TRABAJOS GENERALES

Economics and Nutritional Change

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SUMMARY

The positive or negative impact of economic measures or circunstances on nutritional changes in low income groups, are discussed and explained on hand of a number of actual programs and the analysis of their possible effects.

Until relatively recently, the paramount concerns of nutritionists and policymakers in nutrition seem to have been exclusively of a scientific nature. Although humanitarian concern has been the overriding basis for the application of their work and must not be neglected, many nutritionists have begun to realize that economic questions should also be of primary importance. We intend to show some ways in which economics can be integrated with nutritional science in order to assist in the development of needed nutritional policies.

Economics includes the study of how men choose to allocate scarce resources based on equity and efficiency. Each different pattern of resource allocation provides a positive or negative contribution to the society. Efficiency involves the most productive use of scarce resources, equity relates to the fairness of the distribution of these resources. Economic analysis assits our understanding of the tradeoffs between efficiency and equity. For example, allocating funds for a new factory to increase output might be more productive than

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providing food supplementation to workers in a less expensive facility while spending the same total funds. This is illustrative of the efficiency aspect of economic analysis. If the decision were based on equity, society's desire for healthy citizens may outweigh efficiency.

Society's resources are limited. Thus developing countries cannot design nutrition programs to completely end malnutrition when there are competing demands for funds.

Economists use a number of techniques to determine the most effective allocation of funds, such as benefit-cost analysis. Uses of economic analysis research beyond the estimation of the benefits and costs of a program to include factors such as income and price analysis.

Economic theory and economists who view all health and nutrition programs in terms of only their investment potential often ignore many of the more needy sections of society. It is important for us to continually ask: Are we reaching the unreachables? (5, 12). The distribution of resources and power in a society of the broader political economy considerations are often the reason for failure on this point.

Role of Income and Price Analysis

Several practical problems will be analyzed. The first is the question of the price of commercial nutritional foods. Existing nutrition programs and policy have often placed emphasis on low cost nutritious foods, usually dependent on commercial marketing. Various incentives have been introduced or proposed to encourage private investment and profit from developing such products. These have included: the provision of subsidies or loans to assist development and marketing efforts, special tax and other monetary incentives, duty-free import of machinery and materials, and lastly, guaranteed distribution of the final product through government supported programs and institutions.

The rationale for the development of low-cost nutritious foods is the need to reduce the extent of serious malnutrition in a particular country or region. This objective has seldom been realized (1). Often the more specific issue of the so-called protein crisis is used as the rationale. Sukatme provides an excellent review of this ussue (16).

Commerciogenic nutritious foods are defined as commercially produced products high in protein and designed mainly to reduce the seriousness and prevalence of protein-calorie malnutrition or to improve growth of children at risk. They include milk products for infant use, semisolid manufactured weaning foods, high protein snack foods and beverages, various commercial mixtures of cereal, legume, and oil seed flours, and similar products.

Very little analysis has been completed on the effects on children in low income families who purchase these foods. We know many of these products are purchased extensively (7, 11). One interesting survey of the use of Faffa, an Ethiopian supplementary children's food, pointed out a serious problem. Seventy-nine percent of the respondents who answered a question about Faffa's usage leading to any dietary substitution stated that one or more other dietary items were excluded (18). The primary products excluded were animal products followed by cereals and legumes. Simple economic techniques were utilized to understand the potential effects of introducing foods such as Faffa into the diet of the low income Indian[1].

Data from India have been analyzed to provide an example of the potentially dangerous effects of introducing commerciogenic nutritious foods into the diet of poor farmers and urban dwellers. The conclusions from this example almost certainly are valid for many countries in Asia, Africa, and Latin America. They dramatize the type of findings found in this Faffa study for the low income population among which poor nutrition is most serious.

This discussion centers on the bottom three income deciles (the lowest 30%) of the Indian population. Table 1 shows the per capita monthly consumer expenditures on various categories of products. The 'all others' income is the only available income from which expenditures could be made for new food products without reducing other food purchases. It is assumed that if the family is to buy a new commercial food, it will replace some other food purchase. Also, regular income will be assumed so that the amount of income available for food will be constant.

1. The following discussion reports some of the results of a study by this author and M. C. Latham (12).

TABLE 1
PERCENTAGE OF INCOME SPENT ON DIFFERENT FOOD GROUPS BY INCOME LEVEL[1]

Categories	Income level		
	Bottom 20%	Third decile	Upper 5%
	Per capita monthly consumer expenditure, Rupees		
	8.93	13.14	85.84
	% Spent	% Spent	% Spent
Food grains	54	52	15
Milk and milk products	2	4	10
Meat, eggs, and fish	1	2	3
Other foods	22	22	17
All others, clothing, fuel, light, miscellaneous	21	20	55
Total	100	100	100

[1]Estimated from the functions fitted to data from NCAER, All-India Consumer Expenditure Survey, 1964-1965, II, New Delhi, 1967, in (2).

In Table 2, the amount of calories and protein provided by these foods is shown for these two income groups[2]. The figures are mean estimates of per capita intake. The tables indicate the relatively high amount of cereals consumed by the poor and the fact that the lower income group gets more calories and protein per rupee. Thus, this group has a greater efficiency per rupee in their food purchases of protein foods and calories.

Table 3 shows the calories, protein, and cost per 100 g of a selection of processed nutritious foods from India including certain biscuits and beverages. The multimixes would not be classed as commercial low cost nutritious foods. They consist rather of unprocessed or semiprocessed combinations of cereals and legumes. Both multimixes in Table 3 have been shown to be nutritionally successful (19-21). The Indian multipurpose food, consisting of a mixture of groundnut (peanut) and chickpea flours, is produced in a factory with inexpensive and quite simple labor-intensive equipment. Bal Ahar also fits into this category, although the latter is not now com-

2. Sukhatme presents information from an earlier study in Maharashtra that shows a slightly higher calorie and protein intake for the low income families (16).

mercially available. In contrast, the Hyderabad mix which includes wheat flour, green gram, groundnuts, and sugar jaggery can be produced by the consumer.

TABLE 2
AMOUNTS AND SOURCE OF PER CAPITA CONSUMPTION OF PROTEIN (in grams) AND TOTAL CALORIES BY INCOME GROUP IN MAHARASHTRA[1]

Food groups	Bottom 30% income	Upper 5% income
Cereals	30.1	30.1
Pulses	7.4	15.3
Milk	0.8	9.1
Animal food (other)	0.4	5.3
Vegetables	0.3	2.8
Total protein	38.9	62.6
Total calories per person	1,220	2,238

[1]Data provided by Protein Foods Association of India in their Food Habits survey, India; Operations Research Group, Baroda 1969.

TABLE 3
CONTENTS OF CALORIES AND PROTEIN, AND COST PER 100 g OF SELECTED PROCESSED NUTRITIOUS FOODS

	Calories	Protein g	Cost, Rs
Biscuits[a]			
Uniprotein[a]	500	18	1.44
Threptin[a]	400	63	2.22
Other protein foods[a]			
Complan[a]	450	31	3.36
Protinex[a]	560	45	4.40
Skim milk powder[b]	357	35	0.60
Multimixes			
Hyderabad mix	385	13	0.12
Indian multipurpose food[b]	420	42	0.20

[a] Protein Food Association of India, Bombay.
[b] From (20). The cost of skim milk powder has increased substantially since this time.

Table 4 shows the economic efficiency or inefficiency of these various foods in terms of rupees per 100 kcal/10 g of protein supplied. The mean cost per 100 kcal is 0.02 Rs for the poor and 0.06 Rs for the wealthy; for 10 g protein, it is 0.06

and 0.21 Rs, respectively. The cost of 100 kcal provided by the commerciogenic nutritious foods is in the range of 0.17 to 0.79 Rs and of 10 g protein is in the range of 0.17 to 1.08 Rs. Calories purchased in this form are 8 to 40 times as expensive, and protein is 3 to 18 times as expensive as in the normal diet. In contrast, the two multimixes are extremely close in cost to the traditional diet. For the upper income group, the commerciogenic nutritious foods are a relatively expensive way of buying calories, but in terms of their present purchasing practices, they are not too expensive a way of buying protein.

TABLE 4
COST (in rupees) OF PURCHASING 100 KCAL AND 10 g PROTEIN, USING SELECTED FOODS

	Rs/100 kcal	Rs/10 g protein
Processed commercial products		
Uniprotein	0.29	0.80
Threptin	0.55	0.35
Complan	0.75	1.08
Protinex	0.79	0.98
Skim milk powder	0.17	0.17
Multimixes		
Hyderabad mix[a]	0.03	0.09
Indian multipurpose food[a]	0.05	0.05
Normal diet		
Overall cost of mixed diet	0.02[b]	0.06[b]
	0.06[c]	0.21[c]

[a] This market cost does not include advertising and promotion.
[b] Bottom 30%.
[c] Top 5%.

The effects of replacing the normal diet with purchases of these commercial foods and multimixes could have disastrous effects on the nutritional status of the individual. In contrast, the use of Hyderabad mix only moderately reduces caloric intake and increases protein intake. It should be noted that with 78 g, which is the recommended consumption level for the Hyderabad mix, there is a reduction of over 100 kcal and an increase of 22.8 g of protein; whereas at the 26-g consumption level of the Hyderabad mix, the calories are reduced by 49 and the protein intake increased by almost 10 g or a 25%

increase. Perhaps the higher recommended level should be lowered so that the poor can absorb these costs without substantially lowering their calorie intakes while benefiting from a useful increase in the amount of protein consumed. This mix is designed to supplement the normal diet of children. These results are shown in Table 5.

TABLE 5
SIMULATION SHOWING EFFECTS OF REPLACING TRADITIONAL DIET BY FIXED QUANTITIES OF SELECTED PROCESSED FOODS IN LOW INCOME GROUPS[a]

	Kcal/person	Protein, g person
Traditional family diet	1,220	38.9
Effect of replacement by:[b]		
Uniprotein, 133 g- 2 packets (1.91 Rs/month)	873 (—347)	31.0 (— 7.9)
Protinex, 125 g- 0.5 package (2.75 Rs/month)	725 (—495)	28.1 (—10.8)
Hyderabad mix, 78 g/day (2.85 Rs/month)	1,014 (—106)	61.7 (+22.8)
Hyderabad mix, 26 g/day (0.95 Rs/month)	1,151 (—49)	46.5 (+ 9.6)

[a] Bottom 30%.
[b] It is assumed that the diet will be reduced equally in all categories by an amount necessary to purchase the replacement.

The dangers of replacing part of the normal diet with the purchase of these selected commercial, low cost nutritious foods are many. This analysis uses an artificial simulation. As has been pointed out earlier, the poor are being induced to purchase these foods with the unrealistic assumption of better growth and health for their children (7).

Data from a Filipino home gardening program on which this author is working is discussed next: For this project, an increase in the intake of vitamin A was desired. The goal was provision of about 50 percent of the vitamin A intake of all households who can have gardens. Since the tradition of home gardening existed in the area studied, it was important to understand first who gardens, the contribution of these gardens, and the reasons why others don't have them.

While significant additions in absolute income are not produced by these home gardens, the relative importance to

poorer Cebuanos cannot be underestimated. The value of produce from the home garden was 8% of the income of the lowest income quartile for the entire sample. More significantly, it comprised 15% and 20% of the income of the first quartile families in the rural coastal and hinterland barrios, respectively. The home garden income consisted of only fruits and vegetables. In vitamin A terms, the contribution was just as meaningful. In the region studied, over 90% of the vitamin A was in the form of carotene from fruits and vegetables. Of the total vitamin A intake of a subsample of 60 people, 34% came from vegetables produced in the home garden and 8% from fruits produced in the gardens. The remainder of this subsample's vitamin A derived from fruit and vegetables was the result of food expenditures.

The next key question is, who does the home gardening? Home gardening practices were studied among the 626 families. There was a high percentage of people without any home garden, especially in the urban areas. In the urban squatter areas, 55% of the families do not have a garden. The same figures for the urban fringe, coastal, and hinterland barrios are 34%, 16% and 28%, respectively. The lack of home gardening are more common among the low income population. In the first income quartile, 33% do not have home gardens.

The urban-rural split is very important. When the percent of families with 10 or less square meters of home garden is examined, 81-84% of the urban families and only 47-52% of the rural families are found in this category.

Land is the main reason[3]. About 73% of the families who do not have home gardens report they have no space available to them for home gardening. Close to a fifth of the non-gardeners reported no desire as their prime reason. Of the remainder, land of poor quality and landlords who will not let them home garden are the other obstacles.

Income plays a key role in this situation. Among the non-gardeners who were physically unable to garden, the low income groups in the urban areas are predominant. Thus, 45%

3. The relationship of having or not having a home garden (a 0-1 variable) was analyzed using an ordinary least squares regression format. Land availability increases the probability of having a garden by 69% while a 10% increase in family size will increase this probability by 15%.

of the squatter families and 33% of the urban barrio families in the first income quartile do not have land available for home gardening.

The value of the gardens in both in-kind income and vitamin A are important for the families who have gardens. The average value of the home garden for all families with them is $19.60 per year. The vegetables produced were generally very high in carotene; that is the carotene-rich green leafy ones (e.g. drumstick leaves, water convolvulus, amaranth,....); nevertheless, there is a high incidence of xerophthalmia (severe vitamin A deficiency) among these families. It is the result of inadequate intakes of vitamin A or some other intervening health or nutritional variable such as hookworm, or a protein or fat deficiency. Without going into these issues, we will assume it is a vitamin A deficiency.

We must realize that there has been little research done on most horticultural crops in tropical countries except for the few export-oriented cash crops (citrus fruits, bananas, etc.). Furthermore, the question of carotene content has been even more neglected. In table 6, we examine the potential vitamin A yields of a variety of vegetables. The average size of home gardens for those with a garden of 18.5 square meters was used to estimated vitamin A yields.

The results can be compared with the recommended dietary allowance for a family of seven. Based on the WHO-FAO standard, a family with five children (ages 1, 3, 5, 6, 10) would need 17,210 I. U. of vitamin A daily. Assuming a 20% wastage, this family would need about 10,000 I.U. of vitamin A daily from their garden to obtain 50% of their vitamin A in two manners. Most of the more relevant yields (e.g. Java home garden) are less than this figure. However, several of the more professional vegetable yields do produce an adequate yield of vitamin A.

Thus, we see a technological constraint which must either force us to reevaluate our goal or to change the constraint. Some research by this author has shown that it is possible to increase significantly the carotene content of the popular vegetables in the area studied. The effort involved is minimal. For example, tomato varieties exist with 10 times the carote-

TABLE 6
DAILY YIELD OF VEGETABLES

Product	Days to last harvest	Economic yield/day/ha[a] Kg	Vitamin A/ 100 g IU	Daily yields of vitamin A/ 18.5 sq. meters
1. Swamp cabbage	30	333	4825	29711
1. Chinese cabbage[b]	60	283	3600	18852
2. 1972 Philippine average-all vegetables	c	12	3350	740
3. Bush sitao (green edible pod)	77	156	570	1645
3. Mung bean (edible pod)	67	229	1141	4834
3. Sweet potato				
roots	120	208	1025	3941
tips		69	5565	6590
				10531
3. Cauliflower	49	122	95	215
4. Home garden mixture in Java	c	2	3350	130
4. Market gardens in same Java area	c	68	3350	5328
4. Intensive market gardens (Java)	c	205	3350	12710
5. Tomato	85	165	735	2244

Sources: The vitamin A data was obtained from the Food Composition Table, Food and Nutrition Research Center, Manila, 1968. All the figures are based on Philipine equivalents.

[a] This yield is actual economic yield divided by length of growing period.

[b] It is assumed that pre-transplant growth requires no space and that maximum yield is obtained (Villareal, p. 15).

[c] Yields were only supplied on an annual basis.

ne content of a normal Filipino tomato and organoleptic qualities pleasing to the populace studied.

Of course, there are numerous other technical and social issues involved. However, the critical problem may not be yield of the garden; rather it may be the families who are ignored by developing a home garden program. This issue is discussed later in this paper.

A study of the effects of changes in either food supplies or food changes while holding the other constant on nutritional deficiencies in Cali, Colombia illustrates a third use (9). The research investigated the potential impact of food supply of various agricultural products on the nutritional deficiencies of the population so agricultural research resource allocation could be more effective. Of course, improved nutrition would have to be a goal of agricultural research and, as the authors noted, this is rarely the case. Farm returns and other economic and agricultural yield measures are the prevailing measures by which agricultural research is judged.

First the authors estimated the potential impact of hypothetical supply expansions of selected food commodities on the intake of calories and protein of a group at various income levels. To do this they obtained data on income, family size, quantities of foods consumed and prices paid for these consumed foods. The 230 families were selected using stratified random sampling techniques and visited in February 1969 and August 1970. The present levels of caloric and protein intake and the resultant deficiencies for 5 income groups were estimated. Table 7 shows this information.

The direct price-elasticities and flexibilities and time cross-elasticities were estimated. A price elasticity shows the percentage change (usually increase) of food purchases for a 1% reduction in its price. For example, a price elasticity for beef of -1.6 tells us that a 1% drop in the price of beef leads to a 1.6% increase in the consumption of beef. The estimated change in quantity consumed due to 10% increases in the supply were estimated using the above information. Assuming constant consumer incomes, the changes in prices and the subsequent changes in consumer purchases for each income strata were estimated. Each commodity was examined separately.

TABLE 7
CALORIE AND PROTEIN CONSUMPTION OF 230 FAMILIES OF CALI, COLOMBIA

	Income Strata				
	I	II	III	IV	V
US $/family month	0-37.50	37.6-50.	50.1-100.	100.1-150	150.1-up
% distribution	18.3	17.6	36.8	13.6	13.5
Daily per capita calorie intake	1808	1955	2323	2584	3391
Reommended intake	2150	2150	2150	2150	2150
Calorie balance	-342	-194	173	434	1241
Daily per capita protein intake	41.2	46.7	59.4	75.7	119.8
Recommended intake	62	62	62	62	62
Protein balance	-20.8	-15.3	2.59	13.7	57.8

Source: Tables 1, 3 and 4 (9).

TABLE 8
IMPACT OF A TEN PERCENT SUPPLY INCREASE ON CALORIE AND PROTEIN DEFICIENCIES

Product	Percent of total net addition of calories and protein consumed by the deficient strata		Reduction in nutrient deficiencies in percent of total deficiency	
	Calories	Protein	Calories	Protein
Beef	10.12	48.74	1.62	7.96
Pork	8.96	42.22	0.49	2.04
Milk	15.70	59.67	1.34	3.65
Rice	42.65	84.09	16.55	8.83
Maize	63.84	100.00[1]	18.62	10.17
Beans	45.95	83.48	5.08	5.42
Potatoes	49.87	79.85	6.74	3.37
Plantain	65.15	100.00[1]	13.94	3.95

[1] Since the direct price elasticities for maize and plantain is positive for the high income strata, the increase in the quantity consumed by low income strata exceeds the increase in supply.

Source: Table 11 (8).

The various price reductions affect each strata differently. A 10% increase in supply of beef increases per capita daily protein consumption of the poorest strata by .5 grams while the increase is 3.2 grams in the richest strata. On the other hand, a 10% increase in the supply of rice adds one g of protein to the low-income diets and 0.5 grams to the high income consumers' diets. Table 8 shows the percentage of the net protein and calorie consumption which the deficient strata consume and the resultant net reduction in their calorie and protein deficiencies.

The impact of income increases is estimated with the use of income elasticities. Income elasticity measures the percent change in the consumption of each commodity for a 1% change in income. They found "A ten percent increase in the incomes of low-income consumers would result in an expansion of the consumption of meats and milk approximately equal to that caused by a ten percent supply expansion, while the impact on the consumption of stable foods would be less than associated with a 10 percent supply increase" (9, 18).

Table 9 shows the percent of total income increases necessary to meet the nutritional deficiencies of each strata .

This study points out the relative nutritional benefits of changes in the supply of different commodities. The benefits to the poor of expanded meat and milk production were limited while maize and rice were more beneficial. Once again, such comparisons are meaningful in a limited way without looking at the relative costs of expanding the production of each commodity. Also incomes were assumed to be constant. The interaction of large price and supply changes can produce significant positive and negative income effects for various strata. We also see what the magnitude of the income changes must be to eliminate the calorie and protein deficiencies when prices are held constant. Such an analysis can help to understand the potential of various types of economic development programs in eliminating malnutrition.

This analysis deals with average family data. Intrafamily distribution which is ignored in this study can certainly be analyzed. The effects of price and/or income changes on individual's nutritional needs could be analyzed. However, it must

4. Similar data was not provided for food supply increases.

TABLE 9
PERCENT INCREASE IN CONSUMER INCOMES NEEDED TO FULFILL NUTRITIONAL REQUIREMENTS, BY STRATA

	Strata		
Calories	I	II	III
Increase in per capita incomes (%)	28.88	15.40	—
Increse in per capita incomes (Col. $)	28.82	27.57	—
Increase in incomes per family (Col. $)	149.48	149.67	—
Incrase in incomes per family (U. S. $)	7.47	7.48	—
Protein			
Increase in per capita incomes (%)	55.33	38.42	11.17
Increase in per capita incomes (Col. $)	55.22	68.77	29.38
Increase in incomes per family (Col. $)	286.41	373.41	170.20
Increase in incomes per family (U S. $)	14.32	18.67	8.51

Source: Table 15 (8)

be noted that the distribution of food within the family most likely changes significantly as incomes and prices change. Also the author equates 10% increases in food supply and income. Such comparisons are only meaningful when the cost of producing a 10% rise in both food supply and income are considered. Failure to do this presents a false impression of the results.

Benefit-Cost Analysis[5]

Given this scarcity of resources, we should ensure that allocation of funds be made to all the various programs. Nutritionists and economists together must help establish the priorities between food and other types of programs. Benefit-cost analysis providing a thorough examination of the efficiency question is one basic approach toward establishing priorities (4; 17). This technique enables the analyst to determine the

5. Parts of the following discussion are taken from (13).

relative benefits obtained from a given set of expenditures for a variety of programs. However, benefit-cost analysis cannot answer all the questions, as it cannot deal with many non-quantifiable areas. Effects of nutrition on mental health and skeletal structure are two areas in which quantification is impossible, whereas other aspects are difficult to quantify accurately.

Moreover many of the effects of nutritional improvement (increased physical and mental performance, reduced morbidity and mortality, etc) are very difficult to quantify in any environment. In a laboratory it is quite easy to show the effects of changing a nutritional indicator such as the PER or calorie intake on behavior of rats. This is not the case where numerous social, health and other environmental factors interact synergistically. For example, one study in India attempted to show the relationship between improved caloric intake and work output among poorly fed coal miners but they could detect no effect. Then they finally realized that the organizational structure of the coal mine limited the amount of coal which could be placed in the coal train cars each day, thereby limiting the potential output of these individuals.

When dealing with more subtle changes in mental performance or morbidity among young children, the task is even more difficult. One heroic attempt estimated the effects of increased milk consumption among preschool chilean children on their future work performance (14).

First, Selowsky and Taylor estimated the effects of: poor nutritional status on preschool ability (IQ) of children aged 1-3; the effects of preschool ability on schooling; and the effects of both schooling and preschool ability on adult's ability at a mature age; and the effects on an adult's earnings of schooling and the adult's ability. From these four steps, they were able to estimate the total effects of a change in early earnings on the adult's income. This analysis showed very large economic benefits and a rate of return of 20% or more for a milk program for an infant during his first 2 years to avoid severe malnutrition.

One problem with the Chilean study and others of a similar nature is the lack of quantification of the economic effects of nutritional and health changes. This forces the economist or

planner to make crude assumptions about economic effects. Partially this is the result of the difficulty of determining these effects because of the synergistic interaction between nutrition and many other factors It is also the result of cross-sectional analysis, that is the lack of longitudinal studies which carefully attempt to analyze several effects.

This author is engaged in an attempt to understand the effects of eliminating xerophthalmia (severe vitamin A deficiency). One aspect is the effect of reduced xerophthalmia on children with and without the disease. To do this, 400 children's total morbidity was studied weekly for 3 months in Oct.-Dec. 1973[6]. Then the total morbidity will be studied in Oct.-Dec. 1974 after the xerophthalmia has been eliminated. If any medical effects are determined, economic analysis of the changes in the children's school performance, absenteeism, etc. will be estimated. It should be noted that an understanding of the direction of the effects and the types of effects (positive and negative) of nutritional change can be useful to the economist and the planner.

The analysis of costs of each program are as important as the benefit analysis[7]. This is because costs are rarely quantified but they can be measured easily and will provide a better basis for planning programs. It is useful to examine both the private and the public costs of a program. While we are usually more interested in how much the program will cost the government (public costs), the costs to the private individual are important in estimating the short run and long run success of the program.

These private costs should include the direct and indirect outlays. For instance, a home garden or some other agriculture program may require expenditures for seeds, equipment, or fertilizer. It will also require time to be spent on the gardening or farming. This indirect outlay can be conceptualized as the earnings foregone or the opportunity costs of the time devoted to these programs. If the person involved is unemployed, the opportunity cost of his labor can be viewed as

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6. This study is being conducted by Dr. Florentino S. Solon, Cebu Institute of Medicine, Dr. Michael C. Latham, Cornell and this author.
7. This point has been emphasized by D. L. Call and R. Longhurst, "Evaluation of the Economic Consequences of Malnutrition, "Proc. Western Hemisphere Nutrition Conference III, 1972, 312-317.

zero. Nevertheless, it is important to consider this time factor. This holds true for nutrition education and so many other programs. The sum of these direct and indirect outlays allows us to understand the direct impact of the program on each person. These costs should be considered for the entire population-not only the program recipients. Often the costs on the nonrecipients (if any) can affect the success of the program.

Public or social costs should include all fixed investments on training and other facilities and the operating and maintenance costs for the various programs. The net costs of any food or other subsidy are included. Separate foreign exchange costs might be analyzed if the country has a foreign exchange problem. The clearest example is the milk program in Chile. If the original designers of the programs had estimated the potential foreign exchange impact of the milk program under various funding arrangements, they might have taken steps to lower the foreign exchange needs earlier. For instance, they could have looked at the possibility of replacing part of the milk powder with some indigenous ingredients such as chickpea powder.

Of key importance to food program analysis is that this technique explicitly considers the time stream of benefits and costs. A program with large benefits in the future (preschool feeding) may be less valuable to a society than one with small benefits in the short run (i.e. factory lunch program). The present value of each stream of costs and benefits are estimated. This technique can include only an analysis of the present value of the costs of various programs. Then the costs can be compared. Cost-effectiveness analysis attempts to compare the costs of various programs which meet a given level of effectiveness such as eliminating a given nutritional problem.

It must be emphasized that benefit-cost analysis often gets misused by only examining changes in total production (gross national product). Since the goal of economic policy is an increase in welfare or a key aspect such as the patterns of consumption, a variety of considerations are crucial. One of these is the distribution of benefits and costs between various classes of society. It may be proper to weigh the benefits such that those accruing to the malnourished are given a much larger value than those going to the wellnourished.

Equity considerations: "Reaching the Unreachables"[8]

A fundamental problem in the development of social service programs in the areas of health, nutrition, housing, education and welfare is how best to reach those most in need. Few programs address themselves adequately to this problem when plans are formulated. Yet, 30, 40 or even 50 percent of the population of many developing countries are entrapped in conditions of poverty. Many of these people lie beyond the reach, not only of the public services, but often also of market forces which traditionally act to uplift large segments of a society. Prominent among these "unreachables" are the unemployed or underemployed urban squatters and slum dwellers; the landless agricultural workers and the sharecroppers and the poor peasants with small uneconomic land holdings. Developmental programs supported by governments and international agencies are intended to improve the lot of this segment of society. But in practice these programs too often are simply not reaching those most in need.

In reality, the lowest income 30 or 40 percent of the population have in the past 10 to 20 years experienced little or no increase in real income and often have experienced a decline. This is the case in India, the Philippines and numerous other low income nations including much of Latin America (4, 6, 15).

Economic change is taking place and incomes are growing but the poor are rarely reached. Priorities play a role. It was estimated "that with the annual operating expenditures of the three open heart surgery units in use today in Bogotá, a city with a population of over 2 million, a quarter of the children living there could receive a half liter of milk each day for one year" (8, 10).

Programs aimed at the poor usually don't reach them. Take the Applied Nutrition Program effort in India. One program for 3-6 year olds tried to reach the children of poor families but children came mainly from better-off poor families. The poor children had to stay at home to look after their younger siblings while their mothers worked. Or take the Applied Nutrition Program's emphasis on home gardens. What happens to

8. Parts of this discussion are excerpted from Popkin and Latham (12).

those families who do not have land for gardens. And the resources often do exist. Food supplies in India, Cali, Colombia, and most countries are adequate if an equitable distribution existed (6, 8, 9). Urban-rural, regional, and class imbalances are abundant.

Frequently the blame for the failure of these programs to benefit the very poor is laid at the door of the poor themselves rather than that of the program planners and professional workers. Social scientists explain the relative lack of participation of the poor as being due to social and cultural factors such as a lack of education or unprogressive religious beliefs. The wealthy members of the establishment often make moral judgments about the poor and suggest that they are lazy, spendthrifts and immoral.

In order to develop appropriate methods to reach the poor, it is necessary to examine the existing structure of the health care system and of nutrition programs in relation to the social milieu of the very poor. How successful are the programs in reaching their objectives? What changes are needed? Is a whole new program required which is sensitive to the local culture and to the social structure of the people?

The affluent and even the government agencies often regard those in the low socioeconomic class as being a relatively homogeneous group, "the poor". Although it may sound contradictory, and even inhuman, it is clear that in all countries there are "rich poor" and "poor poor". Most health and nutrition intervention programs have failed to reach the very poorest families. Many workers will agree with this assessment, but there is little understanding of this issue, very few evaluation studies related to it have been carried out, and the planning process gives it minimal consideration. This problem is not limited to low income nations. The programs aimed at "eliminating poverty" in the U. S. produced similar results

Why haven't we reached the poor poor. One basic issue is the lack of political clout among the poor. They are pushed around by many segments of society and have few weapons to challenge entrenched power. Other reasons include:

(1) *Lack of skills or of assets.* The "poor poor" function within a more unstructured labor market than do most laborers. If they are employed they have poorer working condi-

tions, less job security, more frequent non-cash payments, and longer working hours. They are often the landless peasants or the squatters paying their dues to the squatter colony politician. Also their poverty means lower school performance and higher absenteeism for the children.

(2) *Attitudes differ from those of the establishment:* The attitudes, the beliefs, and the life-style of the poor may be quite different from those in positions of power. For example, in Thailand the poor poor may more often be animists rather than Buddhists. In India, their lower subcaste may have subdued them to such an extent that they are fearful of any step forward.

(3) *Professionals look down on them:* The professional and auxiliary workers in health and social programs often show disdain for the very poor and may make it difficult or impossible for them to participate fully in a program designed for their benefit. Workers, often of the same nationality, may have different backgrounds, a lack of understanding of the poor's problems, and even speak a different dialect. In other cases, the poor who become educated are separated from their own class through the very subtle mechanisms of the educational process. As professionals they fail to communicate with and often look down on their former peers.

(4) *Lack of time and other attributes to make use of services:* Where incomes are very low often both men and women have little time away from work or household duties. Without good facilities it is time consuming to carry water, gather fuel, care for children, pound grain, prepare meals and do a hundred other chores. Frequently, they do not have time to utilize fully the available social services. They may also lack the needed low cost transportation to reach these services and they are hindered by illiteracy. A nutrition education program on radio or TV may not help those who cannot afford such appliances. A cereal fortification program will not help those who pound their own grain, and a fluoridated water supply does not assist those who draw water from a ditch or well.

(5) *Lack of meaningful community organizations among the poor:* Seldom are the villages (barrios) or squatters' areas organized in a manner whereby community resources can be

pooled to provide the manpower and financial resources necessary for attacking simple or complex problems. Cooperation on community health and other social welfare projects is often lacking. Of course, combining the few resources as the poor control can be of limited value. This is also the case for other stratas of society, but these middle and upper income groups can afford to purchase and develop the necessary commercial services.

Economists and planners have helped to neglect the poor. As John Mellor has pointed out, development planners have had a tendency to ignore the distribution of income, have placed more emphasis on urban than rural development, have ignored most high employment paths of development, have ignored the composition of consumption as a basis for policy (6). The latter has meant that they have not been concerned with health, nutrition and education programs for the role they will play in development. This has meant that those most lacking in these areas have been more deprived. Health planners have overemphasized curative rather than preventative environmental oriented programs. In Colombia only 8% of the health peso in the public sector goes for preventive services. Over 30% is for hospitals and the combined curative services take up about 91.2%[9].

The statistics used to judge the quality of health care tend to make this emphasis worse (Navarro). Statistics such as doctor/population and hospital bed/population ratios treat the curative-oriented hospital as the center of the health system.

How do we reach the poor poor? What shouldn't we do? The basic trait of poverty is, of course, a lack of money, i.e. of purchasing power. This may be the main reason for the poor nutritional status. Often money is not available for the family to procure either adequate quantities of food or a nutritionally balanced diet. The poor poor are often not in a position to follow the nutritional advice provided in the clinic or at the welfare center. It must be discouraging, even depressing, for a mother to be told that her children will suffer from ill health unless fed this or that protein-rich foodstuff, when she knows that these foods are out of her economic reach.

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9. Data in 8 from J. Margozzini, An Analysis of Cost and Expenditures in Latin America for the Period 1965-1970, John Hopkins University, 1973 (in process).

Nutrition and health workers cannot ignore any of these factors if they really wish to improve the well-being of the poor. Education and training are important to improve skills; a political revolution is often needed to provide the poor with the political power their numbers warrant; the nutrition, health and social workers need to be drawn from the poor communities themselves; and a whole range of services must be made available to them. Above all is a need to increase their purchasing power because this alone will have a marked effect on their dietary intake. In many poor countries a better distribution of resources could go a long way to improving the nutritional status and health of the very poor.

In certain types of programs there may be some logic in not aiming to reach the lowest levels in the community. Effort concentrated on the very poor might be doomed to failure at the outset in, for example, certain nutrition education or food promotion programs. It is important then to make the objectives of the program clear and not to cloud the issue by pretending that it is mainly humanitarian. Thus a government health program that will mainly serve the middle classes should in its objectives state that this is its goal. It should not pretend that it is dealing with problems related to poverty.

In most societies the most extensive and serious nutritional problems exist among the very poor but malnutrition is not limited to them. They are the most difficult group to reach and they are not the leaders or the pace setters, and they are often more traditional. They are the most in need of help though good evaluation studies will show that health and nutrition programs are not reaching them. Honesty in the statement of objectives when planning a program which omits the poor "unreachables" might result in questioning of the appropriateness of the target group selected, but once accepted will allow a realistic evaluation. At the present time, too often the evaluation is looking for changes in the very poor when the program in fact benefited people higher up the social scale.

Some other factors pointed out in this discussion include:

(1) Emphasize research on agricultural crops which will reach the poor Between 80-100% of the protein from the increased supply of rice, maize, and beans would reach the deficient strata in the Cali study (9,18).

(2) Emphasize preventative programs aimed at the poor poor.

(3) Emphasize statistical indicators such as population ratios for children immunized, nutritional status, etc.

Why should an economist be so concerned with nutrition. Isn't increased welfare the goal of all economists and planners. This view was popular in the past. According to it, increased factories, dams, schools, roads, etc., would lead to increased production. This increased national income would tricle down to the poor or reach them through direct subsidies. We have learned this does not happen. The direct nutritional implications of all development strategies must be examined. The problems of the malnourished must be understood and we must directly reach them either with income-producing productions (e.g. jobs) or with other types of nutritional programs.

RESUMEN

La economía como medida para la evolución nutricional

Se presenta una discusión del posible impacto favorable o desfavorable de diversas circunstancias y medidas económicas, sobre cambios nutricionales en grupos de bajos ingresos, como consecuencia de programas en cursos y se citan ejemplos concretos para ilustrar los puntos analizados.

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