow agricultural supply of the United States to grow rapidly at favorable prices, with increased farm income, over the nineteenth century and up to about 1920. Foreign markets were highly elastic, as is true for the product of any one country which does not supply the majority of world exports. They were important to U.S. agriculture as it developed rapidly and drew resources into it. However, farm leaders took a quite different view of foreign trade in the 1920's. Proportionate supplying of international markets by U.S. farm products dropped greatly even as early as 1910. Although protective tariffs could not benefit them at the time, farmers, who had lost their battle for "cheap money" were encouraged to turn to the protectionist fold as far back as the 1890's. It has been suggested that they were convinced to do so by the emerging power group known as the "Captains of Industry," who stood to gain by high tariffs and restrained imports of industrial products.²

But the greatest turn in this direction by farmers came in the 1920's. Decline in U.S. exports undoubtedly caused them to believe this to be a major opportunity for "economic uplifting." During the first decade of this century, U.S. farm exports dropped by about 60 percent. While cotton exports continued to climb, 1910 wheat exports fell to a third of those in 1900. Beef exports fell to a fourth and pork exports were halved. The United States supplied these percentages of world exports in 1884—

¹ For viewpoints of aid in receiving countries, see B. F. Hoselitz, *Progress of Underdeveloped Countries*, University of Chicago Press, Chicago, 1951, pp. 259-69.

² M. R. Benedict and E. K. Bauer, *Farm Surpluses, U.S. Burden or World Asset?* University of California, Division of Agricultural Sciences, Berkeley, 1960, p. 141.

88: wheat, 36; corn, 44; beef, 43; pork, 71; and cheese, 28. The comparable percentages in 1924-28 were respectively 22, 6, 1, 29 and 1.³ Proportionate supplying of world markets dropped even lower during the 1930's. The decline grew out of competing supplies from countries such as Australia, New Zealand, Canada and Argentina, the change to creditor position by the United States and restrictive trade policy tariffs on farm products; the latter lifted to unprecedented levels by the Fordney-McCumber Act of the early 1920's and the Smoot-Hawley Act of 1930.

The Trade Agreements Act of 1934 was a first "restep" in policy to lessen trade restrictions and increase international commodity flows. On the other hand, the price support and production control programs of the 1930's caused farm products of other nations to be substituted for those of the United States in world markets. Increase in cotton exports of other nations somewhat more than exceeded the decrease of exports by the United States during this period. It is generally agreed that the price policy programs were inconsistent with other U.S. attempts to expand foreign markets.⁴ The AAA of the 1930's also provided for limited export subsidies to allow greater foreign sales of U.S. farm commodities. Exports jumped under the Lend-Lease shipments of World War II and continued heavy with reconstruction of Europe. Food represented only about 12 percent of U.S. exports under Lend-Lease, but it was enough to boost farm prices greatly under the regime of inelastic demand. The UNRRA program served similarly in increasing foreign transfer of food and boosting farm profitability at the close of the war. In postwar years, aid to food exports was given under the Mutual Security Act (MSA or P.L. 165) of 1951 and its amendments (particularly P.L. 665) which allowed for food shipments as "defense support" items. With early European recovery, foreign demand slackened and surplus buildup began. However, the Korean conflict erased these export losses and held demand temporarily high. But again in 1953, foreign demand slackened and U.S. farm supply began its rapid march ahead of both domestic and foreign demand.

It was at this time that greater reliance began to be placed on food disposal through foreign assistance programs: the Point IV program and its successors providing technical assistance; commodity grants and emergency aid to India and Pakistan, with provision of revenue forthcoming from sales to be used in promoting technical development of agriculture; Public Law 480 (P.L. 480) promoting foreign disposal of U.S. agricultural surpluses; and subsequent "Food for Peace" authorizations. Whereas legislation such as the Mutual Security Act served more as a general mutual-assistance program with friendly nations, Public Law

³ See R. M. Stern, "A Century of Food Exports," *Kyklos*, Vol. 13.

⁴ Cf. D. G. Johnson, *Trade and Agriculture, A Study of Inconsistent Policies*, Wiley, New York, 1950, and A. Hickman, *Our Farm Program and Foreign Trade*, Council on Foreign Relations, New York, 1949. Along somewhat similar lines, see A. J. Youngson, *The Possibilities of Economic Progress*, Cambridge University Press, Cambridge, 1959, pp. 245-65.

480 was from the start primarily a domestic bill using the foreign-aid program as a means for accomplishing surplus disposal. Sales of food under the Mutual Security Act were sizeable, with other countries able to use some of the funds granted them by the United States under this program to buy food. Restraint in disposal of food surpluses under this program existed, however, because so many of the participating countries were agricultural.

Under P.L. 480 sales, the recipient nation could retain the payment it would otherwise make and use it for selected developmental purposes or investment in mutual security. Sales under P.L. 480 were limited to commodities acquired by government with price support programs or deemed to be in surplus quantity, and emphasis was on expansion of foreign trade in U.S. farm commodities. Public Law 480 also included such provisions as these: developing new markets for U.S. farm products, promoting balanced economic development and trade among nations, aiding international educational exchange and the publication and translation of books and periodicals, collecting and disseminating technical and scientific information and others. Under the program, it became possible to conduct research, from payments held in local currencies, on improved marketing of U.S. farm products abroad, but not on methods of increasing the farm supply function of foods in underdeveloped countries.

As indicated in Table 17.1, an important portion (about a third) of U.S. farm exports went under provisions of P.L. 480 and other special programs over the period 1954-60; exports of wheat, rice and other surplus commodities through normal channels being adapted in nature accord-

TABLE 17.1
U.S. FARM EXPORTS UNDER P.L. 480 AND SPECIAL PROGRAMS AND
NORMAL CHANNELS, 1949-60 (MILLION DOLLARS)

Fiscal Year	Public Law 480 Exports*				All Special Programs†	Total Exports	Percent of Exports Under Special Programs
	Title I	Title II	Title III				
			Donations	Barter			
1949-50 . . .	—	—	—	—	1,969	2,986	65.9
1950-51 . . .	—	—	—	—	1,202	3,411	35.2
1951-52 . . .	—	—	—	—	584	4,053	21.1
1952-53 . . .	—	—	—	—	532	2,819	18.9
1953-54 . . .	—	—	—	—	677	2,936	23.1
1954-55 . . .	73	83	135	125	931	3,143	29.6
1955-56 . . .	439	91	184	298	1,417	3,496	40.5
1956-57 . . .	909	88	165	401	2,003	4,728	42.4
1957-58 . . .	660	92	173	100	1,451	4,002	36.3
1958-59 . . .	730	56	132	132	1,351	3,719	36.3
1959-60 . . .	815	65	107	151	1,400	4,527	30.9

Source: *Agricultural Statistics*, 1960.

* Title I sales are in foreign currency. Title II quantities are donations for emergency relief abroad. Title III quantities are donations in the U.S. and overseas and for barter to American processors who acquire strategic materials abroad and furnish them to the U.S. at a later date.

† Includes P.L. 480 and P.L. 665 with the latter sales also in foreign currency.

ingly. Of total U.S. farm sales, around 12 percent has been going for export. P.L. 480 and MSA exports amounted to about these percentages of total U.S. exports of the particular commodity in 1960: wheat, 75 percent; rice and vegetable oils, 60 percent; feed grains and cotton, 33 percent. Europe (mainly Spain, Yugoslavia, Italy, Poland and France) has taken about 40 percent of these special program exports, Asia (India, Korea, Pakistan and Taiwan) another 40 percent and Latin America and Africa together about 10 percent. These sales have not been in dollars, but in the currency of the importing country, mostly inconvertible currencies, with some food going directly as grants. These local currencies have not been converted to goods shipped to the United States but have remained in the countries or have been used for projects agreed upon by the government of the importing country and the United States. Up to 1961, most of the agreements were for a year's duration, although one was signed with India to run to 1964. A 1959 amendment to P.L. 480 allowed countries to use their payments for these surplus farm products as a loan, payable in 20 years at 2 percent interest. Up to 1962, no sales had been made under this provision.

Under P.L. 480, local currencies received for sales were placed in a U.S. account in the foreign country. The United States spends some for its own purposes (expenses for U.S. agencies abroad, embassy buildings, local military purchases, etc.), but most of it has remained simply on deposit for the United States. A small part (less than 10 percent) has gone to special projects including development of mining, industry, power, transportation, schools, etc. A little has gone for agricultural development such as irrigation projects and a trickle to research. But by and large, P.L. 480 and special programs have sent surpluses abroad, with foreign currency simply piling up in the recipient countries, or a fraction turned back to them for special or highly specific projects on which they agree with the United States.

Foreign aid programs with the partial, and perhaps dominating, goal of surplus disposal have been effective in moving crop stocks out of the country. Without these disposal activities, government storage in the United States would have been much greater. The data below indicate what the percentage exports were of production for three crops in the years specified:

Year	Exports as Percent of Production for:		
	Wheat	Corn	Cotton
1925	14.3	1.8	48.3
1930	11.9	.5	48.7
1935	-4.9	-.4	56.1
1940	3.6	.4	7.5
1945	28.7	.9	36.9
1950	31.6	4.8	40.0
1955	35.9	5.6	14.2
1960	44.6	6.9	39.1

By 1960, the United States was exporting nearly half of the annual wheat crop, with most of this going under foreign aid programs. Feed grain exports had jumped too, but were still only a small proportion of annual

production. Nations with hunger prefer grains serving as human food, rather than that serving as animal feed. Cotton exports had increased, but relative to production were still below the levels of the 1920's.

Long-Term Trends of Agriculture in World Trade

World economic growth over the long pull will not restore agriculture to its "previous place in the national economy." Agricultural exports have become a declining proportion of total U.S. exports, or of total international trade. The reasons are largely those stemming from economic development as explained in Chapters 3 and 6. With expansion in national economies and differential income elasticities of demand under per capita income growth, this trend will continue. As Table 17.2 indicates, farm exports, while increasing in dollar and physical volume in recent years, have become a minor part of total U.S. exports. (Also, see the data and estimates of Table 6.16.) This is true even though P.L. 480 has expanded disposal of surplus commodities. While greater food supply will be needed as nations develop their economies and experience population growth, the mix of goods in international trade will continue to shift towards a greater proportion of nonfood commodities. Even for develop-

TABLE 17.2
VALUE AND PERCENTAGE OF U.S. AGRICULTURAL EXPORTS IN TOTAL EXPORTS*

Period or Year	Agricultural Exports†		Agricultural Exports as Percentage of U.S. Exports	
	Total	Commercial	Total	Commercial
	<i>(million dollars)</i>		<i>(percentage)</i>	
1902-06.....	878	.....	59.4	.....
1907-11.....	974	.....	53.8	.....
1912-16.....	1254	.....	45.1	.....
1916-21.....	2856	.....	42.6	.....
1922-26.....	1950	.....	45.9	.....
1927-31.....	1621	.....	35.9	.....
1932-36.....	713	.....	36.4	.....
1937-41.....	679	.....	20.3	.....
1942-46.....	1976	.....	18.9	.....
1947-51.....	3469	1,563	28.1	12.7
1951.....	3411	2,201	27.1	17.5
1952.....	4053	3,157	26.0	20.3
1953.....	2819	2,273	18.6	14.7
1954.....	2936	2,225	19.3	14.6
1955.....	3143	2,281	21.1	15.3
1956.....	3496	2,140	20.7	12.7
1957.....	4728	2,724	22.9	13.2
1958.....	4002	2,702	21.4	14.4
1959.....	3719	2,419	21.5	14.0
1960.....	4526	3,127	23.7	16.4

* Source: *Agricultural Statistics*, USDA 1960: The Demand and Price Situation 1954-1960; The Foreign Trade of the U.S. USDA 1960.

† Total includes all agricultural exports while commercial includes only those not under government programs such as P.L. 480 and P.L. 665. (Commercial includes sales under international wheat agreements.)

ing nations starting from an early stage, the marginal social efficiency of investment and inadequate supply of foreign exchange typically places premium on import of capital goods for industrialization; or even for producing inputs which serve to develop agriculture.

EXTREME SUPPOSITIONS

Some policy advocates in the United States view the nation's surplus problem nearly as if it were a physical problem, capable of easy solution by shipment of excess products to foreign soils where the recipients can then drop their hoes and turn to building roads, schools, factories and the modern amenities of advanced societies. This picture of matching high development against low development is an oversimplification. It has appeal in politics and to the person who need speak only in grandiose terms and need not face the preliminary but necessary steps involved before this "magic wand" can be waved, eliminating the problem of Cinderellas in both rich and poor nations. But it is an important contrast worthy of much more intellectual effort and imagination than has gone into it in the past. Current speculation and hypotheses pose the possibility that the diametrically opposed problems of food surpluses and food deficits in different parts of the world will continue to worsen in the short run. At one extreme, it appears that the "break through" in agricultural technology and farm progress experienced in recent years by advanced agricultures will continue and surplus potential will continue for a decade or more. On the other hand, conservative estimates of near-term population growth pose food needs in some less advanced countries which exceed prospects of growth in food supply.

The threat of "population explosion," with people standing on each other's heads as suggested by extremists through national magazines, is not realistic. If national societies do not find effective market or institutional means of restraining supply of humans, the "iron law of subsistence" will do so. It is not likely that any major, or any but scattered minor, nations will allow food demand and food supply to progress to the point where physiological well-being of people declines to a miserly subsistence level. In this day of knowledge and enlightenment, it is certainly hoped that the problem of food is not one of averting retrogression whereby human nutrition worsens and approaches the subsistence level; but that it is the more positive one of managing food and agricultural resources against supply of households and labor, such that economic development can be best promoted and real level of living can rise the world over.

The latter is the hope of the world's population, rather than the first. Policy of a food surplus nation takes on quite different image when it is analyzed in this light, rather than purely an emotional appeal to avert starvation of helpless people. Aside from politics and poor social management, nations of this age are concerned with the more important problem

of lifting real incomes, with more of industrial products as well as of variety in food, and with methods of attaining this goal. In fact, as Millikan and Rostow point out,⁵ it is probably a misconception that revolt and political instability of less developed nations are the result alone of hunger and poverty; that relieving hunger by itself will reduce revolutionary tendencies; or that if people are only better fed, they are less likely to shift from one to another political camp. Revolt does not typically come from chronically destitute populations who, after centuries of the same, take it for granted that their lot is thus. Putting extra food in the stomach will not itself generate takeoff in economic development or, unaccompanied by other changes, guarantee a particular pattern of political advance in backward societies. Food to people who can't read is not likely to build up any great convictions in politics and economics. A first concern of most nations of low development is to "break away from the agricultural mold."⁶ They need first to develop industry in their own country, so that the productivity of agriculture can then be increased to release people to nonfarm employment. Until industry can be developed at a rate fast enough to provide this employment, the concern with agricultural productivity is to move it ahead as rapidly as population growth and to keep the real price of food at reasonable level for consumers. An increase of agricultural productivity to release labor to industry is needed only when industrialization increases rapidly enough to absorb people from farming. As suggested in Chapter 2 and as illustrated in Figure 17.1, economic growth is characterized by a decline in agriculture as a share in the national economy. Nations at the lowest level of development have the major part of both their labor force and national income in agriculture. In nations such as India, with 50 percent of national income and 70 percent of population in agriculture, the hope is not to avert diminished nutritional standard through agricultural development, but to use industrial development to allow agriculture to decline in the national economy.

Food surpluses and deficit problems are not simple ones to be solved by transportation models in defining least-distance or least-cost flows against upper restraints of surpluses in some countries and against lower restraints of human nutrition in other countries. They involve more complicated structures in international politics and economics. More importantly, they involve political, economic and psychological structures within countries which are short on food.⁷ Too, the problems of economic development and of bringing more tardy economies to the takeoff stage,

⁵ M. M. Millikan and W. W. Rostow, *A Proposal; Key to an Effective Foreign Policy*, Harper Brothers, New York, 1957, pp. 19-22.

⁶ In this respect, see the discussion by Richard Hartshorne, "The Role of the State in Economic Growth," pp. 317-19, in H. G. Aitken, *The State and Economic Growth*, Social Science Research Council, New York, 1959.

⁷ For discussion of some of these political and planning problems and mechanisms, see E. S. Mason, *Economic Planning in Underdeveloped Areas*, Fordham University Press, New York, 1958, Ch. 4.

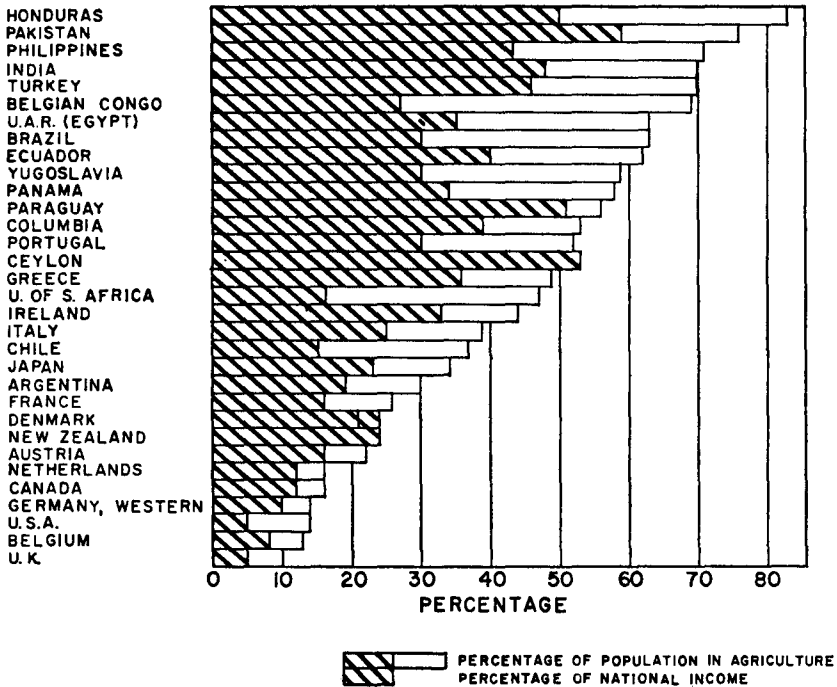


Fig. 17.1. Percentage of Population and National Income in Agriculture for Selected Countries. (Source: FAO. *State of Food and Agriculture*, Rome, 1959, p. 96.)

the foundation upon which most proposals for foreign food disposal are based, involves much more than food. In fact, it cannot be proved that food is the prime restraint to development by most countries which have yet had little of it. Most nations which have been given recent opportunity to direct their own political and economic destiny, or their political leaders, have foundations in values, aspirations, national morale, self reliance and basic creeds as important to them as to major nations which are in the maturity stages of economic development. This is one reason that it is not even easy for nations with surpluses to give food away. It is true that even most infant or less developed nations have pride and self respect which causes them to resist dependence on pure charity, or approaches to it, in times other than natural emergency.⁸ A developed nation is not likely to win many international friends if it maximizes its image as a donor and savior of disadvantaged countries, without creating maximum ability or recognition of recipients to make their own contributions in its growth and development.

⁸ Cf. Millikan and Rostow, *loc. cit.*; Benedict and Bauer, *op. cit.*, p. 141; and S. R. Sen, "Impact and Implications of Foreign Surplus Disposal on Underdeveloped Economies—the Indian Perspective," *Jour. Farm Econ.*, Vol. 42, pp. 1031–32.

DEVELOPMENT OR DUMPING

Use of food surpluses to alleviate hunger has appeal on humanitarian grounds. Basic values in this direction do cause earnest persons of food surplus countries to wish that their abundance could thus be shared with nations which are less fortunate in natural resources, historic surroundings, economic mechanisms and political structure to quickly bring their food supply to level eliminating misery. Individuals and groups take sincere steps and use their own private resources and mechanisms to help bring about matching of supply and food "demand" for food in this international context of imbalance. These steps are reflected by donations of such groups as church organizations and those contributing to CARE.

There also are deeply held convictions throughout American society that disadvantaged nations should be aided in overcoming hunger and being started on the road of economic development so that their people can have better living standards and enjoy opportunity in utilizing human capacities and abilities for these ends alone and apart from any nationalistic purpose. These are noble purposes and they mesh with general "worldwide public purposes" which appear to be developing. It is not likely that the public objectives or conscience of peoples in the various developed countries over the world will long allow them to stand by while other nations suffer food shortages and other deprivations which restrain elementary human dignity and health. Objective evidence in this direction is already provided in the lifting of restraints to self government imposed through colonialism and in investments in economic development of backward countries by even small but economically advanced nations over the world. The general world trend, albeit with difficulty resting in international politics, is to observe and promote the aspirations of people, whatever their nationality and location. It will indeed be beneficial if political and economic competition among advanced nations can be channeled into these types of investments, with positive productivity in human welfare, rather than into war productivity. Environment for development and progress of people over the entire world indeed exists if resources can be allocated thus. While chance for change previously seemed remote for peoples in many backward nations, they now see opportunity for social and economic improvement and aspire to it. Accelerating developments in literacy, mass communications and travel are causing enlightenment of people who were previously isolated. The world community is being drawn into closer proximity of desire and aspirations in education, social structures and economic progress.

Purposes of Aid in Food

But just as concern for economic development and elimination of hunger is a noble and humanitarian end, the same appeal can be used to oversimplify the problems of using food surpluses in international markets and to camouflage policy to get rid of domestic farm surplus problems. Like some other marriages, surplus supply and foreign dis-

posal can be joined to cover up slips which occurred elsewhere. The United States is a wealthy nation and it can afford some "overinvestments" in farm policy which do not lead to a mathematical optimum in use of resources and institutions. It can afford delayed movement to desired community utility positions because of the complexity of decision processes through the political mechanism of a diverse but democratic society which emphasizes sovereignty of individuals. It does and can, for this reason, use domestic agricultural policies which are not optimum in the long-run context of values and aspirations by upcoming generations, or of values held by this generation for the one which follows.

Internally, the United States can afford certain group concurrences and "nonoptimum" uses of resources where imperfections in these activities are consistent with the political process allowing social evaluation of alternatives, policy testing of outcomes which have no *a priori* basis in prediction, and subjectively measuring group outcome in distribution of gains and losses from specific policies. Domestic farm policies which are publicly justified under one label but are directed basically to other ends can function temporarily in this setting without bringing human misery, submersion of general societal goals and major restraint to economic development. But they should be limited to this domestic environment, and not be shoved off on other nations under similar cloak. Political luxury possible for farm policy in a wealthy nation should be limited to its shorelines, and not mixed with its more basic and fundamental goals in foreign relationships and policy. Farm policy orientation which attempts to use supply capacity in manner best consistent with the nation's foreign policy and societal concern in optimum world economic development should be pursued vigorously. That which is only convenient marriage of surplus problems at home and food outlet elsewhere, and in conflict with optimal economic development patterns for less advanced nations, should not even have second consideration.

The type and manner of policy best suited to deal with international economic problems depends on the ends of the policy. Millikan and Rostow have posed these questions as a basis for gauging assistance programs and misconceptions about them:⁹

Are economic assistance programs intended to win friends for the United States? To strengthen the military capability of our allies? To induce other countries to follow foreign policies to our liking? To reduce the appeal of communism to the poverty stricken? To benefit the United States economically? To induce healthy internal political development abroad? To raise living standards for humanitarian reasons?

To this list we might add the questions: Is surplus foreign disposal a means to "ship the American farm problem abroad," just as we were expected to "eat it up" under an earlier set of propositions? Is it convenient method of benefiting American producers? Does it have the fundamental purpose of fitting into optimal economic development programs of nations starting at low level and desiring rapid progress?

⁹ Millikan and Rostow, *op. cit.*, p. 9.

Confusion over the extent to which portion of outpouring from the U.S. farm supply function can or should be used in assistance programs to less developed nations stems from differences in values, beliefs about facts and ends of economic interest groups. Some people press it in pure humanitarian hope. Some sincerely believe that it can or should be used as a primer in economic development of backward nations. Others support it in terms purely of their own economic interest, and policy proposals and legislation have both been made in this vein. Some groups who would call "foul play" should Canada or Australia pour their surpluses into the United States, or if U.S. legislators were willing to accept them, are not unwilling to dump farm surpluses in other countries, without concern over detrimental price and income effect on producers of other countries who also have surplus farm productive power or on producers in countries who might serve as recipients of surpluses.

Concept of "fair play," or expectation of retaliation, does prevent Americans from advocating outright dumping of surplus farm products. Dumping under the cloak of foreign assistance programs is more palatable to the same persons, however. Mortenson estimates that U.S. decision to export cotton in 1956 substituted for about 2 million tons from competing nations and lowered export revenue from the latter by about 350 million dollars per year.¹⁰ Too, even where advocates restrain themselves in suggesting dumping (Public Law 480 states that surplus disposal should not impair the position of friendly countries) which might have serious impact on producers in competing export nations, they often worry little about any adverse price effects which surplus disposal might have on producers in nations which stand to become recipient of aid in the form of our surplus farm commodities.¹¹

Frameworks of Aid

Currently the facts are too few to know exactly where and to what extent U.S. farm products can best fit into assistance programs which optimally promote growth of underdeveloped economies.¹² Undoubtedly there is opportunity for their use, but the exact extent and manner are yet to be determined over the long pull. To be certain, few countries are going to be interested in temporary blasts of policy and appropriations from the United States which provide them with both more food for a year or two and uncertainty thereafter. And this has been the mold of much surplus-oriented legislation. It has been entirely in terms of ephem-

¹⁰ Erik Mortenson, "The Competitor's Perspective," *Jour. Farm Econ.*, Vol. 42. For an expression of sentiment in Australia on use of surplus U.S. food, see: Farm Foundation, *Increasing Understanding of Public Problems and Policies*, Chicago, 1960, pp. 77-8.

¹¹ For an early suggestion of negative price effects in recipient nations, see Millikan and Rostow, *op. cit.*, pp. 91-2. Also see J. S. Davies, "Food for Peace," *Food Res. Ins. Studies*, Vol. 1, p. 146; and N. Islam, "Foreign Aid and Economic Development. A Rejoinder," *Social and Economic Studies*, 1959, p. 285. Dumping is common practice under market orders for nuts. (See Benedict, *op. cit.*, p. 110.)

¹² For a discussion of aid in Latin America, see A. T. Mosher, *Technical Cooperation in Latin American Agriculture*, University of Chicago Press, Chicago, 1957, pp. 245-338.

eral appropriations, subject to cessation with the following year's appropriations. What nation would want, aside from initial building up of buffer stocks to alleviate distribution problems and exorbitant consumer prices in case of disaster, to build economic development on a product or resource lacking certainty and subject to withdrawal at momentary notice? To build diets to an improved level, then have their basis suddenly withdrawn would cause more political and psychological difficulties than leaving nutrition at a somewhat depressed level. Or, from the standpoint of resource allocation, no nation is going to draw resources out of agriculture to extend development in other sectors with the prospects that it would have to rush these resources back into farming at the end of a year—should food aid be withdrawn after the year's political campaign ends in the United States. Not even five years is a sufficient time span for a country to greatly incorporate food aid into its development planning. To do so efficiently, it needs 10 years as a minimum period and 20 years is preferred. Five years is only long enough to get resources in the midst of reorganization, and not long enough to attain major outpouring in product from this reorganization.

Use of surplus food in assistance programs can take on different molds depending on the end or goal of the program. For example, any one of the questions above poses a goal of assistance calling for a different disposal program.¹³ The program optimum for one purpose is not thus for another. If the goal were simply that of getting rid of an embarrassing domestic problem, at least cost with conscience restraint that food must not be wasted and must be used by someone on the globe, we would give it to whatever nation would send ships to haul it away, at whatever price could be forthcoming. If this goal also were to be attained under constraint of "not losing our friends," the mold of the program would have to be quite different, and we would try to get as much food as possible into the hands of less developed nations. But if the goal were, from the limited capital funds available over the world for the purpose, that of maximum economic development of backward nations, we might have a quite different concept of where the latter nations should get their imports, and of whether they should get more resources for industrial development and less food from ourselves.

We can analyze food flows and foreign assistance in many different frameworks of optimizing. Suppose we selected a goal of maximizing, through economic growth over a given time period, the product of a less developed nation. Assistance then would be analyzed in terms of capital productivity for these purposes. Where food per se, in raising the ability of labor and augmenting its productivity, has greater productivity than

¹³ As one example in interpretation of foreign disposal under P.L. 480, the Asia Team of the extension services had this to say (Farm Foundation, *Increasing the Understanding of Public Problems and Policies*, Chicago, 1960, p. 70): "Not only do P.L. 480 programs help people to learn to use U.S. products such as wheat, milk and feed grains but they also increase capital facilities and knowhow for handling U.S. type commodities . . . U.S. furnished aid wheat to the Japanese and taught them to eat it . . . and bread fits into the consumption pattern of a richer people."

any other form of capital, we would send food rather than other materials or capital funds. Where food still serves these purposes but a given amount of funds has greater productivity in form of fertilizer and technical knowledge, in boosting food production within the developing country, we would ship capital in these forms rather than as food. Where food per se does not restrain economic growth as much as development funds for industry, we would ship the capital in the latter form, letting the recipient nation use wise economists to allocate it over the economy in a manner to maximize national product and economic growth for a given time period.

This framework supposes maximization of internal growth of a less developed country, from given capital available from the United States, to be the goal of analysis. Under it, we would provide developmental funds to backward countries and let them buy their food imports elsewhere if food has the productivity mentioned above and if it could be obtained at lower cost of developmental funds to the United States, or the recipient country, than surpluses produced in the United States. There have certainly been cases where the same funds, represented by the subsidies paid to United States farmers to produce surplus, the government purchase of stocks and the storage costs of holding them plus transportation, could have bought more food for recipient countries if they had been used for purchases from the current output of other nations.

Another framework for analysis would be that which supposes we do not have imagination to choke off our surplus production and that it costs us more to store it than to give it away or ship it at subsidized price as assistance resource. Here we can view disposal in a Pareto-better sense, rather than one of a tight and pure mathematical maximizing of growth in backward country from given developmental funds. The analysis then rests not on whether the recipient nation is made *best off*, or even that the total community of nations involved be made so in attainment of highest point on a utility surface; but only whether both ourselves and the recipient nation are made *better off* in the "unanimous consent" manner discussed in an earlier chapter. Certainly some use of U.S. farm products in assistance programs must be so analyzed. Given political processes and inability to choke off the outpouring of farm production within the United States and the high storage costs and depression of public conscience which followed, the nation may well have made itself "better off" by giving food to nations with tardy food supplies. It is even possible that at times these surpluses have provided "windfall gains," in the sense that it would not have been possible, had it been necessary, to get specific public appropriations to buy food, or get it produced, and ship it to nations who needed emergency quantity to tide them over crop failure or in the lean developmental periods following initiation of partition or self government. The large stocks were already in existence and the American public owned them. Hence, it was unnecessary to go so directly to the public for greater appropriations which might have been resisted.

But this is not a convenient or efficient manner of handling the farm surplus problem in the United States. Effort should be made to divorce, and not marry up, problems of our own surplus capacity and needs in our foreign policy and in economic development of other countries. Where U.S. food serves as efficient resource for these purposes in the future, it should be so used. But where it interferes with these goals, we should use other means to solve our problem of farm surpluses. Perhaps one of the greatest dangers in U.S. foreign disposal is that food shipped under P.L. 480, Food for Peace and other programs will be classified in the total assistance and foreign exchange allotments for less developed countries, thus restricting capital items needed for other developmental purposes. Only where it can be shown that the food will not substitute for other claims in exchange, will not depress development of agriculture in the recipient country, will not displace exports from other nations and does not divert resources within the United States from more essential commodities for foreign development, can surplus disposal be considered a perfectly neutral program with no danger of sub-optimum or negative outcome in respect to development.

Basic Aid in Development

We may look at the simple Harrod-Domar type of growth model in (17.1) and inquire how U.S. food might best fit into promoting economic

$$(17.1) \quad dY = sk^{-1} - dL$$

growth of less developed countries.¹⁴ In this equation dY is the rate of growth in national income, dL is the rate of growth in population (i.e. labor force), k is the ratio of capital to output per unit increase of these two items and s is the rate of savings in national income. Where population is increasing rapidly and otherwise $dL = sk^{-1}$, food supplied from the United States at low or no cost could allow dY to be nonzero. However, it would be only a stop-gap measure and no real takeoff would be generated in the recipient country. The more permanent aid to development would be in increase of the magnitude sk^{-1} so that $sk^{-1} > dL$ and income per capita can grow. A country such as the United States can do little to increase s for these purposes, since this is a decision largely in the country trying to accelerate dY . It can, however, help to decrease the magnitude of k through technical improvement or investment aids. As far as agriculture itself is concerned, emphasis should be as much, in true economic development aid, in decreasing k through the means suggested in this chapter and in Chapter 16; as on simply shipping food in line with excess growth in dL or surpluses in the United States. The latter is purely a step in humanitarianism; decreasing k is a fundamental step in development.

¹⁴ R. F. Harrod, *Toward a Dynamic Economics*. Macmillan & Co., London, 1949; E.D., Domar, "Capital Expansion, Rate of Growth and Employment," *Econometrica*, Vol. 14; and H.W. Singer, "The Mechanics of Economic Development," *Indiana Econ. Rev.*, 1952.

Return on Use of "Fixed Surpluses"

If surpluses are taken as "fixed resources" with no alternative uses, or of negative return when held in storage at growing public cost, the investment representing them can be used with low payoff. If the same investment has different opportunities in development allocation for a later period, it has an entirely different payoff and needs to be compared with a more complete range of alternatives in domestic agricultural policy and foreign developmental policy. Considering the specified uses to which these foreign currencies, exchanged under Title I of P.L. 480, must be allocated and the uncertainty of their repayment or conversion to dollars, Schultz places the value of each dollar in P.L. 480 exports at 10 to 15 cents for the United States.¹⁵ He places their value to recipient countries at 37 cents on the dollar, considering price elasticities of demand for surplus commodities and alternative sources of these commodities or inputs. These are extremely low values, for either the United States or the recipient countries. For the period represented by major disposal under the program, however, the "opportunity marginal cost" of the surpluses, and the dollars they represent, may have been near zero to both the United States and numerous recipient countries; to the United States because the surpluses would have been kept in storage generating even greater public storage costs and to recipient countries where equivalent of other development funds would not have been available.

Yet opportunity costs of these magnitudes are in the past. The important alternatives in the future are other developmental uses to which the same total capital might be put. In this sense, there is need to develop American farm policy which eliminates and restrains buildup of surplus supply and which frees the public capital so represented for more optimum developmental purposes. In this sense both goals might have been better attained had we paid U.S. farmers to cease production here, and travel to foreign countries to aid cultivators in their decisions. This is a needed emphasis, rather than adaptation of foreign assistance programs to the surplus producing capacity of American agriculture. In developing more optimum developmental and assistance policy, agricultural policy needs to be divorced from it, agriculture contributing to developmental policy only as growth needs in less developed countries so specify. This is a near-term framework needed for American farming and agricultural policy. The very long-term outlook and orientation, however, may well be quite different to the extent that sustained takeoff in economic development can be generated for nations which thus far have been restrained in growth and per capita incomes.

LONG-RUN DEMAND HOPE IN WORLD DEVELOPMENT

Potential in food demand of particular countries and of the world in aggregate depends on rates of population growth and income improve-

¹⁵ T. W. Schultz, "Value of U.S. Farm Surpluses to Underdeveloped Countries," *Jour. Farm Econ.*, Vol. 42.

ment per head. Using these two variables as the major ones, and forgetting about the smaller quantitative effects of gradually changing preferences and real food price relative to other commodities, approximate annual rate of growth in food demand within a particular country can be represented as in equation (17.2) where Δ is the approximate growth rate in food demand, P is the rate of growth in population, E is the income elasticity of demand for

$$(17.2) \quad \Delta = P + EG$$

food and G is growth rate in per capita income. If rate of growth in food supply is greater than this quantity in a "closed economy," farm depression results; if food supply grows at a slower rate, consumer depression results. As mentioned previously, the value of E for aggregate poundage of food is near zero in the United States. Hence, the main variable affecting domestic food demand is P in (17.2). In other countries, however, the value of E is sufficiently large that national economic growth itself can generate considerable increase in food demand. The main concern in some nations of very small development, of course, is to keep food supply moving ahead as rapidly as P or population.

The need for rapid economic development and food supply in less advanced nations is thus fact. The existence of U.S. surplus supply also has been fact. To some persons, it also is apparent fact that food from the U.S. is needed to get this development on its way. This proposition has both basis and overanticipation. Temporary foreign disposal programs will not, however, solve the U.S. farm supply problem, unless the temporary program extends over 20 or more years and is organized on a larger scale than that conducted between 1955 and 1960.

For those who look to population explosion and growth of world consumers to alleviate the U.S. problem, there is little hope without economic development in the countries of rapidly advancing populations. A better hope in expanded demand for U.S. farm products might even be constant populations, but great economic growth in the specified countries. The reason for this statement is somewhat obvious in Figure 17.2. These data, based on national cross-sectional observations and serving under predictional limitation as conservative indication of differences for food in physical form among countries at various stages of development, indicate that potential food demand is indeed still great in those nations where per capita incomes are low.

Using Clark's measurements in International Units, the income elasticity of demand for food in aggregate is still of important positive magnitude in many densely populated countries with low per capita incomes. From this scale, we would expect Indians to have income elasticity for aggregate food of around .8. More recent figures based on more detailed observations even suggest that the elasticity is higher for certain specific categories of food. One belief is that income elasticity is as high as unity for expenditures in the most densely populated regions which approach

subsistence incomes.¹⁶ Certainly over much of the world, food demand can increase at a rate faster than population with stepped-up rate of growth and higher per capita income. This is in contrast to nations like the United States where food as a physical quantity has income elasticity of zero and domestic demand growth is limited to population. Table 17.3 illustrates the difference in income elasticity of demand in respect to expenditure on food in four countries at various levels in economic growth

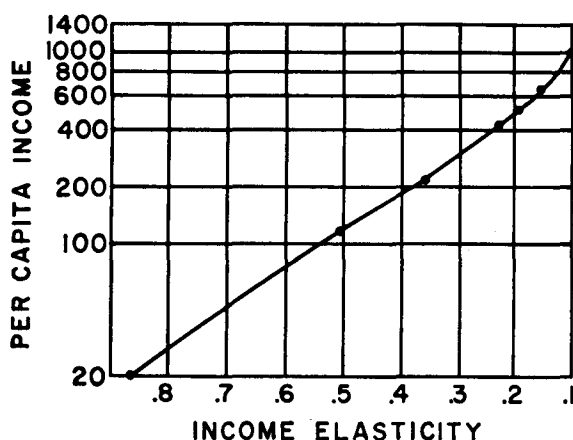


Fig. 17.2. Income Elasticity of Demand for Food (Farm Level) in International Units With Value of Dollar 1925-34 = 100. (Source: Clark, C. *World Supply and Requirements for Farm Products*. Jour. Roy. Stat. Soc. 1954, pt. 3.)

and per capita income. (Also see the elasticities in Chapter 6 for the United States.) Expenditure on food is predicted to have an income elasticity around .7 for Italy.¹⁷ For countries where income of farm families is extremely low, expenditure elasticity is predicted to exceed that of urban persons with higher incomes. In any case, a less developed nation which has rapid growth in population, but no progress in income, is going to lack foreign exchange to buy commodities from surplus producers.

¹⁶ C. P. Kindleberger, *Economic Development*, McGraw Hill, New York, 1958, p. 110. Other estimates are to be found in: N. Tsutomu, "Long-Term Changes in Demand for Agricultural Products and Income Elasticity," *Structure of Food Demand—Prewar Period*, Translation Series No. 1, Translation Unit Tokyo, 1959; H. S. Houthakker, "An International Comparison of Household Expenditure Patterns Commemorating the Centennial of Engel's Law," *Econometrica*, Vol. 25; and "FAO Factors Influencing the Trend of Food Consumption," *The State of Food and Agriculture*, Rome, 1957, pp. 70-110. The later study estimates an income elasticity, based on a rough international comparison, of .1 for calories except for countries with extremely low income. There are some populous countries where even caloric income elasticity is considerably greater than zero.

¹⁷ A somewhat different set of income elasticities, but generally of the same high level, is indicated elsewhere. See A. J. Coale and E. M. Hoover, *Population Growth and Economic Development in Low Income Countries*, Princeton University Press, Princeton, 1958, p. 125.

TABLE 17.3

INCOME ELASTICITY COEFFICIENTS IN RESPECT TO FOOD EXPENDITURES
FOR FOUR COUNTRIES IN SPECIFIED YEARS

	United States 1955		United Kingdom 1953-54		Italy 1953*		Italy 1953†		Japan 1955		India 1952	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Total Food Expenditure.....	.18	.39	.6	.7	.65	.58	.74	.69	.48	.6	.87	.79
Bread and cereals..	.01	.16	-.2	.05	.27	.21	.33	.20	.38	.2	.69	.33
Starchy food, etc....	.20	.16	.4	.05	...	...	...	...	-.55	...	...	...
Sugar.....	.02	.27	.9	.9	.78	.50	.92	.89	...	...	1.43	1.09
Pulses and nuts....	-.17	.16	...	...	...	...	...	...	.30	.65	...	...
Vegetables and fruits.....	.16	.36	.6	.6	.60	.67	.60	.79	.33	.6	...	...
Meat products.....	.27	.31	.3	.3	.88	.71	1.25	1.07	...	...	...	...
Fish products.....	.28	.24	.5	.0	.81	.63	1.06	.93	1.03	.5	1.15	1.26
Eggs.....	.01	.18	.7	.3	.50	.38	.76	.78	.83	1.3	1.86	1.53
Milk products.....	.02	.28	.45	.1	...	...	...	...	...	...	...	...
Butter.....	.17	.50	.1	.0	.81	.54	.83	.70	...	...	...	...
Fats and oils.....	-.13	-.02	.0	.0	...	...	...	...	.31	...	1.16	1.01
Nonalcoholic beverages.....	.06	.28	.2	.05	.86	.72	1.18	.95	.71	1.05	...	...
Alcoholic bev.....	.95	.85	2.0	3.3	...	...	...	...	1.27	.8	...	...
Meals outside the home.....	.92	.85	2.5	5.0	...	...	...	...	1.52	1.6	...	...
Other foods.....	.22	.34	.7	.6	1.15	1.29	.74	1.09	.54	.4	.93	1.01
Tobacco.....	...	...	2.5	3.3	.90	.78	.95	.48	.18	-.2	...	...
Clothing.....	...	...	...	...	1.53	1.16	1.13	1.24	1.95	1.7	...	...

Source: FAO, *The State of Food and Agriculture*, Rome, 1959. p. 195.

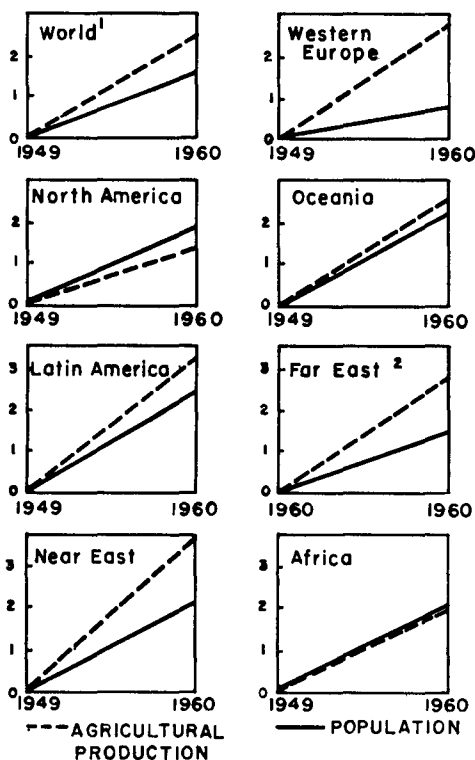
* Central North.

† South.

Potential in Supply and Investment Alternatives

Great strides in economic growth over the world would result in solid advance in food demand. The potential in demand is extremely large relative to current U.S. domestic surplus food capacity of 6 to 8 percent; or to capacity of current surplus-producing countries. But whether this growth in demand would be filled in major part from nations with current surplus supply potential depends on the interaction of economic development and agricultural productivity of nations to be developed rapidly. In the short run the price elasticity of the food supply function has much greater potential of increase in nations such as Canada, the U.S., Australia and Brazil, as compared to countries where population is pressing against food production. Yet this need not hold true in the future to an extent equal to the past. If supply elasticity of resources such as technical knowledge, managerial capacity and capital can be increased greatly in less developed nations, a corresponding increase in the elasticity of the food supply function also will take place over the long run.

Comparing India and the Philippines with Japan and the United States, the relative physical base for increasing food supply elasticity is greater in the former than in the latter countries. Yet whether, and to



¹EXCLUDING U.S.S.R., EASTERN EUROPE AND MAINLAND CHINA

²EXCLUDING MAINLAND CHINA

Fig. 17.3. Trends in Agricultural Production and Population. World Regions, 1949-60. (Source: FAO. *The State of Food and Agriculture*, Rome, 1960, p. 12.)

the extent that, emphasis is or should be on investment to extend food supply elasticity in the former countries will depend on the expected marginal efficiency of capital in farming as compared to other industries, as well as on certain nonmoney and more subjective evaluations to be made by the developing countries. We return to this point later. While the technological potential, against present performance, is greater in some less developed countries than in advanced ones, the rate of progress in output is still currently greater in the latter. As Figure 17.3 indicates, agricultural production has been growing more rapidly than population over most of the world, and especially so in Western Europe and the Near East.¹⁸ Growth in output in these regions, and others where potential is great, may check the rate at which technical advance in the United States can feed into world markets. While production has only kept up

¹⁸ Also see J. Marczewski, "Some Aspects of Economic Growth in France," *Economic Development and Cultural Change*, Vol. 9.

with population in Africa, the physical potential for increasing supply faster than food demand is high.

If per capita income grew rapidly in the short run, food demand in less developed nations certainly would grow more rapidly than the rate at which food supply in these nations has increased over recent decades. This increase in food demand would then spill over to utilize more of the supply forthcoming in more advanced nations and agricultures. However, the rate of per capita income improvement in less developed nations has been slower than the rate of growth in food supply in more advanced nations during the 1940's and 1950's. Consequently, food demand growth in the former has not alleviated surpluses in the latter. Not only has the growth rate been too slow to cause this, but also exchange and investment problems have served as restraints to mushrooming food imports by less developed nations.

If we view the population projections in Table 17.4, it is obvious that the world food supply function will have to increase tremendously or the

TABLE 17.4
WORLD POPULATION BY REGION 1800-1950 AND PROJECTED (MILLIONS)*

Area	Year					Percentage Increase			
	1800	1850	1900	1950	2000 (est.)	1800- 1850	1850- 1900	1900- 1950	1950- 2000 (est.)
World.....	906	1,171	1,608	2,495	6,280	29.2	37.3	55.2	151.7
Asia (exc. USSR)...	602	749	937	1,379	3,870	24.4	25.1	47.2	180.6
Europe (exc. USSR)...	150	204	277	393	568	36.0	35.8	41.9	44.5
USSR.....	37	62	113	181	379	67.6	82.3	60.2	109.4
Africa.....	90	95	120	199	517	5.6	26.3	65.8	159.8
Anglo-America.....	5	24	80	168	312	380.0	233.3	110.0	85.7
Latin America.....	20	35	75	162	592	75.0	114.3	116.0	265.4
Oceania.....	2	2	6	13	29.3	—	200.0	116.7	125.4

* Computed from: United Nations, *The Determinants and Consequences of Population Trends, 1953, and The Future Growth of World Populations, 1958.*

real price of food is going to push upward greatly in particular world regions.¹⁹ This event would work to the advantage of resources in agriculture. Technological improvement and greater supply and lower costs of resources such as those mentioned above are variables which stand to increase supply and restrict increase in food price. The amount by which demand variables will change and cause greater demand for food exports from countries such as Canada and the United States depends on the extent to which agricultural productivity is increased in nations such as India, Pakistan and the Philippines, as well as in other exporting nations such as Japan, Burma and Indonesia. Given the constraints of developmental funds and foreign exchange, it is not likely that rapid developmental take-off in less advanced nations during the 1960's will itself

¹⁹ See also: M. K. Bennett, *The World's Food*, Harper & Brothers, New York, 1954, Ch. 1. Coale and Hoover, *op. cit.*, pp. 34, 124, estimate that India food output could be doubled in 25 years; but project population to 775 million by 1986 with fertility unchanged and to 589 million with a linear decline in fertility rates.

cause demand for exports from the United States to grow faster than the food supply function in the U.S. This situation held true in the 1950's, even as the U.S. stepped up foreign disposal under assistance programs.

FOOD DEFICITS

The problem of food in many underdeveloped regions is not that of producing enough of agricultural products to keep up with the demand increase associated with greater per capita income, high income elas-

TABLE 17.5

ESTIMATED POPULATION AND DAILY FOOD INTAKE BY MAJOR WORLD REGIONS, 1958

Region	Popula- tion	Daily Food Consumption, 1958			
		Calories	All Protein	Animal Protein	Fat
	(<i>millions</i>)	(<i>no.</i>)	(<i>grams</i>)	(<i>grams</i>)	(<i>grams</i>)
Canada	19	3,085	91	58	137
Latin America	210	2,660	66	23	59
Western Europe	310	2,920	79	41	106
Mediterranean Europe	96	2,660	44	25	75
Eastern Europe	341	2,925	77	28	83
Western Asia	84	2,365	76	15	39
Africa	263	2,455	62	11	44
Far East	890	2,100	56	8	32
Mainland China	725	2,200	65	6	32
Oceania	16	3,210	103	67	136
United States	177	3,220	97	66	149
Russia	209	2,985	92	26	70

Source: FAO, *Second World Food Survey*, Rome and Foreign Agricultural Service; Food Balance Sheets USDA; *The World Food Deficit, a First Approximation*, Foreign Agricultural Service, USDA.

ticities and economic growth. Instead it is a problem of bringing level of food consumption up to minimum nutritional standards for the current population, or of meeting food needs for a growing population. In rather aggregate form, Table 17.5 indicates estimated 1958 daily food consumption in major world regions. These consumption rates can be compared against the following daily caloric requirements developed for the Food and Agricultural Organization in the second World Food Survey:

Latin America	2,500
United States	2,640
Canada	2,710
Mediterranean Europe	2,430
Other Western Europe	2,635
Soviet Union	2,710
Other Eastern European	2,635
Oceania	2,650
Western Asia	2,400
Africa	2,375
Far East	2,300
Mainland China	2,300

The above figures represent attempt to provide uniform energy supply for all countries and regions, with variations to accommodate differences in climate, body size and age and sex distributions. The average data of Table 17.5 obscure the meagerness of human rations in some of the less developed nations. For examples, daily caloric intake is estimated to be less than 2,000 for Bolivia, Dominican Republic, Ecuador, El Salvador, Haiti and Nicaragua. Thirteen Latin American countries were estimated in 1958 to have less than 2,500 calories per day and only seven with more; the latter raising the average above 2,500. In Western Asia, out of seven countries, four have less than 2,400 calories. In Africa, nine out of 21 have less than 2,375 while every country in the Far East, aside from Taiwan and Japan, or nine out of 11, has less than the 2,300 specified above. Mainland China also has less than 2,300. The daily caloric, protein, and fat intakes per day for Asian countries and China are estimated as:

Country	Calories (no.)	Protein (all) (grams)	Fat (grams)
Taiwan.....	2,340	60	37
Japan.....	2,310	66	23
Malaya.....	2,290	51	40
Mainland China.....	2,200	65	32
Thailand.....	2,185	45	35
Burma.....	2,150	51	26
Philippines.....	2,145	56	39
Indonesia.....	2,125	48	38
Ceylon.....	2,060	46	59
India.....	2,050	57	34
South Korea.....	2,040	60	19
Pakistan.....	2,030	54	20

The last 10 countries above include more than half of the world's total population. Not only is caloric intake low enough that hunger does prevail, but protein intake is generally below the daily 65 grams recommended for physiological well-being. While the averages are as high as shown, the distribution is uneven in many countries, with a great many people having even less calories and protein than the average. If the diet of persons having less than the specified minimum standard were brought up to this level, it would not be possible to reduce the average of other persons to this level; the averages thus understating the total food problem. Table 17.6 indicates estimated deficits for major regions averaging less than the minimum standards. The total estimated world food deficit for 1962 thus is provided in Table 17.7 from FAS estimates. (As mentioned above, total food required to bring consumption up to the minimum levels would be somewhat greater, unless persons with intake above these levels were reduced to them.) The protein requirements suppose a minimum of 65 grams per day, with 7 grams of this from animals, and 17 grams in total from animal and pulse sources. The remaining protein requirement is estimated in terms of wheat equivalent to bring total per daily protein intake up to 65 grams. The remaining caloric deficit is specified in terms of wheat, beyond that indicated as wheat equivalent in "other" protein (to bring total protein up to 65 grams per day). The

TABLE 17.6
DAILY FOOD DEFICIT PER CAPITA OF CALORIES AND PROTEINS, 1958.
WORLD REGIONS WITH DEFICITS

Region	Calories (No.)	Proteins (grams)		
		Animal	Pulse	Other
Latin America	117	05	0	4.2
Western Asia	150	0	.1	.05
Africa	43	.4	.5	3.6
Far East	200	1.0	.1	8.1
Mainland China	100	1.0	0	0

Source: *The World Food Deficit, A First Approximation*, Foreign Agricultural Service, USDA, March, 1961.

figures of Table 17.7 estimate total imports needed in food deficit countries, as specified above, to bring food intake up to the minimum levels. The total estimated world deficits in terms of wheat (1000 metric tons) are 40,665 in 1958, 44,185 in 1962 and 47,100 in 1965.

These countries are in the lower reaches of economic development, as is any one where people are still hungry or suffer from malnutrition. They could use large food quantities in bringing diets up to minimum levels and without approaching the more than 3,200 calories (and over 90 grams of protein) per head daily in advanced countries such as those of North America and Western Europe. Leaving out the United States, using it as the possible exporting nation, FAS has estimated these gross shortages for the remainder of the world (thousands of metric tons):²⁰

	1962	1965
Fats and oils	2,265	2,489
Coarse grains	9,080	9,850
Wheat	53,717	57,098
Pulses	837	866
Animal protein	1,449	1,599

These quantities represent a lot of food, just to bring consumption up to broad nutritional improvements of the nature mentioned above. They far exceed the annual rate of surplus production in the United States. Why, then, it might be asked, do these countries not buy up all these surpluses and feed their consumers better? The answer is about as easy as the question: the less developed countries are short on both capital and foreign exchange to buy the materials of economic development. While the United States could not, politically and in consistency with its level of affluence, have a large stratum of its population hungry, or with food intake below the recommended minimum, some countries have had to do just that. To divert their limited capital and foreign exchange to food imports would cause limited resources to be shifted into subsistence products, rather than plant to generate capital accumulation and job oppor-

²⁰ Foreign Agricultural Service, *Estimates of the World Food Deficit*, USDA, March, 1961 (Mimeo.).

TABLE 17.7

ESTIMATED WORLD FOOD DEFICIT FOR 1962, FREE WORLD AND COMMUNIST ASIA
(1000 metric tons)

Food Category	Free World			Communist Asia		
	1958	1962	1965	1958	1962	1965
Animal protein*	947	1,025	1,090	700	755	800
Pulse protein*	352	380	400	0	0	0
Other protein*	32,815	35,615	38,020	0	0	0
Remaining caloric deficit†	1,400	1,570	1,680	6,540	7,000	7,400

Source: *The World Food Deficit*, Foreign Agricultural Service, USDA.

* Animal proteins in terms of nonfat milk solids; pulse proteins in terms of dry beans and peas; other protein in terms of wheat to provide remaining protein requirements.

† Caloric requirement in terms of wheat, beyond that provided by wheat in "other protein."

tunity. It is a hard fact that many nations have had to decide to let large strata, or all on average, of the population go somewhat hungry and undernourished in order to use scarce capital and foreign exchange in accumulating funds to stimulate growth and to have employment and higher nutrition plane for subsequent generations. Few if any prefer to do so, but it has been a choice that many have had to make, knowing that the current generation is not unacquainted with, or unwilling to accept, the given status of diets to which it has been frozen. Some nations, with large populations and labor forces exceeding full employment opportunity for the decade ahead, even if labor cannot work up to its full physical potential because of inadequate food intake, may have even had to make this decision: Diets will be kept below minimum specifications (e.g. as above) because of labor excess and because capital accumulation is not generated by a "little more weight or a slightly better filled stomach." Countries concerned with people and welfare maximization for this generation may not do so, but those concerned with maximization of growth and welfare over succeeding generations may decide thus. In this case, and on the basis of these criteria, food imports to boost nutritional level at the current time might have marginal urgency of zero—unless food is given to them, with the gift of other than nontransitory nature for this generation. But nations more advanced in welfare goals and concern with this generation cannot use this calculus.

Not all, and perhaps few, if any, nations would prefer to have others provide food gratis, to bring the level of diet up to nutritional standards. They certainly would not prefer it if this added supply were in sight for only a couple of years. Once it was cut off, they would not be better off diet-wise, and psychologically they would be worse off. Some, or perhaps most, would not even prefer food supplied in this vein if it were guaranteed free for 15 years. They would prefer, where it is economic, to develop and extend their own food supply function, both as a reaction against pure charity and economic dependence, a "weak" colonialism, and as a basis of a firmer foundation in economic development. If capital quantities were free up to a limited restraint, as choice between food and

heavy goods for industrialization, many would prefer the latter with their installation for economic development to create permanent employment, even with some continued undernourishment of present population strata which cannot be effectively engaged in the developmental process.

Much of American food surplus disposal has been offered in even shorter time framework, with high uncertainty for any nation which might latch themselves to it. More would have preferred use of U.S. surplus foods had the promise been at hand to help them develop their own agricultures rapidly, as a "take over" precaution when and should U.S. food aid cease. Early U.S. policy did, however, clearly prevent use of food and P.L. 480 funds as aid in development of the food supply functions in these same countries. Here was a point at which U.S. interest in food disposal and economic development of underdeveloped areas clearly came into conflict. If we had not let the surplus facet come to dominate our developmental interest, we would have wiped this restraint entirely away. In fact we would have tried to provide less developed countries not with food especially, but with that complement of resources which caused U.S. food supply function to move ahead rapidly. In other words, we would have helped increase the supplies of knowledge, scientists, capital and material items of production necessary in improvement of food supply functions in less developed countries. This was, and still is, the successful mix in pushing the U.S. food supply schedule to the right. But in this mix of U.S. development also was another ingredient through the private sector: the supplying of inputs to agriculture at a low and declining real price. Along with the scientists, supply of fertilizer and like improvements shipped to these countries often would be more beneficial than shipment of food. As was mentioned in Chapter 16, world development may come better if more of the scientific resources now used in the United States, where the supply function is still shifting rapidly, are loaned to underdeveloped countries where it is moving tardily.

AID, DEVELOPMENT AND SURPLUS DISPOSAL

A food and developmental program to aid in food needs and maximize progress in less-developed countries would take quite different complexion from one with emphasis on food disposal. With the latter being the overriding force of a program, the commodity mix shipped is that arising under surpluses in the United States and tied to our historic production patterns, and not that most consistent with consumer preference in recipient countries (although a more complex analysis of interrelationships among production possibilities and consumer indifference maps, in reflecting comparative advantage in increasing welfare levels, is necessary for definitive statements here). Pork surplus and price problems of the United States can hardly be solved by disposal of this food in Pakistan.

In numerous countries, food imports under these programs are aimed

at consumer welfare and lower real price of food.²¹ At the same time, effort is underway to provide resource prices and supplies which will encourage growth in the agricultural supply function. Where this opportunity is great over the long run and farmers are restrained mainly by knowledge and other resources in the short run, use of U.S. surpluses which prevent food price increases may have no important supply or output effects in the recipient countries.

But our Martian friend from Chapter 1 would be almost certain to ask: "Why have an international food transfer program which increases prices to producers in a country of surplus and rapid supply march but decreases prices in countries short on food and with tardy supply increase? Wouldn't we expect this price structure to encourage further the output in surplus countries and depress it in deficit countries?"

Here may be another inconsistency of the same general nature: the United States allows technical experts and other capital forms for farm improvement to be drawn from local currencies arising under foreign disposal of food surpluses. This attempt, taken by itself, is to promote development and commodity supply increase. Yet food disposal programs are of theoretical nature to suppress price and curtail response of output in the same countries. More analysis needs to be made of the negative interaction which may arise in this type of mixing in surplus disposal and foreign assistance directed towards development. In some countries, internal rate of progress in supply is too slow to prevent high rise of prices to consumers without supplementary source of food. Even with high food prices, short-run supply elasticity may be too low to prevent consumer misery without imports. Yet policy oriented truly to economic development needs better to view the extent that investment in resources such as knowledge, fertilizer, improved strains and irrigation equipment is more important than food imports in increasing food supply elasticity and augmenting consumer welfare over the long run. There are countries in Latin America and Africa where the food supply function might be greatly increased quantitatively and in elasticity, if more of the resources mentioned above were available.

In a nation such as the United States where public investment has been extremely important in extending development of agriculture, the questions posed above also need to be asked: Can the variables which have been changed in magnitude to promote rapid domestic development of farming be similarly manipulated and included in foreign assistance programs to cause a parallel change in less advanced countries? Should many more of our own stock of public scientific resources be allocated to nations with tardy food supply, rather than to domestic agriculture where we have surpluses? Is it desirable to concentrate all of the U.S. public investment in scientific resources at home, and produce more surpluses; or would efficiency be increased by financing many more

²¹ See Kindleberger, *op. cit.*, pp. 266-76 for some added notes on agricultural development and aid.

of them abroad, helping output to catch up, or maintain pace, with population growth in underdeveloped countries? Would given U.S. assistance outlay go further in development if we shipped fertilizer for use elsewhere, rather than to convert it to domestic crops and then ship their greater weight? Or, along the same line, would given developmental funds go still further towards progress if we shipped the capital, materials and technical knowledge to produce fertilizer and improved seeds in the foreign country rather than to keep them at home for use in producing agricultural inputs and farm outputs which eventually show up as domestic surpluses to be shipped out of the country under aid programs?

These are core questions to be analyzed and answered before we can ascertain the pattern of assistance which allows maximum development from given U.S. outlays for the purpose. In numerous cases, it is most likely that the resources mentioned would be more effective than food in promoting sustained development. Given comparative advantage in immobile natural endowments, but also supply of transferable resources, the optimum mix would undoubtedly include both commodities and farm inputs from the United States to be used by less developed countries. The proportions, however, would undoubtedly deviate widely from the pattern of the last decade. So also would the relative mix of (1) development funds lacking restraint on countries from which supplies of inputs and commodities would be obtained, and (2) resources and commodities relating to food and flowing from the country. Finally, the mix would change with time as (1) the supply function of farm commodities is pushed ahead in less developed countries and (2) industrial development progresses allowing developing nations to take advantage of world markets in line with their comparative advantage in products from farm and industrial sectors.

AGRICULTURAL VERSUS INDUSTRIAL DEVELOPMENT

The extent to which population and income variables have the effects in world food markets implied in Figure 17.2 and Table 17.4 depends on the relative rate at which industry and agriculture are developed in less advanced countries. If development and rise in per capita income come largely from growth in the industrial sector, rise in food demand will be filled largely through imports from countries which currently have a large and elastic supply of farm products. This demand condition will be allowed, of course, only if industrial growth in less developed nations leads to products and international markets wherein foreign exchange can be obtained for food imports. If, on the other hand, less developed countries concentrate on agricultural development and push food supply forward as fast as growth in population and per capita incomes, demand for food from current-surplus countries will grow relatively little.

Two periods possibly exist in respect to demand by currently less developed nations for food from nations with more abundant supply of all commodities, and present prices are not an accurate indication of relative

prices in future periods when income may attain different levels, or of the total mix of commodities to which less developed nations will aspire as their goals in development are attained. First is a near-term period when supply of food might be pushed ahead quite rapidly in selected ones of the less developed nations. The potential for increasing food supply in aggregate is quite large over such nations as India, Philippines, Malaya, and much of Africa and Latin America. The potential is large in comparison with current techniques of production in use and with natural endowments. The potential can, of course, be realized only if pricing and supplying of resources for this purpose are reflected in developmental investment and policy and if particular sociological and other obstacles are overcome.²² Food supply should be given priority in these economies in extent that developmental funds can be best used thus, considering the marginal productivities of capital in development of agriculture and industry and the comparative advantage of these two sectors in world trade. But while the potential in increase of the food supply function and its elasticity would appear to be fairly great over a near-term period of 25 years, over a longer period (as suggested in the population potential projected in Table 17.4), the burden of supplying world food may fall back more on countries now with an elastic food supply function. In contrast to the near-term period, slack in under-utilization of natural endowments of many less developed and highly populated nations would be expected to have been largely "taken up" over the long run, as against the nations with current high development and little population pressure.

It is, of course, the next 25 years which are crucial in world economic development. The extent to which less developed nations should invest in progress of agriculture relative to industry has not yet been well determined. Balance in development is desired, but not simply in diversification so that supply functions of both food and industrial sectors are increased apace. Allocation should best be in terms of marginal resource productivities (1) within the restraints of minimum supplies of food available for growing populations and maximum desired rates of growth and (2) in comparative advantage of the two industries in world markets. But the guides in marginal value productivities and prices are not so readily available as they are in developed economies. Fairly rapid rates of growth in per capita income would result in demand expansion for numerous commodities and services now well out of the reach of masses of consumers in nations at low stages of progress.

Agriculture has short-term advantage in development over durable and producer goods industries in the sense that high payoff is in prospect for the near term. Capital investment to increase supply of fertilizer, improved seeds and knowledge is small relative to the prospective growth in product of agriculture in such nations as India and the Philippines. Returns on these investments are likely to be as high as those outlined in Chapter 16 for research and education in U.S. agriculture. Often it is not

²² For example, see B. F. Hoselitz, *Sociological Aspects of Economic Growth*, The Free Press, Glencoe, Ill., 1960.

new research knowledge which is pressingly needed, but the supplying of inputs already known to have high productivity. Still, a nation which poured all of its investment funds into agriculture would be faced with eventual imbalance in supplying others of its projected consumer demands and with declining productivity of capital if it pushed farm improvement much beyond levels needed to upgrade consumer diets. While food demand has high income elasticity when consumer income is low, the price-caloric elasticity drops sharply with improvement of food supply and satiation of physical requirements. Now, as in the future, the world market is more pressed with "farm commodities trying to find a demand," than for other commodities and services which give rise to foreign exchange. This is a prospect which might well prevail in the future if all potential food resources were fully developed.

As mentioned above, prospects in productivity of resources used for development of agriculture are high up to an extent. The "balance line" is yet to be specified, however. Some writers on development emphasize that priority should be given to agriculture.²³ Here the supposition is that industrial development cannot proceed or is highly restrained without progress in agriculture. Emphasis also has been given to the need for "balanced growth," with the criterion of balance differing among writers.²⁴ Finally, there are those who emphasize need for priority or industrial development, because of either national needs, opportunities in foreign exchange or to change factor prices and thus alter the structure of subsistence agriculture; or disagree with the notion that development policy needs to follow a path of "balanced growth."²⁵

Investment in Farm Productivity and Surplus Disposal

There is, of course, no definite and exact specification which can be applied to growth of all less developed countries. The optimum in alloca-

²³ Cf. A. J. Coale and E. M. Hoover, *op. cit.* pp. 115-25. (Also see Chap. 10 on behavior of agriculture under economic development.); B. Higgins, *Economic Development*, Norton and Co., New York, 1959, pp. 385-402 and 717-30; W. W. Rostow, "The Takeoff into Self-Sustained Economic Growth," *Econ. Jour.*, 1956; A. E. Kahn, "Investment Criteria in Development," *Quar. Jour. Econ.*, Vol. 55; G. Hakim, "Technical Aid from the Viewpoint of Receiving Countries," in B. Hoselitz (ed.), *Progress of Underdeveloped Areas*, University of Chicago Press, Chicago, 1952, p. 264.

²⁴ For discussions of balanced growth, see: A. W. Lewis, *Theory of Economic Growth*, Allen & Unwin, London, 1955, pp. 141, 191, 274-83; W. W. Rostow, "Trends in Allocation of Resources in Secular Growth," in L. H. Dupriez, ed., *Economic Progress*, Institut de Recherches Economiques et Sociales, Louvain, Belgium, 1955; Kindleberger, *op. cit.*, Chap. 9; A. N. Agarwala and S. P. Singh, *Economics of Underdevelopment*, Oxford University Press, Oxford, 1958, pp. 179-85; H. B. Chenery, *Development Policies and Programmes*, Econ. Bul. for Latin America, March, 1958; K. Bekker, "The Point IV Program," in Hoselitz, *loc. cit.*; P. T. Bauer and B. S. Yamey, *Economics of Underdeveloped Countries*, University of Chicago Press, Chicago, 1957, pp. 247-57; and G. M. Meier and R. E. Baldwin, *Economic Development: Theory, History, Policy*, Wiley, New York, 1957, pp. 343-51, 400-403.

²⁵ Cf. Harvey Leibenstein, *Economic Backwardness and Economic Growth*, Wiley, New York, 1957, pp. 261-63; A. O. Hirschman, *Strategy of Economic Development*, Yale University Press, New Haven, 1958, Chaps. 3 and 4.

tion of investment among sectors within any one country depends on natural endowments of resources adapted to various products, the current stage in level of supply and consumer expenditures for particular products, the amount of investment funds available (and whether these must come from internal capital formation or can be imported, with or without "strings" attached), the extent of scale economies in specific industries, availability of entrepreneurial resources in particular industries and possibilities in international demand. Japan is a nation which attained "balance" by adding industry for exports to an agriculture which grew efficient. Obviously, however, the short-term productivity of, or need for, investment in particular sectors of less developed nations will depend on the status of consumption and the extent to which primary wants are satiated. Certainly, balance has quite different meaning, for example, in Puerto Rico and the Philippines where nature's endowment towards agriculture differs greatly.

Development of agriculture, drawing it to a capital intensive structure, is meaningless and uneconomic as long as great underemployment of labor exists and price of this resource is low relative to capital. This type of transformation of agriculture promises to have low payoff under the conditions cited. Regardless of the country, the supply of labor to agriculture tends to be great and of low elasticity relative to other industries. Supply is larger and elasticity is lower inversely to degree of economic development, level of literacy and other communication characteristics. The causes, detailed elsewhere in this volume, extend the supply of labor to agriculture, forcing its marginal cost to be low, and to approach zero or subsistence with low industrialization rates. Accordingly it can be used in quantities causing its marginal productivity to be low. Agricultural technology in less developed countries rests on labor accordingly and its structure is not necessarily obsolete and uneconomic, but consistent with the conditions of factor supply and prices. For example, aside from biological gains from deep plowing which might be proven, it is not necessarily inefficient for the cultivator of India to plow his field a half dozen times with a stick. While a moldboard plow would do it in one operation and save labor, he would have no alternative use for his labor. Similarly, Japanese rice culture with tedious hand planting, has much more to offer India than American mechanized sowing methods.

The need, then, is largely to (1) expand supply of capital and knowledge, allowing current labor and land of agriculture (especially the latter) to become more productive and (2) invest in industrial growth which provides employment opportunity and which can lead to eventual change in factor prices which favors greater mechanization of agriculture. Until that time, "balance" of food shipments from the United States against development of "backward agriculture," or of the latter against industry in the same nations, needs to be made in terms of a large unemployed supply of labor which has few near-at-hand opportunities.²⁶

²⁶ Also see Meier and Baldwin, *op. cit.*, pp. 376-83.

The objective in many less developed countries is necessarily that of both output and employment. To replace labor in agriculture would only increase unemployment in most countries at the low end of development. Hence, high mechanization of agriculture best must await industrialization which creates large demand for labor in industrial sectors.

But there are investments, particularly those representing biological capital forms, in agricultural productivity which do not serve largely as substitute for labor, but increase the productivity of labor and land. The use of improved seeds and fertilizer and similar practices are examples. It appears quite obvious, at current levels of economic development, and in total cost of resources with alternative opportunity, that productivity of specified funds would be greater if used to thus promote agricultural progress in selected underdeveloped economies than to ship food from the United States. The specified funds to which we refer are those public outlays which go into paying for production of surplus commodities (i.e. the fertilizer, seed, fuel, etc. embodied in them), storing the commodities and transporting them. The labor used in producing them has alternative uses in the United States, as in steel plants used at less than capacity and which can fabricate producers' goods for development of other countries. The labor on cultivators' farms, which is otherwise replaced by U.S. food exports, does not always have similar employment opportunity in industry fabricating capital for development. In this sense, and supposing optimization of given resources in international economic development, capital resources for agriculture rather than food would be the preferable import for some less developed countries. Many have opportunities as great as those in Japan where development was encouraged and took place in both agriculture and industry. Here was a country where investment in agricultural advance gave high productivity, but industrialization also was rapid, with the two having positive interaction with each other.²⁷

Surplus Food and Surplus Labor With Zero Opportunity Costs

Still, given institutions and market restraints as they prevailed over the world, unemployed food and unemployed labor have existed during the same time period, with neither caused by the other and both having low opportunity costs at times. To have used unemployed food to put unemployed labor to work in producing selected items of social overhead capital would not have drawn resources away from industrialization in countries such as India. Too, U.S. costs of surpluses would not have grown so great in treasury outlays and resources for storage. Opportunities in this direction led to a 1956 proposal, by Millikan and Rostow for example, that food be used to compensate unemployed labor in underdeveloped countries to build roads, schools and plants.²⁸ Given the fact of

²⁷ For further discussion of rates of progress in Japanese agriculture, see S. Kuznets, *et al.* (eds.), *Economic Growth in Brazil, India and Japan*, Duke University Press, Durham, N.C., 1955, pp. 136-38.

²⁸ Millikan and Rostow, *op. cit.*, Chap. 9.

absolute existence of these two sets of unemployed resources, food and labor, resources are not thus drawn away from any other employment in mixing them into a useful world social product. To be emphasized too is the fact that development comes largely from change and improvement of people—a process possible only through education and communication. More development of this nature, use of unemployed food with unemployed labor to develop social overhead capital, could have been attained in the decade of the 1950's had specific program along this line been utilized. However, it is not necessary that U.S. farmers must forever be compensated, for income and welfare losses growing out of rapid technical progress, in a manner to build up surpluses which become unemployed and immobilized in costly storage. To the extent that procedures of Chapters 11 through 16 can be used as alternative compensation mechanisms, greater flexibilities in use of capital for "eventual development" exist as outlined above.

An amendment to P.L. 480 in 1959 allowed use of surplus foods as grants to foreign countries which would use them in the manner of "wage goods" or direct payment in kind to labor used for working on dams, roads, ports and similar public projects. Since much labor is underemployed in less developed countries, entirely beyond that which can be absorbed by economic growth rates of the next decade, and since food is the main "wage good" preferred by these persons, such public projects need not divert major resources from other national development activity. But provision made by the U.S. was too short: It was to expire in 1961. Obviously nothing but meagre projects can be planned, initiated and completed in a year and a half. Who wants an inventory of half-completed ports and roads?

Investment for Development

Mixed optimally, many less developed economies would find investment in both agriculture and industry to be optimum, with some food coming from developed countries such as the U.S., especially under programs such as P.L. 480 where immediate growth in food needs could be met with discounted purchases from the U.S., a portion of the payment in local currency then being used for internal development. In extending productivity of internal agriculture to eventually replace food imports, many less developed countries will need to extend capital and knowledge resources to agriculture. However, capital supply is more the immediate restraint, than supply of technical knowledge, in bringing forth greater productivity in many regions of underdeveloped agriculture; or, at the minimum, the two resources are technical complements. Cultural orientation, values and customs also sometimes serve as stronger restraints than labor-knowledge in technological change.²⁹ Supply of technical knowledge is limited to wide strata of cultivators, but in many of these same regions it also is true that many farmers already have enough knowledge to

²⁹ For an interesting explanation of these aspects, see L. W. Shannon (ed.), *Underdeveloped Areas*, Harper and Brothers, New York, 1957, pp. 399-433.

increase productivity if capital limitations did not prevent investment and assuming of added risk. Cultivators exist in every village of Asia who stand above fellow villagers in per acre yields and in effective use of labor and capital. Frequently, entire villages excel neighboring villages. This empirical evidence is near at hand and exists for cultivators who are illiterate and must act in terms of "facts."

The cultivator who needs added technical knowledge also requires added capital to put it to use. There are few important practices or innovations in agriculture which do not require purchase of a material. The isoquant relating capital and knowledge as resources has some range of negative slope for literate farmers experienced in management. However, it more nearly approaches a 90 degree angle for cultivators who cannot read and are deeply imbedded in methods by custom and immobility. As two technical complements, one is not less or more important than the other and, extended alone, one has zero productivity. While the extreme is not quite this great, this condition is somewhat characteristic of agriculture over fairly broad regions of the world. In this framework, a decrease in the supply price of capital or knowledge alone can do little to productively increase the demand or use for the factor. Added knowledge of improved seeds, fertilization, irrigation lifts and other resource-using technologies is meaningless unless capital supply is increased in the sense of greater credit availability with favorable interest rates. But equally, magnification of credit facilities may only inflate the prices of resources representing existing techniques if knowledge and supplies of material factors are not extended also.

The supply of farm practice knowledge is partly a function of stages of economic growth. Under paucity of the national stock of capital, private firms invest relatively little in scientific investigation and concentrate more on products for markets representative of wealthier consumer strata. Farm inputs flowing through commercial markets have small demand because of the income and capital position of farmers. The production of scientific knowledge is represented by a decreasing cost industry. As development, education and research are increased, knowledge can be produced and communicated at a declining real cost. Public investment thus cannot only produce and communicate new knowledge but it also aids private firms in producing it at declining cost. The knowledge re-tailed by commercial firms, producing inputs and knowledge to be used in U.S. agriculture, is eased and its cost is reduced because of the large scale research units of the land-grant colleges and the USDA. Private research for agriculture in the U.S. is now far beyond the "takeoff" stage. Per our earlier discussion, diversion of scientific and educational resources for U.S. agriculture would now have quite ready substitutes. Those public resources shifted elsewhere would soon be replaced by those of the private sector. This substitution and shift, for the reasons mentioned above, are easily possible at high stages of economic development. It is much less so, however, at low stages of growth and it is for this reason that the highly-roundabout substitution might best take place: scientific resources from

the United States substituting for those in underdeveloped countries with private research substituting more for public research in maintaining advance of the food supply function in the United States. The productivity of resources used to produce and increase the supply of technical knowledge for farming stands to be greatest in less developed countries when invested in applied rather than in pure or fundamental research. Up to some point in magnitude of knowledge this is likely to be true because a less developed country can import knowledge of fundamental or pure research produced in other countries at a low, and sometimes zero, cost. While fundamental research has the same application in all regions, applied research does not have equal international applicability.³⁰

The hypothesis is often forwarded, and some scattered data are available to support it at a few locations, that the supply function in agriculture sometimes is "backward sloping" over the masses in such countries as India, Africa and Southeast Asia. Prices which increase earnings supposedly cause people to work fewer hours and to allocate more of their time to leisure.³¹ Under the demand regime portrayed in Table 17.4 and Figure 17.2, pure existence of this supply condition in less developed countries would, as they progress, cause extreme draw on food supply from more developed countries where farmers quickly respond to upward price incentives. But the aggregate data of less developed nations with vigor in growth plans do not support a backward sloping supply function forever. The rigor in price responsiveness in these countries may be low partly for reasons of consumer orientations in production and because of other customs and institutional restraints attached to low growth stage. A better hypothesis, as applied to the masses and in terms of potential in growth is, however, that restricted supply and real prices of capital and knowledge resources are the stronger restraints on food supply and its elasticity in these less developed countries. Ceiling to economic development would not appear to exist in inflexibility of consumption habits and extreme attachment to leisure, particularly after development of social overhead capital for human investment and betterment through improved education, government, transportation and communication facilities.

To be certain, the patterns of consumer preference do differ, at various levels of per capita income. Even if all individuals had identical indifference maps, the mix of commodities and services consumed would change with level of income, unless the algebraic nature of the utility surface were characterized by a function such as the Cobb-Douglas.³²

³⁰ Also see E. Staley, *The Future of Underdeveloped Countries*, Harper and Brothers, New York, 1954, pp. 246-50.

³¹ Cf. P. T. Bauer and B. S. Yamey, *op. cit.*, pp. 84-86.

³² The isoclines of this function are straight lines through the origin. Hence, for a given set of commodity prices, the same mix of consumption is specified for a given set of consumer prices regardless of the level of the budget line or utility level to be attained.

Experience and data indicate that this is not the form of the indifference map and that preferences of people change at different levels of income because both (1) indifference curves change in slope, for a given indifference map or set of values, along a scale line in the utility plane and (2) the indifference map itself changes as income of people grows and investment is made in them with consequent alteration of customs and values. The relative role of agriculture in the total food complex also changes for this reason. In this sense, a difference in food demand between less developed and developed economies is illustrated in Figure 17.4 where D_1 is the demand function and p_1 is food price at farm level

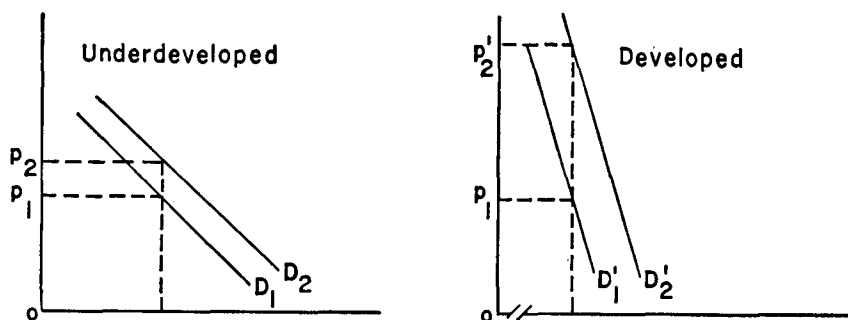


Fig. 17.4. Relative Demand for Food and Related Services.

while D_2 and p_2 are corresponding quantities at retail level. The cultivator's "share of the consumer's dollar" is thus expected to be greater in the less developed economy and less in the highly developed economy. The food processing sector makes up a smaller proportion of the demand price for food and the total mix of services used by the consumer. Given time, education, growth in income and presence of consumer goods, it is expected that cultivators and other consumers in currently underdeveloped economies will have preferences which turn more to nonfood and nonleisure goods and that motivation of farmers in production will be similar. Tardiness in food output, because of backward sloping functions, certainly is not expected then and farmers of advanced nations cannot count on premium export demand centering around economic growth and "inverted" supply functions in less developed countries.

As we stated above, consumer preference is highly a function of income, although it also is affected by cultural and related variables. Yet as Figures 17.5 and 17.6 show, direct consumption of calories in cereals and starchy food declines over nations with level of per capita income exceeding about 250 U.S. dollars (at 1948 prices). Starchy foods are replaced by fats and oils, proteins and fruits and vegetables. Still, over the cross-sectional data included for the comparisons, per capita total consumption of cereals and starches increases continuously, almost linearly, with income because they are required to produce the fats, oils and meat from livestock associated with diets at higher income levels.

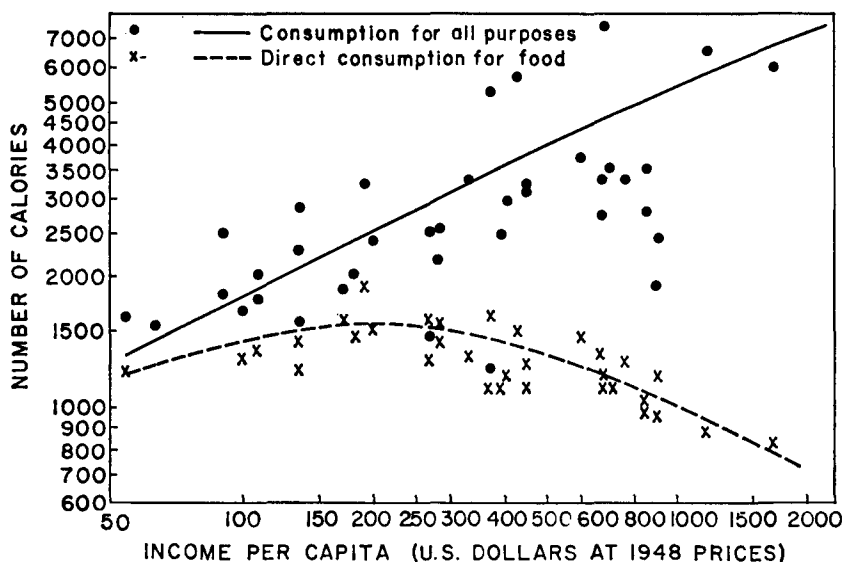


Fig. 17.5. Per Capita Consumption of Cereals and Starches in Relation to Per Capita Income. Cross-Sectional Comparison Among Countries. (Source: FAO, *ibid.*)

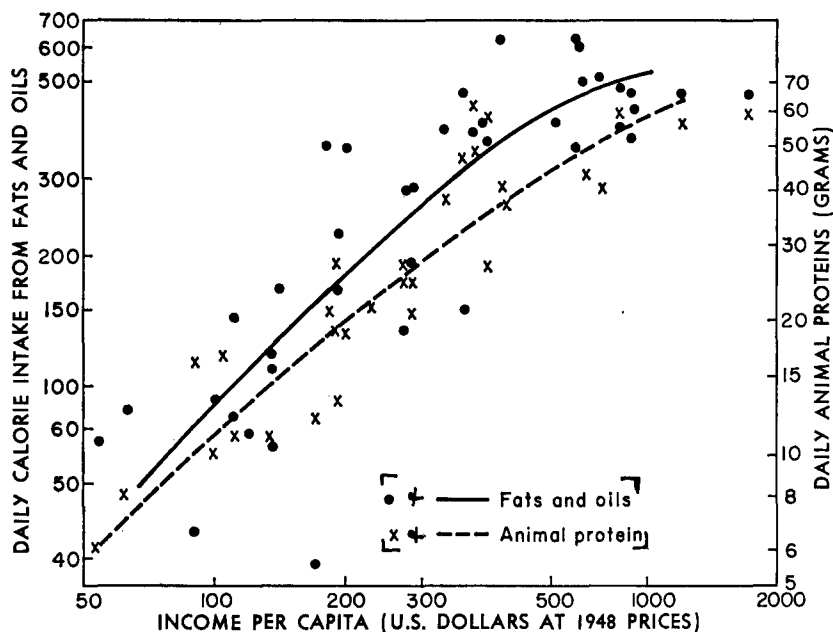


Fig. 17.6. Per Capita Daily Intake of Fats and Oils and Animal Protein in Relation to Per Capita Income. Cross-Sectional Comparison Among Nations. (Source: FAO. *The State of Food and Agriculture*, Rome, 1957, pp. 90, 92.)

Time will prove these consistencies, rather than unique backward sloping supply functions and complete turn to leisure and similar consumer patterns, as national incomes increase and people acquire more education and communication.

RECAPITULATION: SURPLUSES IN DEVELOPMENT

If U.S. surpluses must be taken as a fact and if they have no alternative use, they can make positive contribution in the Pareto-better sense outlined later for "unemployed labor and unemployed food." They are best looked upon in this Pareto-better sense, and not in terms of optimizing economic development from the total U.S. capital or funds represented by summation of investments in surpluses and foreign development programs. Where surpluses do exist as fact and in storage, they can increase welfare and growth in recipient nations as aid in upgrading diets and strength of labor; in serving as developmental funds in the sense that they act as lower-priced substitutes for imports which would be necessary anyway; in providing buffer stocks to lessen price gyrations, uncertainty of producers and frustration of consumers;³³ in providing funds for assistance which Congress and the public would not otherwise appropriate, to the extent that disposal outlay is above other forms of assistance; in suppressing inflation where governments might initiate developmental programs in absence of sufficient wage goods; in providing wage goods for projects of intensive-labor nature which otherwise require a long time to initiate and implement; in acquiring foreign exchange where surplus food allows shift of resources to export industries; and in allowing capital formation in the sense that they replace national income which formerly went to imports and can now be diverted to investment within the country. These attainments are predicated on the basis of surpluses which would exist even if they were not routed to foreign disposal and/or developmental assistance.

Surplus disposal promises to, or may, have negative outcome in developmental effect if: normal imports and food increments to increase worker health are exceeded in recipient countries, depressing returns of agriculture below levels consistent with optimum development;³⁴ surplus imports become charged against total developmental capital or exchange assistance provided to the recipient country by the United States (especially where development requires large capital obtained with foreign exchange); food is not accompanied by other capital items necessary to initiate and implement developmental projects;³⁵ and, aid pro-

³³ For several discussions of policy to stabilize prices of primary products, see "The Quest for a Stabilization Policy in Primary Producing Countries," *Kyklos*, Vol. 11.

³⁴ Millikan and Rostow, *op. cit.*, pp. 91-92; and Sen, *loc. cit.*

³⁵ For discussions of capital in development and its allocation among alternatives, see: R. Nurkse, *Problems of Capital Formation in Underdeveloped Countries*, Blackwell Press, Oxford, 1953; J. Tinbergen, *The Design of Development*, Johns Hopkins University Press, Baltimore, 1958; and V. A. Aziz, "The Interdependent Development of Agriculture and Other Industries," *Malayan Econ. Rev.*, Vol. 4.

vides great uncertainty in use, because of the limited time for which it will be available, or causes political unrest in countries which do not use it when it is available for these purposes.

Analysis of U.S. surplus disposal under P.L. 480 and Food for Peace programs suggests that it has had both these positive and negative elements and its sum value is not easily evaluated if the criterion is extent of economic growth of less developed countries. It has likely had positive-sum outcome in the sense of developmental attainment, but with return on developmental capital much lower than would have been possible under U.S. policy emphasizing economic development rather than surplus disposal.

