WORLD OUTLOOK FOR FOOD DEMAND IN RELATION TO SUPPLY

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When surveying the world food problem, it becomes evident that mankind passes through periods of pessimism and euphoria. Thus in the beginning of the sixties, it was not seen how to increase food production at the same rate as population. But from 1965 on, the Green Revolution provoked euphoria, it was hoped that high yielding varieties would be able to ensure food enough for the world population. Some years later, it was observed that these new varieties were only adequate to certain ecological areas and required inputs that put them out of reach of smaller farmers. Furthermore, bad climatic conditions occurring simultaneously in very many countries decreased agricultural outputs; consequently, pessimism returned. Diminished stocks, shortages and starvation compelled specialists and politicians to re-examine the world food problem. Everybody knows the World Food Conference discussed these realities when it met in Rome in November 1974.

Food Production, Food Availability and Nutritional Status Assessment in the Last Few Years

The long-term average increase in world food production has been greater than population growth ever since the Second World War; however, the margin was smaller in the sixties than in the fifties. In the developed countries, population growth has declined and the slower increase in the sixties was partly due to deliberate government policies. In the developing countries, on the other hand, it occurred that in spite of the fact that Government policies generally aimed at increasing production at a greater rate than accelerated population growth they were not successful.

Thus, although total food production has increased at about the same rate in the developing countries, on a per caput basis, the increase has been much smaller in the latter. Therefore, the gap in the per caput production level between the two groups has widened still further.

The increment of food production in developing countries at a higher rate than population growth is a tremendous achievement. In many individual countries, development has been much less favourable. Regionally, the growth of food production has been most accelerated in Latin America and the Near East. But in each continent, impressive contrasts can be noted between individual countries. For instance, over the twenty-year period from 1952 to 1972, food production expanded at an annual rate of 6.1 per cent in Venezuela, but only 0.8 per cent in Uruguay.

Table 1 compares food production trends with the growth of the population and domestic demand in a few developed countries, the Caribbean and Latin America.[1] At the world level, if the overall effect of rising income and

[1] The document *Assessment of the World Food Situation, Present and Future*, presents a list of these data for all the countries for which they are available.

and population growth is taken into account, it appears that in the 1952-1972 period, the increase in food production was less than in domestic demand in as many as 53 of the 86 developing countries for which relevant data are available.

Fish production also participates in food production, but only in a very small proportion (less than 1 per cent of the world food supply).

In the last few years, seasonal fluctuations have been noted. From the statistician's point of view the fact is not disquieting, because the number of countries where the yields of cereal crops fell in any individual year between 1952-1972, is randomly distributed over the period with no unusual or significant trend. On the other hand, however, the magnitude of the difference in yield between two harvests can be very disquieting for many developing countries where, because of the lack of storage facilities, such drops are the cause of hunger among humans and animals. Although there is no evidence that production fluctuations have worsened at the global level in recent years, there is little doubt that the effects are now much greater and more widely felt.

The longer-term lag of food production behind the growth of domestic demand in many developing countries has greatly increased their dependence on food imports. These imports have already doubled between 1955 and 1966. More recently, the increase is at about 3.4 per cent a year for the developing market economy countries.

International trade plays a major role in the world food situation. Among the principal products, 19 per cent of the world wheat production, 30 per cent of sugar and 33 per cent of fats and oils entered world trade in 1973. Between 1949-1951 and 1966-1968, the gross cereal imports of developing countries rose from 12.4m. tons to 34.4m. tons, and by 1972 they had reached 36.0m. tons. In value terms, they passed from less than US$1000m. in 1955 to US$4000m. in 1972-73 [1].

During many years, the burden of imports for developing countries was partially offset by international aid which now dropped to its lowest level since 1957-58. Most of the developing countries depend heavily on agricultural exports for their foreign exchange earnings, and trends in agricultural export earnings have been generally unsatisfactory for these countries. Frequent short-term fluctuations in export prices have greatly added to the difficulties of coherent national planning in the developing countries.

The unsatisfactory long-term evolution of world trade in agricultural products and the heavy dependence of the developing countries on this trade have led to increasing recognition of the need for major measures of international agricultural adjustment aimed at a more rational system of agricultural production and trade.

Table 2 shows by regions for 1961 and 1969-71 the per caput availability of energy or protein and energy as a percentage of requirements (the requirements are based on the average requirement of a moderately active man whose

body weight is estimated according to the prevailing average in the region).

Energy supplies in the developed regions exceed requirements (23 per cent in 1969-71) and protein availabilities are high also. In the developing regions, energy supplies do not meet requirements in three or them (Africa, Far East and Asian centrally planned economies) and exceed requirements, but only slightly in Latin America and Near East. In view of the inevitable distribution of supplies, it is clear that all developing regions face a serious energy deficit problem in certain sections of the community.

Because of inequalities in consumption between and within countries, the most disadvantaged groups will suffer from a much higher incidence of food deficiencies.

Food consumption within a country is affected by many factors, such as agronomical, ecological, technological, socio-economic factors, this last being the most determining. The poorer groups are those who receive the smaller amounts of food and, consequently, the lower daily caloric/protein intakes. It appears from many studies that the groups most threatened by malnutrition are the recent migrants from rural areas in the cities, landless farmers and also small farmers who live in a subsistence economic system.

Furthermore, food distribution inside the family frequently is not in accord with the specific requirements of each member, specially with the requirements of young children who suffer from malnutrition damaging their health, their physical growth and their mental faculties.

We have just briefly presented the past and present world food situation. Let us see now what the world outlook is for food demand and whether it is possible to meet it with food supplies.

Food Demand Projections

The two principal components which must be taken into account for food demand projections are population and gross domestic product growth. With regard to population growth, the assumption chosen has been the U.N. *medium* variant; concerning gross domestic product, *trend* income growth has been used.

From these assumptions, in developed countries, food demand is projected to rise at an annual growth rate of 1.5 per cent; and consequently, the increase in food demand would be in the order of 26 per cent between 1970 and 1985.[1]

But the situation is quite different in the developing countries. In the developing market economy countries, food demand is projected to rise at an annual growth rate of 3.6 per cent, that is to say 70 per cent between 1970 and 1985. In the Asian centrally planned economies, population growth is somewhat slower and so food demand is projected at

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[1] These and the following Projections for Food Demand figures (1969-71 to 1985) are estimates of the FAO.

a slower annual growth rate (3.1 per cent per annum hence 58 per cent over 15 years).

An alternative working assumption is a *zero* income growth. Then, the per annum growth rate for food demand would be 0.9 per cent in the developed countries, 2.7 per cent in the developing market economy countries and 1.6 per cent in the Asian centrally planned countries, representing 15 per cent, 50 per cent and 27 per cent respectively over 15 years. A *high* income growth assumption raises the annual food demand growth rate from 3.6 to 4 per cent in developing market economy countries; therefore, even with this assumption, population growth remains the dominant factor in determining future food demand. Differences between different countries are due essentially to discrepancies in population growth rates.

The outcome of *high* and *low* population growth rates over the next 15 years is only marginal. Thus, with the *high* rate the developing market economy countries would have in 1985, a population of 3,695m. against 3,631m. with the *medium* rate (1.8 per cent greater). Of course, in the long-run, the effect is more important and a high growth rate jeopardizes the attainment of better nutritional standards.

At the world level, food demand increases vary according to individual commodities: being higher for animal products (fish 3.4 per cent per annum, meat 3.1 per cent per annum, cheese 2.8 per cent per annum) lower for vegetal products (cereals 2.4 per cent per annum, starchy roots 1.4 per cent per annum). These figures indicate a shift in food demand towards protein rich foods.

More particularly, in the developing market economy countries, the growth rate of the demand for these products increased to 4.7 per cent for fish, 4.4 per cent for meat, 3.3 per cent for cereal products and 2.4 per cent for starchy roots.

In order to meet the increased world food demand, caused by the *medium* population and the *trend* income growth rate, world agriculture would need to provide, comparing 1985 with 1970 in round figures, an additional output of 230m. tons of cereals for food, 40m. tons of sugar, 110m. tons of vegetables, 90m. tons of fruits, and 140m. tons of milk.

Total supplementary cereal requirements in 1985 to meet food, feed and non-food requirements would be of the order of 520m. tons, that is to say, an increase of 43 per cent over 15 years (63 per cent in developing market economy countries and 29 per cent in developed countries). Cereal requirements for food in 1985 would be about 230m. tons more than in 1970, the increase occurring mainly in the developing countries.[1]

Concerning feed, assuming there are no substantial changes in feeding techniques, it is supposed that demand of cereals would increase from 420m. tons in 1970 to 650m. tons in 1985, the most part required in

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[1] FAO Estimates: Actual consumption and projected trend demand by main types of utilization 1970 to 1990 "Trend growth assumption".

the developed countries, although the increase is higher in the developing countries.[1] This projection is made, thinking that there will not be substantial changes in feed, consequently assuming the unchanging price relationship in the feed/livestock sector. Therefore, the above-mentioned analysis is only one of the many possible outcomes. If the cereal market continues to be tight, feed substitution would certainly occur.

Total cereal consumption increases faster in the developed countries than in the developing countries.

Summarized in nutritional terms per caput food demand increase had little influence in the developed countries (0.2 per cent per annum for calories and proteins) because of the high consumption and income levels already existing in the developing countries; it would be of the order of 0.6 per cent per annum for calories and proteins.

The diet balance is improved only slightly in the developing countries: calories provided by cereals, sugar and starchy roots would diminish from 77 per cent of total calories in 1970 to 73 per cent in 1990; the proportion of animal proteins in total proteins would rise from 19 per cent in 1970 to 23 per cent in 1990. In the developed countries, the same nutritional indicators would be reached over the twenty years, the first from 53 per cent to 47 per cent and the second from 53 per cent to 60 per cent.

In fact, these average figures for heterogeneous aggregates of countries conceal wide disparities and in 1985, average demand per caput levels would be below the required level for a moderate activity, in a number of countries.

Food Production Trends Extrapolations

It is much more difficult to establish an objective basis for production than for demand, for many factors can strongly modify production extrapolations: relative profitability in farm production, changes in agricultural policies, and possible changes in climatic trends.

In the FAO study the period 1961-73 has been taken as a basis, the commodities' exponential growth rates derived from the rates observed during this period have been used for all the extrapolations.

The production growth rate is smaller than the population growth rate in the developing market economy countries (except for the Near East) and greater in the developed countries and the Asian centrally planned economies (Table 3). In practice, this outcome could materialize only if, in fact, a demand for massive exports from these countries occurs.

The Production - Demand Balance

Together demand projection and production extrapolation constitute a theoretical scheme. Taken together they lead to *surpluses* or *deficits* which, in practice, cannot pile up during several years. Nevertheless,

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[1] *Ibid.*

this scheme makes it possible to emphasize the magnitude of the efforts to be made.

In the developing market economy countries, food demand increase would be of the order of 3.6 per cent per annum while production extrapolation increases would be only 2.6 per cent per annum (Table 3).

With regard to cereals, these countries as a whole imported during the period 1969-71 about 16m. tons; they would import 85m. tons in 1985. The import level would be even higher (100m. tons) if we exclude Argentina and Thailand as exporting countries. In the case of bad harvests, the import level would be still more strongly marked.

Cereal demand as a whole embodies different uses. Changes for food ought not to be perceptible. On the other hand, demand projections for feed can change very much either upwards or downwards for different reasons: adundance of grain cereals, increased demand of animal products for consumption, improvement in the efficiency of the conversion rate from feed to livestock, human use of meat analogues, use of other feed sources. Even if cereal consumption constitutes the main aspect to be looked at, we must also consider other foods, in particular animal products.

For pigs and poultry the unbalances between demand and production disappear quickly. With regard to beef and veal, demand would slightly overcome production in every country. Concerning sheep and lamb, an important deficit would be observed, especially significant in the Near East and in the North Africa. Fishery catches and fish farming as a whole, would outpace fish demand by a small margin; nevertheless, this low surplus would be within the margins of error of the method.

The overall scheme for cereals and animal products is close to a world level balance, except for sheep and lamb. But considering the developing countries alone there is a shortage. This implies that, either demand in developing countries, still insufficient from a nutritional point of view, would not be met, or these countries will have to face bills for massive food imports.

The financing of international food trade at this scale would raise very serious problems and it is likely that governments would be compelled to formulate new policies, whose aim would be increased production, which would modify the trends.

Towards the Attainment of Better Nutritional Standards

The balance of demand and supply has so far been examined in relation to commercial demand. It is advisable also to take into account supplementary needs in order to improve the nutritional value of the diet of certain groups. The assessment of the people who would require supplementary food is difficult. Only some indications of the size of the problem may be given.

Thus, the specialists consider that people who suffer from malnutrition were about 460m. in 1971 and would be of the order of 750m. in 1985. Assuming that to free these people from malnutrition 250 kilocalories per day more per person are required, by 1985 this population group would need an additional quantity of 20m. tons of cereals, or possibly even more

because the extra calories are not only provided by cereals but also by animal products for whose production cereals are also required. Another example: a distribution of 300 gr. of milk (200 kilocalories and 10 gr. protein per day) to half the population of vulnerable groups (vulnerable groups would constitute a population of 700m. in 1985) would require 40m. tons of milk.

Another increase of food demand can be caused by an income distribution policy. A case study has shown that severe measures in this regard would result in an increased food demand of 14 per cent after ten years[2]. Of course, the nutritional impact would be more important if redistribution measures were directed towards particular target groups or specific foodstuffs concerned.

What is to be Done?

The recent world food crisis, the world outlook on food demand in relation with supplies and the necessary improvement of the nutritional status in developing countries make it necessary to establish food and nutrition policies at the national and international levels.

In such countries, even if agricultural production constitutes a priority aspect, others must not be forgotten in a food and nutrition policy. In order to tackle poverty and therefore malnutrition, an endemic scourge among the lower income groups, especially in rural areas, some measures dealing with marketing and distribution, including keeping food retail prices at reasonable levels must be taken in programmes whose aim is to improve nutritional levels in the short and medium terms. Of course, in the longer term, an income redistribution policy is the better solution for fighting malnutrition.

Notwithstanding, the increase of agricultural output is the first priority. Specialists estimate that, in developing countries, an increase of 4 per cent a year must be achieved. In the short term it is difficult to reach. This is the reason why, during several years, an important production increase must be sought in developed countries. In the long term, developing countries must increase their output vigorously to avoid the need for massive imports, the cost of which could unbalance their foreign exchange.

The expansion of developing countries' agricultural output implies various measures such as changes in land tenure structures, technological changes (use of improved seeds, fertilisers, pesticides, etc.) Incentives and extension service policies would be necessary to put certain measures into effect. Many countries also require substructural works and the creation of agricultural research centres requiring huge investments.

During several years, the volume of food and agricultural imports in developing countries will grow larger and larger. The problem is how to finance this transfer, which greatly exceeds the developing countries'

capacity to pay? This could require an international agreement on price stabilization schemes, removal of trade barriers, special preferences extended to agricultural products and some other measures with the same purpose.

The implementation of agricultural production increases at the world scale requires important financing. In this respect, the World Food Conference has decided to create an *Agricultural Development Fund* the purpose of which would be to assist developing countries in this field. Many governments estimate that the budget of this Fund must be as high as $5,000m. in 1980. (At present foreign assistance for agriculture in the developing countries amounts to about $1,500m.)

In order to prevent shortages due to the climatic vagaries national food reserves are a first convenient step, but, often, the food reserves of each country are too limited and the World Food Conference has proposed the constitution of a *World Food Security,* a world reserve the magnitude of which could be 60m. tons. *A food information system,* the objective of which is to collect and provide speedy information on harvest prospects and stocks, and an *early warning system* working in the very short term, constitute vital elements of World Food Security.

In spite of their efforts in expanding their agricultural production, many developing countries will have to resort to *food aid*. In this respect, many governments at the World Food Conference estimated that 10m. tons constituted the minimum target and pointed out that this aid should no longer be the haphazard result of chance surpluses. Special attention must be paid in the receiving countries to the improvement of the nutritional status of vulnerable groups.

Lastly, the World Food Conference has foreseen the constitution of a *World Food Council,* a body combining political and technical authority and functioning at a high level.

Thus, food problems remain serious. But governments are conscious of the efforts to be undertaken in the field of their own production, and of the necessity of world cooperation clearly shown by the decisions of the World Food Conference.

References

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Table 1. Population, food supply and demand for food in individual countries

	Population	Food Production[1]	Domestic demand for Food[2,3]	Dietary Energy Supply[3,4]		Protein Supply[3,4]
	(Percentage rate of growth per year)[5]			Kcal per caput per day	% of requirements[6]	Grammes per caput per day
	(1)	(2)	(3)	(4)	(5)	(6)
Developed Countries:						
Germany, Fed.Rep.	1.0	2.5	1.9	3,220	121	89
Japan	1.1	4.3	3.7	2,510	107	79
Spain	0.9	3.4	3.0	2,600	106	81
United States	1.5	2.0	1.6	3,330	126	106
U.S.S.R.	1.5	3.9	3.0	3,280	131	101
Developing Countries (Latin America and Caribbean)						
Argentina	1.7	1.8	2.0	3,060	115	100
Barbados	0.6	-0.1				
Bolivia	2.3	5.0	2.7	1,900	79	46
Brazil	3.0	4.4	4.0	2,620	110	65
Chile	2.5	2.2	3.3	2,670	109	77
Colombia	3.3	3.1	3.9	2,200	95	51
Costa Rica	3.8	5.4	4.8	2,610	116	66
Cuba	2.2	1.1	2.0	2,700	117	63
Dominican Rep.	3.3	2.2	3.6	2,120	94	48
Ecuador	3.3	5.4	4.0	2,010	88	47
El Salvador	3.0	3.6	4.1	1,930	84	52
Guatemala	3.0	4.1	4.2	2,130	97	59
Guyana	3.0	2.5	3.6	2,390	105	58
Haiti	2.3	1.0	2.2	1,730	77	39
Honduras	3.3	4.0	4.2	2,140	94	56
Jamaica	1.9	1.9	3.3	2,360	105	63
Mexico	3.4	5.3	4.3	2,580	111	62
Nicaragua	3.0	4.9	3.9	2,450	109	71
Panama	3.2	4.3	4.8	2,580	112	61
Paraguay	3.1	2.6	3.4	2,740	119	73
Peru	2.9	2.9	3.9	2,320	99	60
Surinam	3.1		4.0	2,450	109	59
Trinidad & Tobago	2.5	1.9	4.8	2,380	98	64
Uruguay	1.3	0.8	1.2	2,880	108	100
Venezuela	3.5	6.1	4.0	2,430	98	63

[1] Food component of crop and livestock production only (i.e., excluding fish production).
[2] Calculated on basis of growth of population and per caput income, and estimates of income elasticity of farm value of demand in FAO, *Commodity Projections 1970-1980*, Rome, 1971.
[3] Total food, including fish.
[4] 1969-1971 average.
[5] Exponential trend 1952-1972.
[7] 1962-1972.
[6] Revised standards of average requirements (physiological requirements plus 10 per cent for waste at household level).

Table 2. Average energy and protein supply, by region[1]

	Energy		Protein		Energy as percent of requirement	
	1961	1969-71 Av.	1961	1969-71 Av.	1961	1969-71 Av.
	(kcals per caput)		(grms. per caput)		(per cent)	
Developed market economies	2,950	3,090	87.5	95.1	115	121
Western Europe	3,020	3,130	89.3	93.7	118	123
North America	3,110	3,320	92.3	105.2	118	126
Oceania	3,210	3,260	92.7	108.1	121	123
Other developed market economies	2,420	2,550	73.3	79.1	102	108
Eastern Europe & U.S.S.R.	2,990	3,260	85.8	99.3	116	127
Total developed countries	*2,960*	*3,150*	*87.0*	*96.4*	*116*	*123*
Developing market economies	2,130	2,210	55.0	56.0	93	97
Africa	2,120	2,190	55.7	58.4	91	94
Far East	2,050	2,080	51.3	50.7	92	94
Latin America	2,410	2,530	63.7	65.0	100	105
Near East	2,200	2,500	62.3	69.3	89	102
Asian centrally planned economies	2,020	2,170	54.7	60.4	86	92
Total developing countries	*2,100*	*2,200*	*54.9*	*57.4*	*91*	*95*
WORLD	*2,380*	*2,480*	*65.2*	*69.0*	*100*	*104*

[1] The figures relate to protein and energy content of the food available at the retail level after allowance for the storage and marketing losses and waste.

Table 3. Projected food demand growth, extrapolated growth rates of food production and projected population growth, 1969-71 to 1985

	Food Demand	Food Production	Population
	(per cent per annum)		
Developed countries	1.5	2.8	0.9
Market economies	1.4	2.4	0.9
U.S.S.R. & Eastern Europe	1.7	3.5	0.9
Developing countries	3.4	2.6	2.4
Developing market economy countries	3.6	2.6	2.7
Africa	3.8	2.5	2.9
Far East	3.4	2.4	2.6
Latin America	3.6	2.9	3.1
Near East	4.0	3.1	2.9
Asian centrally planned countries	3.1	2.6	1.6
WORLD	2.4	2.7	2.0