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ANALYTICAL WORKING DOCUMENT # 21

FOOD PRICES AND NUTRITIONALLY ADEQUATE DIETS IN LA PAZ, BOLIVIA, 1972, 1973, and 1974.

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September 1975

SECTOR ANALYSIS

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FOOD PRICES AND NUTRITIONALLY ADEQUATE DIETS IN LA PAZ, BOLIVIA, 1972, 1973 AND 1974

This document represents part of an ongoing analysis of food and nutrition in Bolivia. An earlier report focused on the regional distribution of food production. 1/ A study of relationships between socio-economic variables and food consumption and nutrition of rural families based on data collected in a 1972 farm survey is underway. The study reported here, while based on more limited data, will be helpful in designing the methodology of the more extensive rural study, as well as providing some insights on the urban situation.

The specific purposes of this report are to (a) determine the nutritional efficiency of selected foods in La Paz, Bolivia, and (b) analyze the effect of food price inflation during the 1972-1974 period on nutritionally adequate diets. The first two sections discuss ratios of nutritional values to prices and indexes of food price inflation before proceeding to the linear programming analysis in the third section.

Food Prices, Energy and Protein

Prices of 63 food items are regularly collected in La Paz on a monthly basis. Annual average prices for 1972, 1973 and 1974 for 36 of these items will be used throughout this document; the other 27 prices were not used because it was impossible to determine the unit weight measures to which they referred. The 36 items include major grain products, meats,

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1/ Suttor, Richard E. and James L. Doster, Analysis of Food Production Relative to Nutritional Requirements in Bolivia, Analytical Working Document #19, March 1975.

fruits and vegetables (Table 1). Although it would be desirable to analyze a greater number of products, these items appear to be sufficient for this analysis. Further analyses of this type, however, should include a greater disaggregation; particularly important would be further breakdown of beef into several retail cuts rather than the one beef item used here.

Prices in Table 1 have been converted to a standardized unit of 100 grams edible weight. This was done by taking account of the inedible portion of each food and using standard weight conversion factors (See Appendix Table A2).

One hypothesis we wish to test is whether prices or simple ratios such as calories per peso or protein per peso are valid indicators of the most "efficient" foods. We define an "efficient" food as one included in a minimum cost diet selected by the linear programming model. As described in the third section of this report, the foods appearing most often in the minimum cost diets are wheat flour, sardines, milk, peas and sugar.

Four of these five foods--wheat flour, milk, sugar and peas--are also the four cheapest foods, i.e., their prices per 100 grams edible weight are the lowest in the list of 36 items. The fifth item, sardines, is the cheapest animal product except for milk.

Only two of the five efficient foods--wheat flour and sugar--are among the five cheapest sources of food energy. Milk and peas are actually less than average according to this criterion, however, sardines ranks highest among the animal products.

Wheat flour and sardines are among the five cheapest sources of protein, while peas and milk are well above average on this count. Sugar, on the other hand, has no protein.

In summary, the simplest of the measures, price per unit of weight, is the best indicator of efficient foods. It should be emphasized that simply observing prices is not a substitute for the calculation of minimum cost diets. It may, however, be a useful simplified rule of thumb for identifying foods that are "best" from a nutritional point of view.

Table 1. Food Prices and Energy and Protein Per Peso, Averages of 1972, 1973 and 1974

Food	Average Prices	Food Energry Per Peso	Protein Per Peso
	(Pesos Per 100 grams edible weight)	(Calories Per Peso)	(Grams Per Peso)
Noodles	0.563	689.20	22.74
Wheat Flour	0.444	761.06	20.88
Rice	0.528	686.40	11.59
Beef	1.925	154.28	8.31
Trout	5.503	15.81	3.31
Sardines	1.217	254.72	16.93
Salmon	1.096	155.11	18.79
Edible Oil	1.501	588.94	-
Lard	1.344	667.41	-
Butter	4.712	157.68	0.21
Milk	0.273	212.45	12.45
Powdered Milk	3.963	127.20	6.12
Peas	0.435	135.40	14.8
Lima Beans	0.498	168.11	22.85
Tomatoes	0.639	34.44	1.47
Carrots	1.676	20.83	0.54
Potatoes	1.281	72.97	2.11
Chuño	1.034	336.31	2.74
Lentils	2.081	167.27	11.56
Peanuts	1.883	292.45	14.41
Oranges	1.757	29.10	0.43
Grapes	1.211	52.25	0.57
Sugar	0.419	916.47	-
Red Chile	2.822	116.33	3.37
Yellow Chile	3.222	105.26	2.29
Coffee	1.231	104.79	-
Tea	3.498	84.05	-
Soda	0.497	92.55	-
Beer	0.833	44.42	0.36
Wine	2.671	26.58	-
Ketchup	4.480	23.66	0.45
Peach Juice	2.254	21.29	0.09
Dried Peaches	2.332	141.22	1.61
Olives	4.030	57.82	0.42
Candy	1.984	184.98	-
Pineapple	1.956	56.24	0.20
Average	1.883	215.42	5.60

Source: Based on data in Appendix Tables A2 and A4.

Food Price Inflation

Bolivia has had a high rate of inflation in the past two years, including a more than doubling of many food prices. For the 36 foods included in this analysis, the average price increase from 1972 to 1974 was 147 percent (Table 2). Individual price increases ranged from 52 percent for pineapple and 56 percent for chuño to 526 percent for tea.

Of the five most important foods in the minimum cost diets, two (wheat flour and sardines) increased at a higher than average rate in both 1973 and 1974, while milk and peas increased at a lower than average rate. The fifth, sugar, showed a relatively small rate in increase in 1973 but a higher than average rate in 1974.

We wish to test two hypotheses with respect to food price inflation. First, we would expect the wide range of price increases for different foods to result in a considerable shift in the composition of minimum cost diets. Second, we would expect the cost of the minimum cost diets to increase at a slower rate than the average food price. As shown in the following section, the second hypothesis is refuted by the 1972-1974 analysis, although some shifts in the composition of the diets occur.

Minimum Cost Diets

By means of a linear programming model, the minimum cost of a diet that fulfills minimum nutritional needs can be calculated. 2/ In this analysis, ten minimum requirements established by the Division of Nutrition in the Bolivian Ministry of Social Welfare and Public Health were used.

2/ Costs of nutritionally adequate diets in Bolivia have been analyzed by applying prices to predetermined "minimum quantities of recommended foods." The recommended diets can be found in Recomendaciones Alimentarias published by the Division of Nutrition in the Ministry of Social Welfare and Public Health in 1971. Costs calculated by this technique tend to be somewhat higher than the costs calculated by the linear programming model.

Table 2. Food Price Indexes 1972, 1973 and 1974

Food	Price Indexes (1972 Index = 100.0)		
	1972	1973	1974
Noodles	100.0	140.9	298.7
Wheat Flour	100.0	155.8	338.8
Rice	100.0	132.0	285.6
Beef	100.0	178.8	274.8
Trout	100.0	160.5	266.3
Sardines	100.0	145.2	272.1
Salmon	100.0	137.4	266.9
Oil	100.0	131.1	307.5
Lard	100.0	136.3	338.0
Butter	100.0	134.9	230.1
Milk	100.0	122.6	186.0
Powdered Milk	100.0	135.3	164.0
Peas	100.0	114.9	198.4
Lima Beans	100.0	127.3	197.1
Tomatoes	100.0	132.6	311.0
Carrots	100.0	128.4	212.3
Potatoes	100.0	133.8	258.8
Chuño	100.0	98.7	156.1
Lentils	100.0	183.0	318.3
Peanuts	100.0	163.3	436.8
Oranges	100.0	103.2	349.8
Grapes	100.0	129.2	176.9
Sugar	100.0	118.8	265.0
Red Chile	100.0	93.2	220.6
Yellow Chile	100.0	108.3	248.4
Coffee	100.0	130.6	215.8
Tea	100.0	191.0	625.5
Soda	100.0	137.0	223.1
Beer	100.0	145.1	190.5
Wine	100.0	126.8	225.5
Ketchup	100.0	95.0	189.6
Peach Juice	100.0	141.5	278.7
Dried Peaches	100.0	119.0	248.7
Olives	100.0	143.6	301.9
Candy	100.0	137.3	225.4
Pineapple	100.0	117.1	152.4
Average Price	100.0	131.8	247.2

Source: Based on data in appendix table A2.

The computer program determines the minimum cost diet that provides the specified amounts of food energy (calories), total protein, animal protein, calcium, iron, vitamin A, thiamine, riboflavin, niacin and vitamin C. Separate diets were calculated for seven different age groups and then summed to arrive at the summary statistics in the following three tables. The data input and detailed specification of the model are presented in Appendix A.

The minimum cost of nutritionally adequate diets for a family of seven was 18.09 pesos in 1972 (Table 3).

Table 3. Minimum Cost Per Day of Nutritionally Adequate Diets for a Family 1/ in La Paz, 1972, 1973 and 1974

	1972	1973	1974
		(Pesos)	
Cost of Nutritionally Adequate Diets (Pesos)	18.09	25.05	48.21
Index of Cost of Nutritionally Adequate Diets	100.0	138.5	266.5
Index of Food Prices 2/	100.0	131.8	247.2

1/ Cost refers to a family of seven members consisting of a male adult, a female adult and five children. The data in this table are aggregates of the individual costs presented in Appendix Table B1.

2/ Unweighted index of 36 food prices. The original prices, data source and conversion factors are presented in Appendix Table A2.

The cost increased to 25.05 in 1973 and 48.21 in 1974. Surprisingly, the rate of increase in both years was higher than that of average food prices. It should be emphasized that a minimum cost diet is not a fixed market basket of foods. The diet is allowed to change each year in response to price changes. Thus, if a family purchased the quantities of foods that provided the required nutrients at the least possible cost in 1972 and adjusted its purchases in 1973 and 1974 to minimize costs, its food bill would actually increase faster than the average food price.

The high rate of food cost increases may have resulted in a higher incidence of malnutrition among the poor, although we have no direct measurements of this. The nutritional well-being of the poor is a function of wage rates and employment as well as food costs. If incomes of the poorest groups increased at a rate lower than that of the minimum cost diets, the incidence of malnutrition would almost certainly have increased.

The composition of the minimum cost diets is presented in Table 4. Wheat flour is the most important food in terms of weight (except for fluid milk in 1974) despite its rapid price rise. Sugar enters the 1973 diets and becomes more important in 1974. The increase in sugar roughly parallels the decrease in wheat flour, reflecting the higher rate of price increases for flour relative to sugar. The animal protein requirement is filled by fluid milk and the canned fish products, while peas is the dominant vegetable in the diets.

Wheat flour is also the most important food in the diets in terms of costs (Table 5). Expenditures on flour decline from 42 percent of the budget in 1972 and 1973 to 33 percent in 1974. Animal products and vegetables each account for roughly one-fourth of total food expenditure.

Table 4. Food Quantities Per Day in Nutritionally Adequate Diets for a Family 1/ in La Paz, 1972, 1973 and 1974

Food	1972	1973	1974
		(Kilograms)	
Wheat Flour	3.389	3.039	2.111
Canned Sardines	0.559	0.035	0.200
Canned Salmon	-	0.510	-
Milk	0.527	0.545	2.672
Peas	1.333	1.825	1.717
Lima Beans	0.067	0.035	-
Carrots	0.088	-	-
Sugar	-	0.440	1.052

1/ Quantities refer to a family of seven members consisting of a male adult, a female adult and five children. The data in this table are aggregates of individual quantities obtained from the seven linear programming solutions presented in Appendix Table A2.

Table 5. Food Costs Per Day for Nutritionally Adequate Diets for a Family 1/ in La Paz, 1972, 1973 and 1974

Food	1972	1973	1974
		(Pesos)	
Wheat Flour	7.59	10.61	16.02
Canned Sardines	3.95	0.36	3.84
Canned Salmon	-	4.57	-
Milk	1.10	1.39	10.34
Peas	4.21	6.62	10.77
Lima Beans	0.24	0.16	-
Carrots	0.98	-	-
Sugar	-	1.36	7.25
Total 2/	18.07	25.07	48.22

1/ Costs refer to a family of seven members consisting of a male adult, a female adult and five children. Costs of individual foods are obtained by multiplying the quantities in Table 4 by the prices in Appendix Table A2 adjusted to a kilogram edible weight basis.

2/ Total cost equals cost of nutritionally adequate diet in Table 3 except for rounding error.

Quantity and Quality

The "quantity" of food, referring to its energy content, is sometimes contrasted with the food's "quality", which takes into account its protein, vitamins and minerals. To obtain a measure of the cost of quantity and quality, the cost of the minimum cost diet is divided into two parts in Table 6. The first column refers to the minimum cost of a diet that provides the required food energy without reference to other requirements. Such a diet would consist of only one food, namely, the one that provides the cheapest source of calories; this turns out to be 4.2 kilograms of wheat flour in 1972 and 3.7 kilograms of sugar in 1973 and 1974. Of course, these diets would be deficient in other respects; this is particularly true of sugar, which provides only calories.

The second column of Table 6, the difference between the cost of a nutritionally adequate diet and the cost in the first column, is a measure of the cost of the quality component. According to this imputation of cost, quantity and quality each account for approximately one-half of the cost of a nutritionally adequate diet. It should be noted that there are other schemes for imputing costs, one of them being the pricing of nutritional requirements according to their shadow prices, which is discussed in Appendix B.

Relative Scarcity of Nutrients

A minimum cost diet, while providing only the bare minimum of some nutrients, provides more than the minimum requirement of others. The differences in the scarcity of nutrients arises from great differences in nutrient content among different foods. As an illustration, Table 7 shows the percentage contribution of the foods in the 1974 minimum cost diets for a family. Together the five foods provide only the minimum requirements of food energy, vitamin A and niacin, and only slightly more than the minimum amount of animal protein and riboflavin. In terms of the linear programming model, the first three restrictions are binding for all the 1974 solutions, while the other two are binding in six of the seven solutions. (All shadow prices are presented in Appendix B). The other nutrients--total protein, calcium, iron, thiamine and vitamin C--are supplied in quantities considerably greater than their minimum requirements.

Table 6. Costs of Food Energy and Other Nutritional Requirements in Minimum Cost Diets for a Family in La Paz

Year	Cost of Food Energy Requirement 1/	Additional Cost of other Requirements 2/	Total Cost 3/
		(Pesos)	
1972	9.52	8.57	18.09
1973	11.55	13.50	25.05
1974	25.75	22.46	48.21
Average	15.61	14.84	30.45

1/ Cost of minimum cost diets in which only the food energy restriction is used.

2/ Total cost minus cost of food energy requirement.

3/ Cost of minimum cost diet that satisfies all ten nutritional requirements.

Table 7. Percentage Distribution of Quantities, Costs and Nutritional Contribution by Food in Nutritionally Adequate Diets for a Family in La Paz, 1974

	Wheat Flour	Sardines	Milk	Peas	Sugar	Total Diet	Total as Percent of Requirement
			(Percent)				
Quantity	27	3	34	22	14	100	-
Cost	33	8	22	22	15	100	-
Food Energy	50	4	11	7	28	100	100
Protein	45	9	21	25	-	100	126
Animal Protein	-	31	69	-	-	100	106
Calcium	20	13	53	14	-	100	156
Iron	83	2	2	13	-	100	475
Vitamin A	-	1	10	89	-	100	100
Thiamine	45	*	14	40	-	100	164
Riboflavin	32	4	29	35	-	100	104
Niacin	70	9	3	18	-	100	100
Vitamin C	3	-	4	93	-	100	206

* Less than 0.5 percent

The importance of wheat flour and sugar as energy sources is apparent when their costs are compared with their contribution to nutritional needs. They provide 78 percent of the energy requirement while accounting for only 48 percent of the cost. Wheat flour is also outstanding in terms of niacin, contributing 70 percent of the requirement.

Sardines and milk contribute the required animal protein. The contribution of milk to the scarce supply of riboflavin is proportionately greater than its cost. Both sardines and milk are good sources of calcium, but this is of less importance because the total calcium content in the diet is considerably greater than the minimum requirement.

The relatively large quantity of peas is important for its contribution of scarce vitamin A and riboflavin, and it accounts for nearly all of the vitamin C. Two other vegetables, carrots and lima beans, could play a similar role and, in fact, are part of some of the minimum cost diets in 1972 and 1973. Depending on the price ratios, one or two of these three vegetables appear in each diet.

We would expect the scarcity of nutrients to be related to observed nutritional deficiencies. More specifically, we would expect the greatest deficiencies for those nutrients that are limiting in the minimum cost diets.

We have no direct measurements of nutritional deficiencies in the city of La Paz in the 1972-74 period, although a study 3/ of nutritional status in Bolivia was conducted in 1962. The report includes data on average per capita nutrient intake of 202 families in the Department of La Paz and comparable "acceptable" levels of nutrient intake. 4/

3/ Interdepartmental Committee on Nutrition for National Defense, Bolivia Nutrition Survey, June 1964.

4/ Ibid, p.106, 130 and 131.

Assuming that the nature of the nutritional problem has not changed drastically and that the problem in the city of La Paz is similar to that for the Department, we would expect the survey results to be consistent with the findings of the minimum cost diet analysis.

The survey is in complete accord with the present study for five of the ten nutrients. Severe deficiencies of vitamin A and riboflavin and, to a lesser extent, food energy deficiencies were documented by the survey. These were consistently limiting factors in the minimum cost diets. Both the survey and the diet study show greater than minimum intake of iron and vitamin C.

The survey found a severe shortage of calcium, apparently due to the lack of milk products in the diet. The minimum cost diet study found that calcium was a limiting factor only for the two youngest age groups.

The averge intake of total protein and animal protein appear to be adequate according to the survey data; 5/ in the present study, animal protein is limiting, although total protein is not. The survey shows a moderate thiamine shortage, but thiamine is not limiting in the minimum cost diets. Average intake of niacin is slightly more than the acceptable level according to the survey data. In the minimum cost diets, niacin is limiting in 1974, but not in 1972 or 1973.

Relative Efficiency of Foods

Although only eight of the 36 foods are included in any of the minimum cost diets, all foods are "goods" in that they provide some nutrients. Any food could enter a minimum cost diet if its price were low enough. This suggests a ranking of foods according to the reduction in price required to bring them into a minimum cost diet. The "relative efficiency" of a food can be defined as the required percentage price reduction. The higher the required

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5/ Total protein intake is considerably higher than the minimum requirement used in the minimum cost diet model, but it is slightly less than the higher "acceptable" level in the survey report.

percentage price reduction, the lower is the relative efficiency of a food.

Price changes effect the relative efficiency measures and, with a given set of prices, the relative efficiencies are somewhat different for the diets of different age groups. Nevertheless, some sharp distinctions among foods emerge from an examination of the ranges of required percentage price reductions in Table 8. The 36 foods fall into three groups of approximately equal size.

The first group includes the efficient foods. Wheat flour and peas are part of all 21 minimum cost diets. Sardines and milk appear in some of the minimum cost diets in all three years, while salmon, lima beans, carrots and sugar appear in at least one year. Three additional foods might be added to this group. Noodles and rice could probably substitute for wheat flour with fairly small price cuts, particularly in 1974 when an eight percent reduction in the price of noodles or a 16 percent rice price reduction would bring them into at least one minimum cost diet. Red chile could begin to substitute for other vegetables with as little as an 18 percent price reduction in 1973.

The second group consists of those foods for which at least a 25 percent price reduction but less than 75 percent in at least one year is required to bring them into a minimum cost diet. The most efficient in this group are edible oil, lard and powdered milk which would enter some minimum cost diet each year with no more than a 50 percent price reduction. Similarly, beef, tomatoes, chuño, yellow chile, coffee and tea would enter some diets in one or two of the years with no more than a 50 percent price reduction. The other foods in this group--butter, potatoes, lentils and peanuts--require more than a 50 percent reduction in every year.

Foods in the third group are significantly less efficient. Dried peaches and candy would enter a minimum cost diet with less than an 80 percent price reduction in 1973 or 1974. At least an 85 percent reduction is required for the other foods in this group,

Table 8. Ranges of Percentage Price Reductions Needed to Bring Foods Into a Minimum Cost Diet 1/

Food	1972 Diets	1973 Diets	1974 Diets
Noodles	15-24	10-17	8
Wheat Flour	0	0	0
Rice	35-46	21-29	16-20
Beef	45-86	55-87	45-80
Trout	85-98	87-98	85-97
Sardines	0-3	0-15	0-25
Salmon	2-36	0-41	2-48
Edible Oil	48-59	35-46	38
Lard	37-57	25-37	32
Butter	72-78	72-79	68-69
Milk	0-23	0-12	0
Powdered Milk	38-52	39-50	32-37
Peas	0	0	0
Lima Beans	0-46	0-49	14-40
Tomatoes	46-50	55-59	67
Carrots	0-18	10-38	7-15
Potatoes	71-81	67-78	66-72
Chuño	71-83	55-71	42-52
Lentils	67-76	73-80	74-76
Peanuts	57-58	58-59	63-65
Oranges	87-94	86-88	93
Grapes	93-94	92-93	90
Sugar	27-43	0-17	0
Red Chile	35-43	18-26	42-45
Yellow Chile	47-51	42-46	57-58
Coffee	61-82	62-80	48-49
Tea	35-88	53-89	81-91
Soda	93-94	92-93	88-89
Beer	94-97	94-97	91-93
Wine	98	97-98	97
Ketchup	91-92	88-91	89-90
Peach Juice	92-93	93-94	93-94
Dried Peaches	82-87	79-84	79-80
Olives	87-90	88-90	89-91
Candy	86-89	82-86	76-77
Canned Pineapple	94-97	93-96	89-92

1/ Compiled from Appendix Table B5.

including fruit products (oranges, grapes, peach juice and canned pineapple), beverages (beer, wine and soda), a high priced meat product (trout), olives and ketchup.

This classification can also be used as a rough indication of the costs of more diversified diets with given prices. If the minimum cost diets were modified to include a wider variety but confined to the eleven foods in the first group, more palatable (as well as nutritionally adequate) diets could be attained with perhaps no more than a ten percent increase in cost. The substitution of small amounts of foods in the second category might add another ten or twenty percent to total cost. However, if substantial quantities of foods in the third group are consumed, the cost of a nutritionally adequate diet could easily be double or triple the minimum cost.

Appendix A: The Cost Minimization Model and Data Input

The linear programming model used to obtain the minimum cost diets reported in this document consists of ten linear restrictions, three objective functions (one for each year) and seven right hand sides (one for each age group).

$$\text{Minimize:} \quad \sum_j C_{kj} X_j \qquad k = 1,2,3$$

$$\text{Subject to:} \quad \sum_j A_{ij} X_j \geq N_{im} \qquad \begin{matrix} i = 1,2,\ldots,10 \\ m = 1,2,\ldots,7 \end{matrix}$$

Where, X_j = Quantity of food j in the diet,

C_{kj} = Price per unit (100 grams edible weight) of food j in year k,

A_{ij} = Amount of nutrient i in one unit of food j,

N_{im} = Minimum requirement of nutrient i for an individual in age group m.

Twenty-one solutions were obtained, one for each combination of the three objective functions and seven right hand sides.

There are at least three ways to formulate nutritional restrictions, the main differences among these alternatives being the treatment of protein. The formulation used here, the simplest of the three, specifies fixed amounts of total protein and animal protein. The second formulation specifies fixed requirements of total protein and several of the essential amino acids. An example is a model dealing with agriculture and food in Colombia. 1/ The third formulation, developed by Victor Smith, 2/ specifies a fixed quantity of "reference protein," the amino acid requirements being determined endogenously. All models can be solved by a standard linear programming package. 3/

The simplest formulation was chosen for this study primarily because the amino acid content of foods and the minimum requirements for amino acids are not as well established as for other nutrients. In addition, minimum nutrient requirements established by the Division of Nutrition in the Bolivian Ministry of Social Welfare and Public Health include total protein and animal protein rather than amino acids or reference protein. The model used for the present study, while being in conformance with Bolivian nutritional work and requiring less data than the alternatives, is also acceptable from a theoretical point of view. The other two models, although more complex, are far from perfect. Current knowledge of human nutrition is such that none of the alternative formulations of nutritional restrictions is clearly superior.

1/ Suttor, Richard E., Adjustments in Agricultural Production to Attain Minimum Nutritional Requirements Consistent with Consumer Incomes, Analytical Working Document #16, February 1974.

2/ Smith, Victor, "A Diet Model with Protein Quality Variable," Management Science, Vol. 20, #6, February 1974.

3/ Suttor, Richard E., Application of a Non-linear Nutritional Constraint System, Methodological Working Document #27, January 1975.

The following tables present the data input for the cost minimization model. Since some of the tables use the Spanish names, English names of the foods in the model are shown in Table A1. The other three tables present the price data, minimum nutrient requirements (the right hand sides of the linear programming matrix) and the food composition data.

Table A1. List of Foods in Minimum Cost Model

Spanish	English
Fideos	Noodles
Harina de Trigo	Wheat Flour
Arroz	Rice
Carne de Res Sin Hueso	Beef (without bone)
Trucha	Trout
Sardina en Conserva	Canned Sardines
Salmon en Conserva	Canned Salmon
Aciete Comestible	Edible Oil
Manteca de Cerdo	Lard
Mantequilla	Butter
Leche Fresca	Fresh Milk
Leche en Polvo	Powdered Milk
Arvejas Frescas	Fresh Peas
Habas Frescas	Fresh Lima Beans
Tomates	Tomatoes
Zanahorias	Carrots
Papa Negra	Potatoes (Black)
Chuño	Chuno
Lentejas	Lentils
Mani	Peanuts
Naranja	Oranges
Uva Blanca	Grapes
Azucar	Sugar
Aji Colorado	Red Chili

Table A1. List of Foods in Minimum Cost Model (Cont'd)

Spanish	English
Aji Amarillo	Yellow Chili
Cafe Molido	Coffee (Milled)
Te	Tea
Refrescos	Soda or Soft drink
Cerveza	Beer
Vino	Wine
Salsa de Tomate	Ketchup
Duraznos Al Jugo	Peach Juice
Duraznos Secas	Dried Peaches
Aceitunas	Olives
Dulces Nl	Candy or Sweets
Conserva de Piña	Canned Pineapple

Table A2. Conversion of Price Data for Use in Linear Program

Food	Unit	Edible 1/ Proportion	Weight Conversion Factor	Conversion Factor 2/	Price Per Original Unit 3/			Price Per 100 Grams Edible Weight 4/		
					1972	1973	1974	1972	1973	1974
Fideos	Kgrs.	1.0	0.1	0.1	3.13	4.41	9.35	0.313	0.441	0.935
Harina de Trigo	Kgrs.	1.0	0.1	0.1	2.24	3.49 13/	7.59	0.224	0.349	0.759
Arroz	Kgrs.	1.0	0.1	0.1	3.06	4.04	8.74	0.306	0.404	0.874
Carne de res con hueso	Kgrs.	0.56	0.1	0.178	8.19	12.34	23.43	1.458	2.196	4.170
Carne de res sin hueso	Kgrs.	0.85	0.1	0.118	8.84 13/	15.81 13/	24.29 13/	1.043	1.865	2.866
Trucha	Libra	0.46	0.22	0.478	6.56	10.53	17.47	3.135	5.033	8.350
Pejerrey	Libra	0.46 8/	0.22	0.478	4.66 13/	5.99 13/	10.62 13/	2.227	2.863	5.076
Sardina en conserva (452 gr.)	Lata	1.0	0.22	0.22	3.21	4.66	8.73	0.706	1.025	1.921
Salmon en conserva (492 gr.)	Lata	1.0	0.20	0.2	3.26 12/	4.48	8.70	0.652	0.896	1.740
Aceite Comestible	Litro	1.0	0.1	0.1	8.36	10.96	25.71	0.836	1.096	2.571
Manteca de Cerdo	Kgrs.	1.0	0.1	0.1	7.02	9.57	23.73	0.702	0.957	2.373
Mantequilla (200 grs.)	PQte	1.0	0.5	0.5	6.08	8.20	13.99	3.040	4.100	6.995
Leche Fresca	Litro	1.0	0.1	0.1	2.08	2.55	3.87	0.208	0.255	0.387
Leche en Polvo (1 libra)	Lata	1.0	0.22	0.22	0.22	13.53	18.31	22.20	2.977	4.028
Arvejas Frescas	Libra	1.0 9/	0.22	0.22	1.44	1.65	2.85	0.316	0.363	0.627
Habas Frescas	Libra	0.6	0.22	0.367	0.96	1.22	1.89	0.352	0.448	0.694
Tomates	Libra	0.86	0.22	0.256	1.38	1.83	4.29	0.353	0.468	1.098
Zanahorias	25 Unid	0.63	0.22 5/	0.349	3.27	4.20	6.94	1.141	1.465	2.422
Papa Negra	Libra	0.82	0.22	0.268	0.97	1.30	2.51	0.260	0.348	0.673
Chuño	Libra	0.82 10/	0.22	0.268	3.26	3.22	5.09	0.874	0.863	1.364
Tunta	Libra	0.82 10/	0.22	0.268	6.64	7.34	9.57	1.780	1.967	2.565
Lentejas	Libra	1.0	0.22	0.22	4.72	8.64 14/	15.02	1.038	1.900	3.304
Mani	Libra	0.73 9/	0.22	0.301	2.68	4.38 13/	11.71	0.807	1.318	3.525
Naranja	C.U	0.63	2.0 6/	3.175	0.30 13/	0.31 13/	1.05 13/	0.953	0.984	3.334
Uva Blanca	Libra	0.68	0.22	0.323	2.77 14/	3.58 14/	4.90 14/	0.895	1.156	1.583
Azucar	kgrs.	1.0	0.1	0.1	2.60	3.09	6.89	0.260	0.309	0.689
Pimienta	Kgrs.	0.85	0.1	0.118	29.32	40.70	64.21	3.342	4.803	7.577
Cominos (entero)	Kgrs.	0.85 11/	0.1	0.118	22.63	40.24	63.77	2.670	4.748	7.525
Aji Colorado	Libra	0.84	0.22	0.262	7.81	7.28	17.23	2.046	1.907	4.514
Aji Amarillo	Libra	0.84	0.22	0.262	8.08	8.75	20.07	2.117	2.292	5.258
Cafe Molido	Kgrs.	1.0 9/	0.1	0.1	8.27	10.80	17.85	0.827	1.080	1.785
Te	Kgrs	1.0 9/	0.1	0.1	1.45 12/	21.87	71.62	1.145	2.187	7.162
Refrescos (330C.C.)	Botell	1.0	0.30 7/	0.3	1.08	1.48	2.41	0.324	0.444	0.723
Cerveza (660C.C.)	Botell	1.0	0.15 7/	0.15	3.78	5.49	7.20	0.567	0.823	1.080
Singani (720C.C.)	Botell	1.0	0.14 7/	0.14	42.33	52.72	85.17	5.926	7.380	11.924
Vino (750C.C.)	Botell	1.0	0.13 7/	0.13	13.68	17.35	30.84	1.778	2.255	4.009
Salsa de Tomate (110 grs.)	Lata	1.0 9/	0.91	0.91	3.84	3.65	7.28	3.494	3.321	6.625
Duraznos al jugo (550 grs.)	Lata	1.0 9/	0.18	0.18	7.22	10.22	20.13	1.300	1.840	3.623
Duraznos Secos (orejon)	Libra	1.0 9/	0.22	0.22	6.80	8.09	16.91	1.496	1.780	3.720
Aceitunas	Libra	0.84	0.22	0.262	8.46	12.15	25.54	2.216	3.183	6.691
Dulces Nl.	Kgrs.	1.0 9/	0.1	0.1	12.86	17.66	28.99	1.286	1.766	2.899
Conserva de piña (550 grs.)	Lata	1.0	0.18	0.18	8.82	10.33	13.45	1.588	1.859	2.421
Polvo para hornear (52 grs.)	Bolsta	1.0	1.92	1.92	2.50	2.99	3.09	4.800	5.741	5.933

1/ Source unless otherwise noted: Instituto Nacional de la Nutricion, Valor Nutritico de los Alimentos, Mexico, 1971

2/ Weight conversion factor divided by edible proportion.

3/ Source: Instituto Nacional de Estadistica, Unpublished data, La Paz, Bolivia, 1975

4/ Price per original unit times conversion factor.

5/ Assumes unit of 25 carrots weighs one pound.

6/ Assumes one orange weighs 50 grams.

7/ Assumes one c.c. weighs one gram.

8/ Assumed to be the same as edible proportion for trucha

9/ USDA, Composition of Foods, Agriculture Handbook No.8, Washington, D.C., 1963

10/ Assumed to be the same as edible proportion for papa negra.

11/ Assumed to be the same as edible proportion for pimiento.

12/ Average of 11 months.

13/ Average of 7 months.

14/ Average of 5 months.

Table A3. Minimum Nutrient Requirements per Day, La Paz, Bolivia 1/

Nutrient	Unit	Less than One Year Old 2/	1 thru 4 Years Old	5 thru 9 Years Old	10 thru 14 Years Old	15 thru 19 Years Old	Male Adult	Female Adult
Food Energy	K Cal.	840	1,365	1,785	2,650	2,780	2,835	2,100
Total Protein	Grams	25.0	27.5	35.0	60.0	75.0	65.0	60.0
Animal Protein	Grams	7.5	11.0	14.0	24.0	30.0	19.5	18.0
Calcium	Mg.	650	450	450	650	550	450	450
Iron	Mg.	4.0	7.5	9.0	13.5	13.0	10.0	10.0
Vitamin A	Mcg.	800	700	900	1,200	1,300	1,300	1,300
Thiamine	Mg.	0.4	0.5	0.7	1.1	1.1	1.1	0.8
Riboflavin	Mg.	0.6	0.8	1.1	1.6	1.9	1.7	1.2
Niacin	Mg.	5.5	9.0	11.8	17.5	18.3	18.7	13.9
Vitamin C	Mg.	15	30	38	52	58	50	50

1/ Source: Division Nacional de Nutricion, Ministerio de Prevision Social y Salud Publica, La Paz, Bolivia, unpublished data.

2/ Assumes children less than one year old are breast fed. The nutrient requirements refer to additional needs of the nursing mothers above and beyond those of other adult females.

Table A4. Nutritional Content of Foods Per 100 Grams Edible Weight

Nutrient	Unit	Fideos 3/	Harino de 1/ Trigo	Arroz 1/	Carne de Res Sin Hueso 2/	Trucha 2/	Sardina en 2/ Conserva	Salmon en 2/ Conserva	Aciete 2/ Comestible	Manteca de 2/ Cerdo
Food Energy	Calories	388	337.91	362.42	297	87	310	170	884	897
Protein	g.	12.8	9.27	6.12	16.0	18.2	20.6	20.7	-	-
Animal Protein	g.	-	-	-	16.0	18.2	20.6	20.7	-	-
Calcium	mg.	31	54.93	9.09	8	12	354	216	-	-
Iron	mg.	1.9	12.46	5.24	2.60	1.00	3.50	1.00	-	-
Vitamin A	mcg.	66.7	-	-	-	-	55.0	40.0	-	-
Thiamine	mg.	0.17	0.20	0.18	0.06	0.05	0.02	0.03	-	-
Riboflavin	mg.	0.09	0.14	0.05	0.16	0.05	0.17	0.16		
Niacin	mg.	2.1	3.12	2.62	3.2	2.8	4.4	7.4	-	-
Vitamin C	mg.	-	0.75	-	-	-	-	-	-	-

1/ Source: Tabla de Composicion de Alimentos Bolivianos, Ministerio de Prevision Social Y Salud Publica, La Paz, Bolivia, 1973.

2/ Source: Valor Nutritivo de los Alimentos, Instituto Nacional de la Nutricion, Mexico, 1971.

3/ Source: Composition of Foods, Agriculture Handbook No.8, U.S. Dept. of Agriculture, Washington, D.C., 1963.

Table A4. Nutritional Content of Foods Per 100 Grams Edible Weight (Cont'd)

Nutrient	Naranja 1/	Uva Blanca 1/	Azucar 2/	Ají 1/ Colorado	Ají 1/ Amarillo	Café 3/ Molido	Té 3/	Refrescos 2/ (330 c.c.)	Cerveza 2/ (660 c.c.)
Food Energy	51.13	63.27	384	328.28	339.15	129	294	46	37
Protein	0.75	0.69	-	9.52	7.37	-	-	-	0.3
Animal Protein	-	-	-	-	-	-	-	-	-
Calcium	24.41	18.63	-	139.69	145.40	179	11	-	-
Iron	.63	0.96	-	16.36	14.62	5.6	1.6	-	0.10
Vitamin A	87.55	-	-	1,482.60	1,203.10	-	-	-	-
Thiamine	0.07	0.04	-	0.24	0.25	-	-	-	0.01
Riboflavin	0.06	0.05	-	0.84	0.71	0.21	0.95	-	0.03
Niacin	0.75	0.44	-	1.90	1.64	30.6	8.9	-	0.6
Vitamin C	55.50	3.60	-	55.00	46.25	-	-	-	-

1/ Source: Tabla de Composicion de Alimentos Bolivianos, Ministerio de Prevision Social Y Salud Publica, La Paz, Bolivia, 1973.

2/ Source: Valor Nutritivo de los Alimentos, Instituto Nacional de la Nutricion, Mexico, 1971.

3/ Source: Composition of Foods, Agriculture Handbook No.8, U.S. Dept. of Agriculture, Washington, D.C., 1963.

Table A4. Nutritional Content of Foods Per 100 Grams Edible Weight (Cont'd)

Nutrient	Mantequilla 2/	Leche Fresca 2/	Leche en Polvo 1/	Arvejas Frescas 1/	Habas 1/ Frescas	Tomates 1/	Zanahorias 1/	Papa Negra 1/	Chuño 1/	Lentejas 1/	Mani 1/
Food Energy	743	58	504.08	58.90	83.72	22.01	34.91	93.48	347.75	348.10	550.72
Protein	1.0	3.4	24.27	6.44	11.38	0.94	0.91	2.71	2.83	24.06	27.14
Animal Protein	1.0	3.4	24.27	-	-	-	-	-	-	-	-
Calcium	19	113	968.00	46.61	29.11	15.53	29.12	4.24	72.50	67.27	70.36
Iron	0.20	0.30	0.68	2.35	3.24	1.15	0.42	1.00	4.36	37.58	4.69
Vitamin A	840.0	27.9	-	387.00	184.00	268.00	2,002.00	-	-	-	-
Thiamine	-	0.05	0.28	0.22	0.23	0.06	0.04	0.08	0.02	0.22	0.62
Riboflavin	0.01	0.10	1.57	0.19	0.36	0.08	0.09	0.06	0.02	0.31	0.19
Niacin	-	0.1	0.48	1.01	0.94	0.55	0.98	1.09	0.92	1.87	9.75
Vitamin C	-	1	7.60	32.60	28.40	16.10	5.00	12.00	-	2.40	1.30

TABLE A4. NUTRITIONAL CONTENT OF FOODS PER 100 GRAMS EDIBLE WEIGHT (Cont'd)

Nutrient	Vino 2/ (750 C.C)	Salsa de tomate (110 grs.) 3/	Duraznos aljugo (550 grs.) 3/	Duraznos Secas 1/ (Orejon)	Aceitunas 2/	Dulces Nl.3/	Conserva de pina 2/ (550 grs)
Food Energy	71	106	48	329.32	233	367	110
Protein	-	2.0	0.2	3.75	1.7	-	0.4
Animal Protein	-	-	-	-	-	-	-
Calcium	-	22	4	36.23	122	12	27
Iron	-	0.8	0.2	2.72	3.00	1.1	1.45
Vitamin A	-	424.2	130.3	109.41	6.7	-	3.3
Thiamine	-	0.09	0.01	0.04	0.03	-	0.04
Riboflavin	-	0.07	0.02	0.03	0.24	-	-
Niacin	-	1.6	0.4	0.52	1.0	-	0.2
Vitamin C	-	15	-	30.90	-	-	4

Appendix B. Results of Cost Minimization Model

The following tables present in greater detail the results discussed earlier. Costs of each of the 21 minimum cost diets appear in Table B1. Each diet is evaluated at prices prevailing in each of the three years.

The quantities of foods in the minimum cost diets appear in Table B2. The shadow prices in their original units (Table B3) and expressed as elasticities (Table B4) are presented for each restriction that was binding in one or more solutions.

The elasticities can be used to impute the total cost of the diet to the various nutrients. The elasticity of cost with respect to nutritional requirement i (E_i) is

$$E_i = \frac{dC}{dN_i} \quad \frac{Ni}{C}$$

Where N_i is the nutritional requirement and C is the cost of the diet. Note that the sum of the shadow prices times their respective right hand sides equals the value of the objective function. 1/

1/ Hadley, G., Linear Programming, Addison-Wesley, Reading, Massachusetts, 1962, p.228-230.

For this particular model,

$$\sum_i \frac{dC}{dN_i} N_i = C$$

Therefore, dividing by C,

$$\sum_i E_i = 1$$

and E_i is the proportion of the cost imputed to nutritional restriction i.

Finally, Table B5 presents the percentage price reductions needed to bring individual foods into the minimum cost diets.

TABLE B1. COSTS OF MINIMUM COST DIETS BY AGE GROUP, 1972, 1973 and 1974

Age Group and Year	Cost Evaluated at 1972 prices	Cost Evaluated at 1973 prices	Cost Evaluated at 1974 prices
	(Pesos per Day)	(Pesos per Day)	(Pesos per Day)
Less than one year old			
1972 minimum cost diet	1.76	2.29	3.91
1973 minimum cost diet	1.78	2.24	3.87
1974 minimum cost diet	1.81	2.25	3.86
One thru four years old			
1972 minimum cost diet	1.64	2.32	4.56
1973 minimum cost diet	1.74	2.30	4.46
1974 minimum cost diet	1.78	2.32	4.43
Five thru nine years old			
1972 minimum cost diet	2.13	2.99	5.93
1973 minimum cost diet	2.18	2.97	5.96
1974 minimum cost diet	2.36	3.06	5.80
Ten thru 14 years old			
1972 minimum cost diet	3.14	4.44	8.82
1973 minimum cost diet	3.21	4.42	8.90
1974 minimum cost diet	3.50	4.57	8.63
Fifteen thru 19 years old			
1972 minimum cost diet	3.56	5.00	9.77
1973 minimum cost diet	3.57	4.96	9.90
1974 minimum cost diet	3.98	5.16	9.51
Male Adult			
1972 minimum cost diet	3.23	4.56	9.11
1973 minimum cost diet	3.29	4.54	9.15
1974 minimum cost diet	3.59	4.68	8.91
Female Adult			
1972 minimum cost diet	2.63	3.72	7.32
1973 minimum cost diet	2.78	3.62	7.20
1974 minimum cost diet	2.84	3.67	7.07
Total (All age groups)			
1972 minimum cost diet	18.09	25.32	49.42
1973 minimum cost diet	18.55	25.05	49.44
1974 minimum cost diet	19.86	25.71	48.21

Table B2. Foods in Minimum Cost Diets by Age Group, 1972, 1973 and 1974

	Wheat Flour	Sardines	Salmon	Milk	Peas	Lima Beans	Carrots	Sugar
	(100 grams)	(100 grams)	(100 grams)	(100 grams)	(100 grams)	(100 grams)	(100 grams)	(100 grams)
Less than one year old								
1972 minimum cost diet	1.59	-	-	4.81	0.23	-	0.29	-
1973 minimum cost diet	1.44	-	-	4.33	1.76	-	-	-
1974 minimum cost diet	1.05	-	-	4.52	1.74	-	-	0.31
One thru four years old								
1972 minimum cost diet	3.35	0.46	-	0.46	1.03	-	0.13	-
1973 minimum cost diet	2.21	0.35	-	1.12	1.68	-	-	0.90
1974 minimum cost diet	1.94	0.25	-	1.72	1.65	-	-	1.13
Five thru nine years old								
1972 minimum cost diet	4.31	0.68	-	-	1.98	-	0.05	-
1973 minimum cost diet	4.02	-	0.68	-	2.26	-	-	0.46
1974 minimum cost diet	2.72	0.21	-	2.87	2.09	-	-	1.33
Ten thru 14 years old								
1972 minimum cost diet	6.30	1.17	-	-	2.72	-	0.04	-
1973 minimum cost diet	6.06	-	1.16	-	2.98	-	-	0.60
1974 minimum cost diet	4.00	0.42	-	4.54	2.71	-	-	1.95
Fifteen thru 19 years old								
1972 minimum cost diet	6.23	1.46	-	-	2.83	0.57	-	-
1973 minimum cost diet	6.88	-	1.45	-	3.04	0.35	-	-
1974 minimum cost diet	4.33	0.28	-	7.13	2.81	-	-	1.69
Male Adult								
1972 minimum cost diet	7.01	0.95	-	-	2.91	-	0.06	-
1973 minimum cost diet	6.64	-	0.94	-	3.26	-	-	0.62
1974 minimum cost diet	4.59	0.20	-	4.52	3.00	-	-	2.04
Female Adult								
1972 minimum cost diet	5.10	0.87	-	-	1.63	-	0.31	-
1973 minimum cost diet	3.14	-	0.37	-	3.27	-	-	1.82
1974 minimum cost diet	2.48	0.64	-	1.42	3.17	-	-	2.07
Total (all age groups)								
1972 minimum cost diet	33.89	5.59	-	5.27	13.33	0.67	0.88	-
1973 minimum cost diet	30.39	0.35	5.10	5.45	16.25	0.35	-	4.40
1974 minimum cost diet	21.11	2.00	-	26.72	17.17	-	-	10.52

Table B3. Shadow Prices of Constraints for 1972, 1973 and 1974 Linear Programs

	Energy	Calcium	Vitamin A	Vitamin C	Animal Protein	Riboflavin	Niacin
Less than 1 years old							
1972 minimum cost diet	0.00042	.00149	.00054	.00040			
1973 minimum cost diet	0.00075	.00172	.00062				
1974 minimum cost diet	0.00179	.00224	.00105				.00959
1 thru 4 years old							
1972 minimum cost diet	0.00040	.00127	0.00054		.00390	.13002	
1973 minimum cost diet	0.00080	.00110	.00062		.01611	.11939	
1974 minimum cost diet	.00179		.00096		.05418	.70292	.01740
5 thru 9 years old							
1972 minimum cost diet	.00050		.00054		.02203	.40310	
1973 minimum cost diet	.00080		.00055		.03137	.55063	
1974 minimum cost diet	.00179		.00096		.05418	.70292	.01740
10 thru 14 years old							
1972 minimum cost diet	.00050		.00054		.02203	.40310	
1973 minimum cost diet	.00080		.00055		.03137	.55063	
1974 minimum cost diet	.00179		.00096		.05418	.70292	.01740
15 thru 19 years old							
1972 minimum cost diet	.00039		.00043		.02180	.66844	
1973 minimum cost diet	.00067		.00040		.03020	.88355	
1974 minimum cost diet	.00179		.00096		.05418	.70292	.01740
Male Adult							
1972 minimum cost diet	.00050		.00054		.02203	.40310	
1973 minimum cost diet	.00080		.00055		.03137	.55063	
1974 minimum cost diet	.00179		.00096		.05418	.70292	.01740
Female Adult							
1972 minimum cost diet	.00050		.00054		.02203	.40310	
1973 minimum cost diet	.00080		.00055		.03137	.55063	
1974 minimum cost diet	.00179		.00096		.05418	.70292	.01740

Table B4. Elasticities 1/ of Constraints for 1972, 1973 and 1974 Linear Programs

	Energy	Animal Protein	Calcium	Vitamin A	Vitamin C	Riboflavin	Niacin
Less than 1 years old							
1972 minimum cost diet	0.201		0.551	0.246	0.003		
1973 minimum cost diet	0.281		0.498	0.221			
1974 minimum cost diet	0.390		0.373	0.218			0.007
1 thru 4 years old							
1972 minimum cost diet	0.332	0.261	0.347	0.230		0.063	
1973 minimum cost diet	0.474	0.077	0.215	0.188		0.041	
1974 minimum cost diet	0.551	0.134		0.151		0.127	0.035
5 thru 9 years old							
1972 minimum cost diet	0.420	0.145		0.229		0.208	
1973 minimum cost diet	0.480	0.148		0.166		0.204	
1974 minimum cost diet	0.551	0.131		0.149		0.133	0.035
10 thru 14 years old							
1972 minimum cost diet	0.422	0.168		0.206		0.205	
1973 minimum cost diet	0.479	0.170		0.149		0.199	
1974 minimum cost diet	0.549	0.151		0.133		0.130	0.035
15 thru 19 years old							
1972 minimum cost diet	0.305	0.184		0.157		0.357	
1973 minimum cost diet	0.375	0.182		0.105		0.338	
1974 minimum cost diet	0.523	0.171		0.131		0.140	0.033
Male Adult							
1972 minimum cost diet	0.440	0.133		0.217		0.212	
1973 minimum cost diet	0.500	0.135		0.156		0.206	
1974 minimum cost diet	0.570	0.119		0.140		0.134	0.036
Female Adult							
1972 minimum cost diet	0.399	0.151		0.267		0.184	
1973 minimum cost diet	0.463	0.156		0.197		0.182	
1974 minimum cost diet	0.531	0.138		0.176		0.119	0.034

1/ Elasticities of cost with respect to the nutritional requirement, calculated by multiplying the shadow price in Table B3 by the indicated nutritional requirement and dividing by the cost of the minimum cost diet.

Table B5 - Percentage Reduction in Price Needed to Bring Foods Into the Minimum Cost Diet[1/]

Food	Diet for less than one year old			Diet for 1 thru 4 years old			Diet for 5 thru 9 years old			Diet for 10 thru 14 years old		
	1972	1973	1974	1972	1973	1974	1972	1973	1974	1972	1973	1974
				(Percent)								
Noodles	21	12	8	22	10	8	15	10	8	15	10	8
Wheat Flour	-	-	-	-	-	-	-	-	-	-	-	-
Rice	45	28	20	46	24	16	35	21	16	35	21	16
Beef	86	87	80	80	72	45	46	55	45	46	55	45
Trout	98	98	97	96	92	85	85	87	85	85	87	85
Sardines	3	15	25	-	-	-	-	1	-	-	1	-
Salmon	36	41	48	29	16	2	4	-	2	4	-	2
Edible Oil	56	39	38	57	35	38	48	35	38	48	35	38
Lard	46	29	32	49	25	32	37	25	32	37	25	32
Butter	74	73	68	74	72	69	72	73	69	72	73	69
Milk	-	-	-	-	-	-	23	12	-	23	12	-
Powdered Milk	44	49	37	38	49	32	52	50	32	52	50	32
Peas	-	-	-	-	-	-	-	-	-	-	-	-
Lima Beans	46	49	40	38	43	14	19	18	14	19	18	14
Tomatoes	48	55	67	48	55	67	46	56	67	46	56	67
Carrots	-	10	7	-	10	15	-	20	15	-	20	15
Potatoes	81	78	72	73	75	66	73	69	66	73	69	66
Chuño	71	55	42	74	58	52	79	66	52	79	66	52
Lentils	76	80	76	74	79	74	71	76	74	71	76	74
Peanuts	58	59	65	58	59	63	57	58	63	57	58	63
Oranges	87	85	93	94	87	93	90	88	93	90	88	93
Grapes	94	93	90	94	93	90	94	93	90	94	93	90
Sugar	38	6	-	41	-	-	27	-	-	27	-	-
Red Chile	43	26	45	41	24	42	36	19	42	36	19	42
Yellow Chile	51	46	58	50	45	57	48	42	57	48	42	57
Coffee	61	62	48	63	70	49	82	80	49	82	80	49
Tea	88	89	91	78	83	81	54	65	81	54	65	81
Soda	94	92	88	94	92	89	93	92	89	93	92	89
Beer	97	97	93	97	96	91	94	94	91	95	94	91
Wine	98	99	97	99	97	97	99	97	97	99	97	97
Ketchup	91	89	89	91	88	90	91	89	90	91	89	90
Peach Juice	93	93	93	93	93	94	92	93	94	92	93	94
Dried Peaches	82	79	79	84	79	80	84	81	80	84	81	80
Olives	87	88	89	87	89	91	90	90	91	90	90	91
Candy	87	83	76	87	82	77	86	83	77	86	83	77
Canned Pineapple	94	93	89	95	93	92	96	95	92	96	95	92

[1/] Percentages are calculated by dividing "reduced cost" by "input cost" in the computer printouts and multiplying by 100.

Table B5 - Percentage Reduction in Price Needed to Bring Foods Into the Minimum Cost Diet (Cont'd)

Food	Diet for 15 thru 19 years old			Diet for Male Adult			Diet for Female Adult		
	1972	1973	1974	1972	1973	1974	1972	1973	1974
				(Percent)					
Noodles	24	17	8	15	10	8	15	10	8
Wheat Flour	-	-	-	-	-	-	-	-	-
Rice	43	29	16	35	21	16	35	21	16
Beef	45	56	45	45	55	45	46	55	45
Trout	85	87	85	85	87	85	85	87	85
Sardines	-	2	-	-	1	-	-	1	-
Salmon	2	-	2	4	-	2	4	-	2
Edible Oil	59	46	38	48	35	38	48	35	38
Lard	51	37	32	37	25	32	37	25	32
Butter	78	79	69	72	73	69	72	73	69
Milk	16	5	-	23	12	-	23	12	-
Powdered Milk	40	39	32	52	50	32	52	50	32
Peas	-	-	-	-	-	-	-	-	-
Lima Beans	-	-	14	19	18	14	19	18	14
Tomatoes	50	59	67	46	56	67	46	56	67
Carrots	18	38	15	-	20	15	--	20	15
Potatoes	71	67	66	73	69	66	73	69	66
Chuño	83	71	52	79	66	52	79	66	52
Lentils	67	73	74	71	75	74	71	76	74
Peanuts	58	59	63	57	58	63	57	58	63
Oranges	90	88	93	90	88	93	90	88	93
Grapes	93	92	90	94	93	90	94	93	90
Sugar	43	17	-	27	-	-	27	-	-
Red Chile	35	18	42	36	19	42	36	19	42
Yellow Chile	47	42	57	48	42	57	48	42	57
Coffee	77	75	49	82	80	49	82	80	49
Tea	35	53	81	54	65	81	54	65	81
Soda	94	93	89	93	92	89	93	92	89
Beer	94	94	91	95	94	91	95	94	91
Wine	98	98	97	98	97	97	98	97	97
Ketchup	92	91	90	91	89	90	91	89	90
Peach Juice	93	94	94	92	93	94	92	93	94
Dried Peaches	87	84	80	84	81	80	84	81	80
Olives	89	88	91	90	90	91	90	90	91
Candy	89	86	77	86	83	77	86	83	77
Canned Pineapple	97	96	92	96	95	92	96	95	92