



International Institute for
Applied Systems Analysis
www.iiasa.ac.at

BRAZIL 2 - Consumption. Analysis of Consumption Patterns by Region and Income Class with Emphasis on Food Categories

Williamson, C. and McCarthy, F.D.

IIASA Working Paper

WP-81-016

February 1981



Williamson, C. and McCarthy, F.D. (1981) BRAZIL 2 - Consumption. Analysis of Consumption Patterns by Region and Income Class with Emphasis on Food Categories. IIASA Working Paper. WP-81-016 Copyright © 1981 by the author(s). <http://pure.iiasa.ac.at/1745/>

Working Papers on work of the International Institute for Applied Systems Analysis receive only limited review. Views or opinions expressed herein do not necessarily represent those of the Institute, its National Member Organizations, or other organizations supporting the work. All rights reserved. Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage. All copies must bear this notice and the full citation on the first page. For other purposes, to republish, to post on servers or to redistribute to lists, permission must be sought by contacting repository@iiasa.ac.at

WORKING PAPER

BRAZIL 2 - CONSUMPTION
ANALYSIS OF CONSUMPTION PATTERNS BY
REGION AND INCOME CLASS WITH EMPHASIS
ON FOOD CATEGORIES

C. Williamson, and F.D. McCarthy

February 1981
WP-81-16

NOT FOR QUOTATION
WITHOUT PERMISSION
OF THE AUTHOR

BRAZIL 2 - CONSUMPTION
ANALYSIS OF CONSUMPTION PATTERNS BY
REGION AND INCOME CLASS WITH EMPHASIS
ON FOOD CATEGORIES

C. Williamson, and F.D. McCarthy

February 1981
WP-81-16

Working Papers are interim reports on work of the International Institute for Applied Systems Analysis and have received only limited review. Views or opinions expressed herein do not necessarily represent those of the Institute or of its National Member Organizations.

INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS
A-2361 Laxenburg, Austria

THE AUTHORS

D. McCARTHY is a research scholar at the International Institute of Applied Systems Analysis, Schloss Laxenburg, 2361 Laxenburg, Austria.

C. WILLIAMSON is a research assistant at the International Institute for Applied Systems Analysis, Schloss Laxenburg, 2361 Laxenburg, Austria. Her home institute is Harvard University, Cambridge, Mass. USA.

FOREWORD

Understanding the nature and dimensions of the world food problem and the policies available to alleviate it has been the focal point of the IIASA Food and Agriculture Program since it began in 1977.

National food systems are highly interdependent, and yet the major policy options exist at the national level. Therefore, to explore these options, it is necessary both to develop policy models for national economies and to link them together by trade and capital transfers. For greater realism the models in this scheme are being kept descriptive, rather than normative. In the end it is proposed to link models to twenty countries, which together account for nearly 80 percent of important agricultural attributes such as areas, production, population, exports, imports and so on.

This work analyses the demand sector for the Brazil Planning Model.-BPM.

Kirit S. Parikh
Acting Program Leader
Food and Agriculture Program

PREFACE

This paper discusses consumption patterns in Brazil. Most of the results are based on the ENDEF National Household Expenditure Survey 1974/75.

It provides estimates of expenditure shares and elasticities for seven broad expenditure classes both at the national and regional level and by income class. Food consumption is then analysed under seventeen separate commodity headings. This is also done at the regional level and by income class.

This analysis also provides the basis for the consumption module of the Brazil general equilibrium planning model - BPM.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the contribution of many people to this work. These include members of the Food and Agriculture Program at IIASA.

In Brazil the following contributed:

Sergio Luiz de Branganca, IBGE
Paulo de Tarso Alfonso de Andre, IBGE
Eduardo Bustelo, UNICEF, Brazilia
Tito Bruno Bandeira Ryff, GIA, Fundacao Getulio Vargas
Luis Paulo Rosenberg, IPEA
Juan Jose Pereira, Comissao Economica Para A America Latina
Joseph Weiss, SCS Ed Marcia, Brazilia
Alberto Veiga, CPE, Ministerio da Agricultura
Mauro Lopes, CPE, Ministerio da Agricultura
Antonio C.C. Campino, CIDADE Universitaria, S.P.
Edmar Bacha, Pontificia Univ. Catolica, R.J.
Fernando Homen de Melo, IPE, USP
Denisard Alves, IPE/USP

FAO, Rome:

Patrick Francois
Nickos Alexandratos
J.P. Hrabovszky
J.P. O'Hagan

Alberto de Portugal, University of Reading, England
Lance Taylor, MIT, USA
Agop Kayayan, UNICEF, Guatamala
Roberto Macedo, University of Cambridge, England
John Wells, University of Cambridge, England
Peter Knight, World Bank, USA

I would like to thank Margaret Milde who prepared the final version.

TABLE OF CONTENTS

1.	INTRODUCTION	1
1.1	Growth of Consumption Expenditure	1
1.2	Demand at the Macro Level	2
1.3	Food Demand	2
2.	CONSUMPTION PATTERNS OVER TIME BY REGION AND INCOME CLASS	11
3.	HOUSEHOLD EXPENDITURE SHARES - BROAD CATEGORIES OF EXPENDITURE	16
4.	HOUSEHOLD EXPENDITURE ELASTICITIES BY BROAD CATEGORIES OF EXPENDITURE	22
5.	FOOD COMMODITIES EXPENDITURE SHARES	26
6.	FOOD COMMODITIES EXPENDITURE ELASTICITIES	34
7.	POLICY ISSUES	42
APPENDICES		
A.	NATIONAL HOUSEHOLD EXPENDITURE SURVEY	46
1.	DESCRIPTION OF THE SURVEY	46

1.1	Responsible Agency, Title and Source	46
1.2	Objective	46
1.3	Reporting Period	46
1.4	Coverage	47
1.5	Design	47
1.6	Organization of Field Work	47
1.7	Method of Investigation	48
2.	TABULATION	48
2.1	Scope of the Tables	48
2.2	Geographical Groups	48
2.3	Unit of Tabulation and Concept of Household	48
2.4	Food Nomenclature	49
B.	AVERAGE EXPENDITURE SHARE AS A WELFARE MEASURE?	50
B1.	BROAD EXPENDITURE CLASSES	50
B2.	FOOD COMMODITY EXPENDITURE	55
C.	REGRESSIONS FOR BROAD EXPENDITURE CATEGORIES	61
D.	ELASTICITIES BY FOOD COMMODITY	64

BRAZIL 2 - CONSUMPTION

C. Williamson, and F.D. McCarthy

1. INTRODUCTION

1.1. Growth of Consumption Expenditure

This paper discusses private household expenditure patterns in Brazil with particular emphasis on food consumption. At the aggregate level annual growth rate of private fuel consumption expenditure over the period 1965 to 1977 has averaged 8.3 percent at constant prices. Few countries have achieved a record like this over an extended period. Inevitably such rapid growth has induced rather dramatic changes. These are best understood by trying to disaggregate, at least by region and income class.

There is an extensive literature on income distribution in Brazil particularly during the period of rapid expansion of the sixties and early seventies. These range from the rather critical assessments of scholars such as Bacha and Taylor (1978) Fishlow (1972) and Syvrud (1974) to the less critical views of Langoni (1973) and Fields (1977). Analysis of private

household expenditure provides another input to this debate. In particular caloric intake is one possible measure that may be used to assess whether low income groups are better off, in absolute terms. Here again one is faced with aggregation difficulties so that significant differences can only be identified by consideration of regional and income differences.

1.2. Demand at the Macro Level

At the macro level the principal factors effecting demand are population growth, per capita income and increasing urbanization. During the period 1960-70 the average population growth rate for Brazil has been close to 2.9 percent per year. Regionally this varied from 5.6 percent for center-west region to 2.4 percent for the relatively depressed northeast.

The pace of urbanization has followed along the lines of a rapidly industrialising economy. The percentage of population living in rural area in 1940 was 69 percent. This had fallen to 44 percent by 1970 and official estimates suggest a figure of 33 percent by 1980. In view of the major differences in urban and rural consumption patterns this imposes a number of features on the changing macro demand situation. These spatial variations are captured to some extent in the analysis by considering seven urban and three rural regions separately.

1.3. Food Demand

There have been a number of studies of food demand in recent years from that of rural population of the State of Sao Paulo by the Fundacao Getulio Vargas in 1963 to the extremely elaborate ENDEF, national study of 1974-75. Some of the results of the regional studies are summarized in Tables 1.1, 1.2 and 1.3. These studies have to be interpreted rather judiciously because of both the limited sample and the method of investigation used. Often they are conducted at a specific time of the year which gives rise to seasonality

TABLE 1.1

ESTADO DE SAO PAULO - ESTIMATED HOUSEHOLD FOOD CONSUMPTION (KGS PER CAPUT PER YEAR)

BRASIL '79

Items	Average	INCOME PER HOUSEHOLD PER YEAR IN Cr \$					
		UP TO 100	100- 249	250- 499	500- 799	800- 1199	1200 OVER
NUMBER OF HOUSEHOLDS	480	4	54	169	113	51	89
AVERAGE SIZE OF HOUSEHOLD	5.9	4.5	4.8	5.2	6.1	7.4	6.6
INCOME	154.4	17.5	41.4	70.3	98.7	129.6	421.3
TOTAL EXPENDITURE	102.1	42.1	65.0	80.1	93.8	105.6	164.8
TOTAL FOOD EXPENDITURE	57.1	32.6	40.4	49.5	54.6	57.9	81.2
CEREALS	155.36	80.00	156.14	139.41	171.35	150.98	165.26
RICE	91.65	47.78	82.23	86.22	87.64	94.99	107.83
WHEAT FLOUR	13.50	0.00	9.26	12.65	13.71	14.91	15.91
MILLET	35.42	0.00	44.97	27.74	54.85	25.11	27.62
OTHER FLOURS	14.79	32.22	19.68	12.80	15.15	15.97	13.90
STARCHY ROOTS	31.67	16.66	21.23	25.02	35.31	35.75	39.80
POTATOES	14.80	1.33	8.29	9.12	17.44	14.92	23.41
CASSAVA	11.07	3.33	8.43	9.53	10.11	15.12	13.31
CASSAVA FLOUR	5.80	12.00	4.51	6.37	7.76	5.71	3.08
SUGAR AND SWEETS	41.51	41.11	40.46	41.81	38.77	42.19	44.29
SUGAR	41.29	40.00	40.46	41.47	38.63	42.05	44.06
SWEETS	0.22	1.11	0.00	0.34	0.14	0.14	0.23
BEANS	33.05	41.33	31.37	31.32	29.53	30.87	41.68
FRUIT (DOZENS)	20.14	5.17	14.27	16.33	14.87	30.03	28.67
BANANAS (DOZENS)	9.87	0.28	6.75	8.94	6.83	12.99	14.46
ORANGES (DOZENS)	10.27	4.89	7.52	7.39	8.04	17.04	14.21
MEAT							
BEEF	7.80	2.67	3.31	6.25	7.06	9.06	12.33
PORK	11.70	3.33	6.36	11.39	11.81	10.23	15.59
POULTRY (NUMBERS)	6.59	1.39	3.60	6.41	6.39	5.78	9.10
SALTED MEAT	1.14	0.00	0.69	0.98	1.04	2.07	1.12
EGGS (DOZENS)	7.31	3.56	4.14	5.29	7.12	6.13	12.86
MILK AND DAIRY PRODUCTS							
FRESH MILK (LITERS)	74.15	38.89	47.77	67.04	74.14	72.97	98.33
MILK POWDER (LITERS)	0.62	0.00	0.41	0.58	0.77	0.35	0.77
CONDENSED MILK (LATAS)	0.23	0.00	0.00	0.05	0.02	0.13	0.90
CHEESE	0.78	0.00	0.16	0.38	0.74	1.08	1.54
FATS AND OILS	15.23	11.95	10.37	12.40	15.99	16.32	14.12
MARGARINE	0.39	0.00	0.10	0.16	0.33	0.63	0.77
LARD	9.32	6.67	5.99	7.34	9.36	11.85	12.18
BACON	5.52	5.28	4.28	4.90	6.30	3.84	1.17
COFFEE	10.42	15.78	8.60	9.59	9.94	10.31	12.95

SOURCE OF DATA: FUNDACAO GETULIO VARGAS - CENTRO DE ESTUDOS AGRICOLAS - ORCAMENTOS FAMILIARES RURAIS, SAO PAULO :
PAGE 263 - QUADRO F

FAO (1979) Review of Food Consumption Surveys, Vol. 2: Africa, Latin America, Near East, Far East.

TABLE 1.2

RIO DE JANEIRO - ESTIMATED HOUSEHOLD FOOD CONSUMPTION (KGS PER CAPUT PER 3 MONTHS)											BRAZIL 1968
Items	Average	INCOME PER HOUSEHOLD PER 3 MONTHS IN Cr \$									
		UP TO 315	315 - 469	470 - 704	705 - 1099	1100 - 1649	1650 - 3519	2520 - 3779	3780 - 5669	5670 and over	
NUMBER OF HOUSEHOLDS	192	9	12	13	45	41	33	22	12	5	
AVERAGE SIZE OF HOUSEHOLD	4.2	2.6	3.7	2.3	4.4	4.4	5.0	4.2	3.7	5.0	
INCOME	406.4	66.1	111.6	240.3	196.4	305.0	394.0	714.2	1254.7	1286.4	
TOTAL EXPENDITURE	348.9	183.2	135.2	284.2	202.1	281.3	344.1	539.6	889.8	964.8	
TOTAL FOOD EXPENDITURE	153.25	41.37	77.87	146.82	107.44	140.49	159.54	248.95	256.51	261.17	
CEREALS AND CEREAL PRODUCTS	22.90	12.61	19.94	23.42	22.39	23.70	22.27	27.82	23.45	24.00	
RICE	10.28	5.09	9.50	12.27	11.41	10.16	10.95	10.85	8.55	7.12	
FLOURS	1.69	0.94	1.28	1.27	1.49	1.81	0.77	2.20	2.33	1.71	
BREAD	8.44	5.50	7.63	6.68	7.72	9.23	7.74	11.48	8.56	11.68	
OTHER BAKERY PRODUCTS	2.49	1.08	1.55	3.20	1.77	2.50	2.81	3.30	4.02	3.49	
STARCHY ROOTS	10.62	4.87	8.11	10.67	9.61	10.28	11.39	15.29	11.77	11.34	
POTATOES	7.60	3.02	5.99	7.63	6.55	7.08	8.04	12.14	8.27	9.34	
OTHER N.E.S.	3.02	1.85	2.12	3.03	3.06	3.20	3.35	3.16	3.50	2.00	
SUGAR AND SWEETS	10.16	6.26	8.62	12.56	9.55	9.82	11.38	11.61	12.60	8.40	
SUGAR	9.28	6.26	8.52	12.20	9.02	9.08	10.34	9.90	9.81	7.32	
SWEETS	0.89	0.00	0.10	0.36	0.53	0.74	1.04	1.71	2.79	1.08	
PULSES	5.83	2.41	6.20	7.84	6.15	6.07	5.94	6.40	4.82	3.46	
VEGETABLES	15.79	5.68	10.06	18.78	12.40	15.24	16.98	22.25	30.57	18.70	
VEGETABLES (KG)	9.26	0.64	2.92	15.07	4.80	7.13	9.53	13.87	26.88	15.64	
VEGETABLES (MOLHO)	4.32	2.26	2.92	5.56	3.42	3.49	5.20	6.84	6.68	3.12	
VEGETABLES (PE)											
FRUIT	6.43	1.69	4.63	5.73	6.91	5.89	6.67	8.02	3.31	5.20	
BANANAS (DZ)	7.10	1.08	9.60	6.88	6.07	5.49	6.82	12.31	8.78	7.80	
CITRUS FRUIT (DZ)	3.10	0.00	0.25	2.36	1.11	2.72	3.03	5.59	9.93	7.24	
OTHER FRUIT											
MEAT	14.66	5.32	6.45	13.93	11.09	13.03	16.05	24.05	26.00	19.58	
BEEF	8.88	3.70	4.68	8.53	6.88	7.84	10.08	14.22	14.09	11.96	
PORK	0.42	0.00	0.00	0.43	0.27	0.33	0.41	1.10	0.95	0.48	
POULTRY	2.36	0.52	0.30	1.42	1.72	1.74	2.56	4.71	5.79	3.18	
OFFALS	0.69	0.02	0.43	1.35	0.39	0.61	0.68	0.87	2.49	0.60	
PROCESSED MEAT	2.30	1.09	1.05	2.21	1.83	2.51	2.34	3.15	2.68	3.35	
EGGS (DZ)	4.74	7.52	1.97	5.03	2.97	4.58	3.46	8.59	8.38	11.96	
FISH	3.34	2.04	1.69	3.16	1.92	2.07	1.95	3.69	5.11	2.25	
MILK AND DAIRY PRODUCTS	15.78	6.08	12.38	16.30	13.96	14.11	10.81	23.84	35.35	32.56	
FRESH MILK (LITERS)	0.30	0.02	0.16	0.04	0.20	0.37	0.59	0.29	0.19	0.00	
MILK POWDER	0.82	0.13	0.07	0.20	0.36	0.50	0.96	1.27	3.54	2.50	
CHEESE											
FATS AND OILS	3.70	2.24	2.57	3.86	3.05	3.20	3.80	5.05	4.44	3.55	
BUTTER	0.11	0.69	2.00	1.15	1.63	1.76	1.92	1.82	2.03	1.76	
MARGARINE	0.61	0.58	0.31	0.86	0.61	0.49	0.51	1.03	0.80	0.66	
OILS	1.37	0.98	0.26	1.85	0.81	0.95	1.38	2.20	1.62	1.14	
CHOCOLATE	0.04	0.00	0.00	0.01	0.01	0.04	0.04	0.05	0.28	0.08	
SPICES	1.36	0.63	1.16	1.72	1.26	1.24	1.60	1.65	1.64	0.98	
BEVERAGES	2.00	1.57	1.20	3.67	1.90	1.60	2.00	3.31	2.24	1.32	
COFFEE	6.26	3.95	0.13	5.90	2.62	5.16	6.71	13.50	10.87	10.87	
NON ALC. DRINKS (BOTTLE)	2.40	3.13	0.00	6.83	1.28	1.04	2.86	5.09	5.61	2.80	
ALCOHOLIC DRINKS (BOTTLE)											

SOURCE OF DATA: FUNDAÇÃO GETULIO VARGAS, CENTRO DE ESTATÍSTICA ECONÔMICA - PESQUISA SOBRE ORÇAMENTOS FAMILIARES: CIDADE DE RIO DE JANEIRO 1967/68 - TOMO IV - VOL. I

FAO (1979) Review of Food Consumption Surveys, Vol. 2: Africa, Latin America, Near East, Far East.

TABLE 1.3

BRAZIL 1973

RIO DE JANEIRO (Conjunto Vertical *) - ESTIMATED HOUSEHOLD FOOD CONSUMPTION (GRS/caput/day)

Items	Average	Income per household (in number of minimum salaries per month ^{1/})					
		Up to 1.00	1.00 - 1.49	1.50 - 2.24	2.25 - 3.49	3.50 - 5.24	5.25 - 7.99
Number of households	214	5	20	34	80	51	24
Average size of households	4.9	3.8	4.6	4.3	4.7	5.1	6.1
Income	6.86	1.91	2.90	4.56	6.42	8.78	10.7
Total expenditure	7.41	4.20	4.75	6.73	7.50	8.46	8.63
Total food expenditure	3.65	2.56	2.55	3.21	3.58	4.33	4.32
Cereals	215	142	224	224	211	216	222
Starchy roots and tubers	41.2	53.2	37.4	36.6	38.9	44.2	41.5
Sugar	69.8	73.9	65.8	64.7	69.2	71.4	75.4
Pulses and nuts	45.6	43.9	50.0	50.5	43.8	47.1	42.3
Pulses	44.6	43.9	50.0	50.5	42.2	45.8	41.4
Nuts	1.0	-	-	-	1.6	1.3	0.9
Vegetables	107	99.6	81.1	108	107	107	125
Fruits	76.1	101	31.1	75.1	73	79.6	94.7
Meat	75.6	51.2	60.6	79.5	72.7	75.7	90.4
Beef	42.2	17.3	21.7	53.1	42.0	37.5	56.6
Pork	11.3	12.7	8.3	9.6	9.8	15.1	11.1
Poultry	21.2	21.2	30.6	16.8	18.4	23.1	22.8
Other	0.9	-	-	-	2.5	-	-
Eggs	14.1	5.8	11.1	13.5	15.5	15.3	11.9
Fish	20.3	16.1	12.3	20.4	21.6	19.7	23.4
Milk	152	187	13.4	176	153	155	138
Fats and oils	32.6	29.1	28.3	34.6	31.1	33.5	36.0
Vegetable origin	24.4	20.9	22.4	26.4	23.5	21.8	30.3
Animal origin	8.2	8.2	5.9	8.2	7.6	11.7	5.7
Other	48.4	43.0	30.3	39.9	40.8	55.7	76.4
Alcoholic beverages	14.1	15.2	9.1	9.5	8.6	16.3	36.3
Non alcoholic beverages	3.9	-	1.0	0.6	1.4	8.6	8.4

* Conjunto Vertical = Multistore houses

^{1/} No information is available on value of minimum salary, however the average monthly household income, in cruzeiros, for the six income groups is as follows: 1053 (average); 218; 400; 588; 905; 1343; 1950.

Source: Instituto Brasileiro de Economia - "Pesquisa sobre Consumo Alimentar" - Vol. I, 1975.

FAO (1979) Review of Food Consumption Surveys, Vol. 2: Africa, Latin America, Near East, Far East.

problems. The techniques to assess quantities may be of limited value. For instance interview techniques can yield quite misleading information about food consumption levels. Similarly if one is interested in extending the analysis to nutrient intake it is desirable to obtain information about intrafamily distribution. Nevertheless some of these surveys do give an indication of consumption patterns by income class.

In Table 1.1 one observes that cereals consumption, and millets in particular tends to fall at upper income levels. One finds a similar pattern for cassava flour. Beans consumption tends to be reasonably constant across income groups. Among the meat categories beef exhibits high income elasticity. The total consumption of fats and oils tends to be constant across income groups but this obscures two opposite effects: consumption of lard rises with incomes while bacon falls.

It is interesting to compare the situation in Rio de Janeiro 1968 to that in 1973 - Tables 1.2 and 1.3 respectively even though the groups are not strictly comparable. Cereal consumption in 1973 seems to have fallen from 90 to around 80 kgs (caput/year) while consumption of starchy roots has increased. Across income groups in the 1968 survey one observes the relatively inelastic demand for cereals and starchy roots while meat consumption is much more elastic. It is also notable that even the poorest groups (up to the 704 Cr \$ category) tends to have relatively high meat consumption by international standards up to around 35 kg/caput/year.

Macro Estimates of Food Intake

At the macro level estimates of consumption are often given by a Food Balance Sheet. This provides a detailed supply and utilisation account for each commodity. The balance for the years 1972-74 is given in Table 1.4. For example one notes that for wheat, domestic production was 1958 thousand tons while

TABLE 1.4
(page 1 of 3)

FOOD BALANCE SHEET

BRAZIL

(INFORMATION AVAILABLE AS AT 30/12/75)

POPULATION 103702
(THOUSANDS)

WEIGHT (MGT) THOUSAND METRIC TONS
NUMBERS(MOS) THOUSAND UNITS

YEAR AVERAGE 1972-74

COMMODITY	PRODUCTION		IM- PORTS	STOCK CHANG- ES	EX- PORTS	DOMES- TIC SUPPLY	DOMESTIC UTILIZATION				PER CAPUT SUPPLY				
	INPUT	OUTPUT					FEED	SEED	MANUFACTURE	WASTE	FOOD	KILO- GRAMS /YEAR	PER DAY		
													FOOD NON USE	NON FOOD USE	GRAMS
GRAND TOTAL												2537	63.2	49.5	
VEGETABLE PRODUCTS												2202	41.5	26.1	
ANIMAL PRODUCTS												335	21.7	23.4	
GRAND TOTAL EXCL ALCOHOL												2495	63.1	49.5	
CEREALS												904	20.5	2.5	
WHEAT		1958	2381			4338	205	4003	130						
WHEAT/FLOUR	4063	2882	9			2891		14	58	2019	27.2	74.5	271	7.2	
WHEAT FLOUR/MACARONI	6	6				5				5	.1	.1	1		
WHEAT FLOUR/BERAC	4	5				5				5	.1	.1			
WHEAT FLOUR/PASTRY	4	4				4				4		.1			
WHEAT/BRAN	4003	1001			35	966	966								
RICE PADDY		6804				6804		352	6112	340					
RICE PADDY/HUSKED	12	10	1			11				11	.1	.3	1		
RICE PADDY/MILLED	6160	4148	6	-33	31	4156				4071	39.3	107.6	392	7.7	
RICE PADDY/BRAN	6100	488			3	485	461		24					.6	
RICE BRAN/CAKE	24	19				19									
BARLEY		18	28			46	5	2	37	2					
BARLEY/MALT	37	30	122	-5		157			157						
MAIZE		15428	2		439	14992	5851	1543	2463	772	363	3.5	9.6	35	
MAIZE/FLOUR	2443	2694	2			2096				21	2075	20.0	54.6	199	
MAIZE/BRAN	2443	244			45	201	196		5					.7	
MAIZE/CAKE	5	3				3									
RYE		18	1			19	3	2	13						
RYE/FLOUR	13	12				12				12	.1	.3	1		
CATS		35	27			62		4	56	2				.1	
CATS/MOLDED CATS	56	26				26				26	.2	.7	3	.1	
SCRAGUM		300		-1	22	279	270	3		6					
CEREALS NES			25		17	8	8								
/INFANT FOOD			18			18				18	.2	.5	2	.1	
/CEREALS PREPARED NES			1			1				1					
ROOTS AND TUBERS													260	2.3	
POTATOES		1606	18		5	1620	332	81	130	1077	10.4	28.4	20	.7	
POTATOES/STARCH	81	11				11				11	.1	.3	1	.1	
SWEET POTATCES		1571				1971	394		197	1380	13.3	36.5	32	.4	
CASSAVA		27034				27034	4252		12267	5407	3108	30.0	82.1	74	
CASSAVA/FLOUR	12144	3336			7	3029	1214		235	1579	15.2	41.7	133	.7	
CASSAVA/STARCH	123	34			9	25			25					.2	
SUGARS AND HONEY													433		
SUGAR CANE		91132				91132	13000		74833	3017	282	2.7	7.4	2	
CANE BEET/SUGAR RAW	72000	6883			2528	4355			4355						
SUGAR RAW/REFINED	4355	4007			-3	23	3986			3986	38.4	105.3	408		
CANE BEET/MOLASSES	72000	2520			729	1791	252		1539						
CANE/SUGAR MUGENTRIF	3530	245				245				245	2.4	6.5	23		
HONEY		5			1	4				4		.1			
PULSES													202	13.2	
BEANS DRY		2381	17		2	2396			147	72	2177	21.0	57.5	194	
BUJAD BEANS DRY		98				98		16		3	79	.8	2.1	.5	
PEAS DRY			5			5					5		.1		
CHICKPEAS			1			1					1				
LENTILS			1			1					1				
NUTS AND OILSEEDS													39	1.6	
BRAZIL NUTS		55	1		36	20				20	.2	.5	2	.2	
CASHEW NUTS		37	2		6	33				33	.3	.9	1	.1	
CHESTNUTS			7			8				8	.1	.2			
ALMONDS			1			1				1					
WALNUTS		1	2			3				3		.1			
HAZELNUTS FILBERTS			1			1				1					
SOYBEANS		5370	10	+10	1849	3521	189	3137	165	30	.3	.8	3	.3	
SOYBEANS/CAKE	3136	2133				460	460							.1	
GROUNDNUTS IN SHELL		642				642		16	633	13					
GROUNDNUTS/SHELLED	633	443				54			230		158	1.5	4.2	23	
GROUNDNUTS SHELLED/CAKE	230	133				108	25	25					1.1	1.8	
COCCONUTS		283				283			16	267	2.6	7.1	10	.9	
COCCONUTS/COPRA		10	2			2			2						
COCCONUTS/DESICLATED		5	1			1									
COPRA/CAKE		2	1			1	1								
PALM KERNELS		233				233			226	7					
PALM KERNELS/CAKE	226	90			50	40	40								
CLIVES		1				1									
CASTOR BEANS		446	18	+77		410		8	292	96	15				
TUNGNUTS		11				11			10	1					
SESAME SEED		3			1	1				1					
CUTTONSEED		1208	14			1222		116	900	206					

TABLE 1.4
(page 2 of 3)

FOOD BALANCE SHEET

BRAZIL

(INFORMATION AVAILABLE AS AT 30/12/75)

POPULATION 103702
(THOUSANDS)

YEAR AVERAGE 1972-74

WEIGHT (WGT) THOUSAND METRIC TONS
NUMBERS(NOS) THOUSAND UNITS

COMMODITY	PRODUCTION		IM- PORTS	STOCK CHANG- ES	EX- PORTS	DOMES- TIC SUPPLY	DOMESTIC UTILIZATION				PER CAPUT SUPPLY						
	INPUT	OUTPUT					FEED	SEED	MANUFACTURE		WASTE	FOOD	KILO- GRAMS /YEAR	PER DAY			
									FOOD USE	NON FOOD USE				GRAMS	CALO RIES NOS	PRO- TEINS GRAMS	FAT GRAMS
COTTONSEED/CAKE	900	405			119	286	286										
LINSEED		12				12		1	10	1							
LINSEED/CAKE	10	6				6											
GILSEEDS NES		54				54			54								
GILSEEDS NES/CAKE	54	30			6	24	24										
/FLOUR MEAL CF GILSEEDS		1															
VEGETABLES														16	8	1	
TOMATOES		912				912					91	821	7.9	21.7	5	.2	.1
ONIONS DRY		310	31			340					34	306	3.0	8.1	3	.1	
GARLIC		33	25			58					3	49	.5	1.3	2	.1	
VEGETABLES FRESH NES		1270				1200		6	6		120	1074	10.4	28.4	6	.4	.1
/VEGETABLES PRESERVE NES	6	5			2	3						3		.1			
/VEGETABLE TEMP PRESERVE			20			20						20	.2	.5			
FRUIT														139	1.9	6	
BANANAS		7034			136	6898			7		1759	5132	49.5	135.6	85	1.1	.1
ORANGES		4984			54	4929			498		498	3932	37.9	103.9	28	.5	.1
/JUICE OF CITRUS FRUIT	498	199			106	94						94	.9	2.5	1		
TANGERINES MANDARINES		274				274					27	246	2.4	6.5	2		
LEMONS LIME S		66				66					7	59	.6	1.6			
GRAPEFRUIT PEEL		30			1	29					5	25	.2	.7			
APPLES		13	125			138					14	125	1.2	3.3	2		
PEARS		40	24			65					6	58	.6	1.5	1		
CHINESE		10				10					1	9	.1	.2			
PEACHES NEL TARINES		134				135					13	121	1.2	3.2	1		
PLUMS			3			3						3		.1			
PLUMS/DRIED PLUMS			4			4						4		.1			
STRAWBERRIES		1				1											
GRAPES		508	4			511			240		51	220	2.1	5.8	4		
GRAPES/RAISINS			3			3						3		.1			
WATERMELONS		482				482					48	434	4.2	11.5	1		
MELONS CANTALOUPE S		21	1			22					2	20	.2	.5			
FIGS		17				17					2	15	.1	.4			
FIGS/DRIED FIGS			1			1						1					
MANGOES		664				664					66	598	5.8	15.8	5		
AVOCADOS		119				119					12	107	1.0	2.8	2		.2
PINEAPPLES		508			9	499					51	448	4.3	11.8	4		
TROPICAL FRUIT FRESH NES		15				15					1	13	.1	.4			
/TROPICAL FRUIT DRIED	7	1				1						1					
FRUIT FRESH NES		197				197			79		20	99	1.0	2.6	1		
/FRUIT PREPARATIONS NES	77	57	4		8	53						53	.5	1.4	1		
/FLOUR OF FRUIT	2	1				1						1					
MEAT AND OFFALS														168	13.0	12.4	
CATTLE(NOS)		10598	67		110	10955			10955								
CATTLE(NOS)/BEEF(WGT)	10555	2139	18		111	2046			376			1670	16.1	44.1	95	6.1	7.7
BEEF/UNDED SALTED		243				85						85	.8	2.2	7	1.5	.1
BEEF/MEAT EXTRACTS		10				2											
BEEF/PREPARETIONS		133				35	11					11	.1	.3	1	.1	
CATTLE(NOS)/OFFALS(WGT)	10955	422			10	412					10	211	2.0	5.6	6	1.0	.1
SHEEP(NOS)		2281	1		5	2277			2277								
SHEEP(NOS)/MUTTON(WGT)	2277	36			1	36						36	.3	.9	2	.1	.2
SHEEP(NOS)/OFFALS(WGT)	2277	7				7						7	.1	.2			
WATS(NOS)		1962				1962			1962								
WATS(NOS)/MEAT(WGT)	1962	22				22						22	.2	.6	1	.1	.1
WATS(NOS)/OFFALS(WGT)	1962	5				5						5		.1			
PIGS(NOS)		10923				10923			10923								
PIGS(NOS)/MEAT(WGT)	10923	732			2	729			2			727	7.0	19.2	38	2.6	3.6
PIGMEAT/SAUSAGES		1				1						1					
PIGMEAT/PREPARATIONS		1				1						1					
PIGS(NOS)/OFFALS(WGT)	10923	60				60						60	.6	1.6	2	.3	.1
CHICKENS(NOS)		339556	571		126	340000			340000								
CHICKENS(NOS)/MEAT(WGT)	340000	340	1			341						341	3.3	9.0	14	1.0	1.1
DUCKS(NOS)		9223				9223			9223								
TURKEYS(NOS)		5225				5225			5225								
/POULTRY MEAT NES(WGT)		28				28						28	.3	.7	1	.1	.1
HUMS(NOS)		322	3			325			325								
EQUINES(NOS)/MEAT(WGT)	325	63			44	19		13				6	.1	.2			
EGGS															15	1.1	1.0
FENS(NOS)/EGGS(WGT)	105767	476				476		48			24	405	3.9	10.7	14	1.1	.9
/POULTRY EGGS NES(WGT)	4310	18				18		2			1	15	.1	.4	1		.1
FISH AND SEAFOOD															12	2.0	.4
FRESHWATER DIADROM WHOLE		73				73			24			49	.5	1.3	1	.1	
FRESHWATER/FROZEN WHOLE	4	4				4						4		.1			
FRESHWATER/CLRED	20	7				7						7	.1	.2			.1
CEREAL FRESH WHOLE		161	15			175			82			94	.9	2.5	1	.2	

FOOD BALANCE SHEET

BRAZIL

(INFORMATION AVAILABLE AS AT 30/12/75)

POPULATION 103702
(THOUSANDS)

YEAR AVERAGE 1972-74

WEIGHT (MGT) THOUSAND METRIC TONS
NUMBERS(NGS) THOUSAND UNITS

COMMODITY	PRODUCTION		IM- PORTS	STOCK CHANG- ES	EX- PORTS	DOMES- TIC SUPPLY	DOMESTIC UTILIZATION				KILO- GRAMS /YEAR	PER CAPUT SUPPLY					
	INPUT	OUTPUT					FEED	SEED	MANUFACTURE			WASTE	FOOD	PER DAY			
									FOOD USE	NON FOOD USE				GRAMS	CALO RIES NOS	PRO- TEINS GRAMS	FAT GRAMS
CERESAL/FROZEN WHOLE	32	32				8					24	.2	.6		.1		
CERESAL/CURED	50	17	33			50					50	.5	1.3	2	.5		
PELAGIC FRESH WHOLE		203				203		106			97	.9	2.6	2	.3		
PELAGIC/CURED	41	14				14					14	.1	.4	1	.1		
PELAGIC/CANNED	61	38	1			38					38	.4	1.0	2	.2		
PELAGIC/PEALS	4	1	1			2	2										
MARINE FRESH WHOLE		76				76					76	.7	2.0	1	.2		
CRUSTACEANS FRESH		87				87		56			31	.3	.8		.1		
CRUSTACEANS/FROZEN	31	17				10	7				10	.1	.3				
CRUSTACEANS/CURED	25	8				8					8	.1	.2		.1		
CRUSTACEANS/CANNED	2	1				1					1						
MOLLUSCS FRESH		4				4					4		.1				
CEPHALOPODS FRESH		1				1					1						
CEPHALOPODS/FROZEN			1			1					1						
/AQUATIC MAMMALS MEAT	1	1				1					1						
/AQUATIC MAMMALS MEALS	4																
MILK														101	5.6	5.2	
CONDENSED/MILK(MGT)	9833	7343				7344		2152	367	4824	46.5	127.5	83	4.2	4.5		
COND MILK/EVAPORATED COND	140	29			1	28				28	.3	.7	1	.1	.1		
COND MILK/DRIED	178	20				20				20	.2	.5	3	.1	.1		
SFE GOATS(INCS)/MILK(MGT)	3096	93				93			5	88	.9	2.3	2	.1	.1		
COND MILK/COND SKIM MILK	1264	1304				1306		730	511	65	.6	1.7	1	.1			
COND SKIM MILK/DRIED	653	56	15			72				72	.7	1.9	7	.7			
COND MILK/CHEESE	470	45	1			49				49	.5	1.3	5	.3	.4		
COND SKIM MILK/CHEESE	37	3				3				3		.1					
OILS AND FATS														198	22.4		
VEGETABLE OILS AND FATS														159	18.0		
RICE BRAN/OIL	24	4				4				4		.1	1		.1		
PALEO/OIL	5	2				2				2		.1			.1		
SOYBEANS/OIL	3136	505	1	60	72	374				374	3.6	9.9	87	9.9			
GROUNDNUTS SHELLS/OIL	230	87			51	37				37	.4	1.0	9	1.0			
COCONUT LIL	2	1	2			3				3		.1	1		.1		
PALM KERNELS/OIL		95			2	93				93	.9	2.5	22	2.5			
/PALM OIL		6	1			7				7	.1	.2	2	.2			
OLIVES/OIL			15			15				15	.1	.4	3	.4			
CASTOR BEANS/OIL	252	163			139	24		24		24							
TUNGNUTS/OIL	10	2				2		2		2							
CUTTUNSEED/OIL	500	144			1	142				142	1.4	3.8	33	3.8			
LINSEED/OIL	10	3	6			10				10							
/VEGETABLE OILS RES		14				13				3							
COCOA BEANS/BITTER	69	31			27	4				4		.1	1		.1		
ANIMAL OILS AND FATS														39	4.4		
(CATTLE(NGS)/FAT(MGT)	10555	66				66		66		66							
/TALLOW		89	52			141			141								
SHEEP(NGS)/FAT(MGT)	2277	1				1				1							
GOATS(NGS)/FAT(MGT)	1962	1				1				1							
PIGS(NGS)/FAT(MGT)	10523	393				393		143	251								
PIG FAT/LARD	143	114	4			118				118	1.1	3.1	28	3.1			
PIG MILK/BUTTER	1364	57	3		1	59				59	.6	1.6	11	1.6			
/AQUATIC MAMMALS OIL		1	1			2			2								
SPICES																	
PEPPER WHITE BLACK		23		4	15	5			1	4		.1					
CINNAMON CANELLA			1			1				1							
ANISE GALIANG FENNEL			1			1				1							
STIMULANTS														8	1.2		
COFFEE GREEN		1371	1	-218	936	655		120	12	523	5.0	13.8	6	.9			
/COFFEE EXTRACTS	120	40			36	3				3		.1					
COCOA BEANS		194			105	101		89	2	11							
COCOA BEANS/POWDER	69	31			26	4				4		.1					
COCOA BEANS/PASTE	89	71			2	69		69									
TEA		6			5	2				1							
MATE		175			18	86				81	.8	2.1	1	.2			
HOPS			2			2		2									
ALCOHOLIC BEVERAGES														42	.1		
BARLEY MALT/BEEF	157	1043			2	1042				1042	10.6	27.5	10	.1			
GRAPES/WINE	240	169	4		1	175		2		171	1.7	4.5	3				
VERMOUTH WINE APERITIFS	2	2				2				2							
/DISTILLED ALCOHOL		662	7		6	663		293		370	3.6	9.8	29				

imports were 2382 thousands tons. After allowing for various conversion factors and losses this resulted in flour consumption of 27.2 kgs. per caput per year.

The table also summarises the overall calorie situation and estimates a national average of 2537 cal/caput/day while the protein intake is put at 63.2 grams per day. Of this latter figure about one third comes from animal sources the remainder coming from vegetable sources. The Food Balance Sheet is primarily a production oriented measure but it does afford some check on the quantities obtained by demand estimate approaches.

The rise of aggregate demand in Brazil since 1964 has been about 8.6 percent annually. This may be decomposed into an average per capita annual increase of around 5.6 and a population growth rate close to 3 percent.

The composition of this demand has changed due to structural change - increasing urbanisation and a smaller share of the workforce in the agriculture sector.

At the macro level, as measured by Food Balance Sheet for example, the average supply of food is adequate. However certain classes and regions have done better than others so that inevitably one must obtain disaggregated estimates to analyse this. A few surveys of limited coverage have highlighted the important role of income and regional location in determining behavior as consumers.

This study seeks to address some of these issues by using the comprehensive ENDEF survey of 1974/75.

Section 2 discusses general features of consumption patterns. Sections 3 and 4 discuss consumption by broad expenditure categories, first by shares (3) and then by elasticity estimates (4).

Sections 5 and 6 analyse food commodity expenditures first in terms of shares and then by elasticity measures.

Section 7 provides a brief discussion on some of the policy issues.

2. CONSUMPTION PATTERNS OVER TIME BY REGION AND INCOME CLASS

Consumption patterns at the National level tend to mask many effects. These effects may be considered under a number of headings but typically one should at least consider temporal, income and regional variations.

- Temporal Effects

Consumption patterns change over time due to a wide variety of factors. At one level there are the rather evident effects due to changes in income and production structure. As income increases the food consumption patterns for most populations tend to reflect higher shares of processed foods and higher levels of animal protein. If production structure in agriculture changes from staples to cash crops this will effect the diet. Similarly increasing urbanization changes food demand patterns towards more 'convenience foods'.

At another level there are more subtle effects which may be classified under the general heading of taste changes. These includes a whole plethora of phenomena that are often attributed to psychological effects, snob values, advertising. In a country such as Brazil undergoing rapid change such phenomena inevitably play a major role. Some of these effects may be analysed by introducing quality indices but inevitably this is not a very satisfactory approach.

- Income

If one discounts temporal and regional effects then there is still a strong variation across income classes. Total expenditure on food tends to rise with income but not as rapidly as caloric intake. There are two major effects; one is the substitution within goods the other is between foods. The poor may be willing to purchase rice from a bulk container with little processing while the rich may prefer the highly polished variety wrapped in an expensive package. The rich may opt for less cassava but more fillet steak.

- Region

Brazil is a highly diverse country with a mixture of many traditions and living patterns. Regions have also developed economically in a great variety of ways so consequently consumption patterns exhibit strong spatial variation.

Choice of Variable for Analysis

Inevitably one is faced with the problem of choosing an appropriate model. This largely reflects the objective of the study and the data available. This particular study is concerned with the national situation and is also being used as part of an overall general equilibrium planning model. The major data source available with broad national coverage is based on the ENDEF - National Household Expenditure survey conducted over the period 1974-1975. A number of studies with more limited coverage have also been reported in recent years see for example, Campino (1978) and Ward and Sanders (1980).

The ENDEF survey, used in this work has been discussed and used by a number of authors. These include Campino (1979) and Knight (1979).

ENDEF Survey (Estudo Nacional da Despesa Familiar (1974-75))

This survey was conducted during the period August 18th 1974 to August 15th 1975 by Fundacao Instituto Brasileiro de Geografia e Estatistica (IBGE). Particular emphasis was placed on food and nutrition data but many other socio-economic variables were also included such as family size, expenditure, prices. The survey covered 55,000 families in seven zones.

The present analysis is largely based on the tables prepared by IBGE from the survey results. Some further details of the survey are given in Appendix A.

Categories of Expenditure

Twenty four expenditure categories were analysed. These are listed in Table 2.1 where the sub-components are identified. This provides a mapping from the ENDEF categories to the classification chosen. The categories, have seventeen food commodities, tobacco and six non agriculture groups. These groups are chosen to match the requirements for the Brazil Planning Model (BPM).

Data Classification

In order to simplify the analysis and reduce the computation needs, ten representative sub regions were selected from the twenty two available. These are given in Table 2.2. It is seen that these represent 79% of the rural and 66% of the urban population. This data was then analysed for the twenty four categories listed above by expenditure class.

The ENDEF data tabulations on total expenditure and food expenditure are broken down by 9 expenditure classes for each region. Unfortunately the class breakdowns for the two sets of data are not the same, the former being based on "global" expenditure per family and the latter on "current" or "ordinary"

TABLE 2.1. Categories of Expenditure

-
1. Wheat - bread, biscuits, flour, other derived products
 2. Rice
 3. Maize
 4. Roots - potatoes, cassava, cassava flour, other roots
 5. Sugar - refined sugar, other sugars + sweets
 6. Pulses - beans, other pulses
 7. Vegetables
 8. Fruits + nuts
 9. Bovine + ovine meats - beef, offals, canned meats, other meats
 10. Pork - meat and pork fat
 11. Poultry + eggs
 12. Fish - fresh, salted and canned fish
 13. Dairy - fresh + canned milk, cheese + other derived products, butter
 14. Vegetable oil - oils, + margarine
 15. Coffee, cocoa, tea
 16. Beverages - alcoholic + carbonated
 17. Condiments
 18. Tobacco
 19. Manufacturing - clothing articles, shoes, furniture, home appliances, home cleaning items, medicines + treatments, books (school + other), school uniforms, journals + newspapers, recreation articles, automobiles + other vehicles, 1/2 "diverse expenditures"
 20. Services - clothing services, rent + taxes (for home), 1/2 "maintenance of home", restaurants, hygiene + personal care, doctors + dentists, hospitalization + surgery, other health expenses, education costs, 1/2 "diverse expenditures"
 21. Transportation services - 1/2 "costs of own vehicles" urban transport, long distance travel
 22. Energy - 1/2 "home maintenance" 1/2 "costs of own vehicle"
 23. Investment - diminution of indebtedness, own home, apartment, land, estate, ranch, home improvements, credits, other investments
 24. Taxes - income taxes, worker contributions, pensions
-

TABLE 2.2- Population of Selected Subregions¹.
(million inhabitants)

	1975		% of Total 1975	
	Population	Rural Population	Population	Rural Population
<u>RURAL</u>				
Region III - Rural South	10.23	23.8		
Region IV - Rural Southeast	6.01	13.9		
Region V - Rural Northeast	17.74	41.2		
	33.98	78.9		
Total Rural Population	43.05	100.0		
<u>URBAN</u>				
Region I - Rio de Janeiro	8.33	13.0		
Region II - Sao Paulo	10.04	15.7		
Region III - Urban non-metropolitan ² .	6.18	9.6		
Region IV - Urban non-metropolitan ³ .	6.24	9.7		
Region V - Urban non-metropolitan ⁴ .	9.42	14.7		
Region VI - Salvador	1.40	2.2		
Region VII - Belem	.80	1.3		
	42.41	66.2		
Total Urban Population	64.09	100.0		
Total 1975 Brazilian Population	107.14			
% Rural	40.2			
% Urban	59.8			

1. Population figures are taken from Anuario Estatístico do Brasil, 1978, pp. 81-83
 2. All urban areas other than Curitiba and Porto Alegre.
 3. All urban areas other than Belo Horizonte.
 4. All urban areas other than Fortaleza, Recife, and Salvador

expenditure (global expenditure minus savings and investment). This results in significant differences near the upper end of the income distribution, where savings and investment become a nonnegligible part of global expenditure. A two-stage process was used to adjust for this.

Adjustment:

First the elasticity of expenditure on a particular item with respect to total food expenditure was estimated, and then it was multiplied by the elasticity of food expenditure with respect to global expenditure was estimated.

3. HOUSEHOLD EXPENDITURE SHARES - BROAD CATEGORIES OF EXPENDITURE

Expenditure by seven categories are given in Table 3.1 at the national level and also for urban and rural sectors. It is seen that the share of food at 24 percent puts Brazil close to most of the industrialized countries which typically at highest income levels drop to around 20 percent. The share on "investment" (see Table 2.1 for composition) at 20 percent is primarily saving but also includes home improvement and credit payments. It is typical of industrialised countries while "taxes" at 5.3 percent includes income taxes and worker contributions. However Brazil generates significant government revenues through value added and other indirect taxes.

Urban - Rural Differences

There are vast urban-rural differences. The average annual per capita urban global expenditure at 7,900 \$Cr. is more than three times higher than the corresponding rural figure at 2,366 \$Cr. The breakdown by category follows the typical patterns observed in international comparison studies. In urban areas housing (as reflected in the services category) and transportation are more expensive. In rural areas a much bigger share of expenditure at 45 percent goes to food - than in urban areas at close to twenty percent.

TABLE 3.1-BREAKDOWN OF TOTAL EXPENDITURE IN BRAZIL, 1974-1975

A. Percentage Breakdown of Total Consumption								(in percent)	
	<u>Food</u> ¹	<u>Manufacturing</u>	<u>Services</u>	<u>Transportation</u>	<u>Energy</u>	<u>Taxes</u>	<u>Investment</u>	<u>Total</u>	
Total Brazil ²	24.07	18.81	24.90	3.16	3.42	5.32	20.34	100.00	
Urban	19.79	18.69	26.68	3.35	3.64	5.92	21.93	100.00	
Rural	45.31	19.40	16.00	2.19	2.28	2.38	12.44	100.00	
B. Value of Total Consumption								(in Cr'000,000,000)	
								<u>Total</u>	1975 Population (million) <u>Persons</u>
Total Brazil	146.36	114.38	151.40	19.19	20.77	32.37	123.68	608.15	107.14
Urban	100.21	94.62	135.10	16.96	18.45	29.95	111.01	506.30	64.09
Rural	46.15	19.76	16.30	2.23	2.32	2.42	12.67	101.85	43.05
C. Average per Capita Expenditure								(in Cr'000,000,000)	
								<u>Average per capita Global Expenditure</u>	
Total Brazil	1,366	1,068	1,413	179	194	302	1,154	5,676	
Urban	1,564	1,476	2,108	265	288	467	1,732	7,900	
Rural	1,072	459	379	52	54	56	294	294	

1. Including tobacco

2. All figures are aggregated from basic ENDEF data published in IBGE, Estudo Nacional da Despesa Dados Preliminares 6 Volumes, Rio de Janeiro, 1978.

3. All figures denominated in cruzieros are evaluated in August 1974 cruzieros.

Thus the cost of living index for rural areas is strongly influenced by food prices while rents and transportation costs (and energy) exert a relatively bigger influence in urban areas. Most of the household savings, 83 percent, are generated in the urban area but it is possible that some agricultural investment such as land improvement may not be adequately represented here. These are highly aggregated estimates. To gain a little more insight one should look at some disaggregated estimates.

Regional Dissagregation

Allocation of expenditure in different regions is given in Table 3.2. The regional breakdown highlights the differences between expenditure patterns in the northeast and in smaller towns in general from those in other regions or in larger cities. In general, as areas become more urbanized the share of total expenditure going to food falls and that going to services rises. The expenditure share on transportation, energy and taxes is higher in urbanized areas as well, resulting in a reduced share of the total for savings and investment. These differences are evident in a comparison of different regions with similar per capita expenditure levels, such as the rural south and the nonmetropolitan urban northeast.

Income Variations

The allocation of expenditure shows strong variation across income classes. The pattern is summarized in Table 3.3.

The most obvious changes appear in the share of total expenditure going to food, rising from a low of 12.6% for the highest urban income group (20% of the urban population) to 64.8% for the lowest rural income group (60% of the rural population). This does not imply that the poor spend more on food in absolute terms; on the contrary, the 12.6% figure for the upper income class translates to 2,685 \$Cr. per capita per year compared with 725 \$CR. per capita for the lowest rural

TABLE 3.2 - SPATIAL VARIATIONS - ALLOCATION
OF TOTAL PRIVATE EXPENDITURE IN SEVEN URBAN
AND THREE RURAL REGIONS 1974 - 1975

	Food ¹	Manufacturing	Services	Transportation	Energy	Taxes	Savings and Investment	Total	Average per Capital Global Expenditure	Population million Inhabitants
URBAN:										
Rio de Janeiro	19.4	16.9	29.8	4.0	3.8	7.3	18.8	100.0	9,503	8.33
Sao Paulo	17.4	17.4	26.9	3.8	3.7	6.4	24.4	100.0	10,902	10.04
Nonmet Urban										
South	26.4	21.7	23.8	2.4	3.6	4.6	17.5	100.0	5,919	6.18
Nonmet Urban										
Southeast	24.9	23.3	22.6	2.5	3.6	4.3	18.8	100.0	5,568	6.24
Nonmet Urban										
Northeast	28.7	22.6	19.5	2.5	3.3	4.5	10.5	100.0	3,028	9.42
Salvador	19.2	18.8	27.1	3.6	3.7	5.9	21.7	100.0	7,406	1.40
Belera	31.2	17.5	27.6	2.9	4.6	5.7	10.5	100.0	4,788	.80
RURAL:										
South	41.3	20.1	18.2	2.5	2.3	2.0	13.6	100.0	3,343	10.23
Southeast	44.0	20.2	15.1	2.4	2.4	3.3	12.6	100.0	2,474	6.01
Northeast	56.8	18.3	13.4	1.5	1.9	2.1	6.0	100.0	1,416	17.74

1. Including tobacco

TABLE 3.3 - INCOME VARIATION - ALLOCATION OF
TOTAL PRIVATE EXPENDITURE BY INCOME CLASS
1974-75

		Food	Manufacturing	Services	Transportation	Energy	Taxes	Savings and Investment	Total	Average per Capital Global Expenditure	Population million Inhabitants
SEVEN											
URBAN											
AREAS:											
Lowest	20%	48.4	14.6	27.4	2.1	2.6	2.9	2.0	100.0	1,540	
Lowest	40%	44.3	16.5	27.6	2.7	2.6	3.7	2.6	100.0	2,125	
Middle	40%	28.8	20.2	27.6	3.6	3.3	5.3	11.2	100.0	5,750	
Upper	20%	12.6	18.9	24.7	3.4	4.2	6.8	29.4	100.0	21,313	
THREE											
RURAL											
REGIONS:											
Lower	60%	64.8	15.1	15.2	1.0	1.5	1.0	1.4	100.0	1,119	
Middle	30%	55.0	19.3	16.3	1.5	1.5	1.7	4.7	100.0	2,116	
UPPER	10%	28.2	22.7	16.0	3.5	3.4	3.7	22.5	100.0	6,391	

income group. In comparison, of the total expenditure of the poorest 20% in urban areas, 48.4% or 745 \$Cr. per capita per year goes to food, a per capita amount very close to that for the poorest 60% in rural areas.

Thus in Brazil the share of expenditure on food by the urban upper income group is similar to that found among the richest country of the world while the rural low income share at 65% is typical of the very poorest countries.

The falling share going to food as incomes rise is counteracted by rising shares going to manufacturing, transportation, energy, taxes, and -- most of all -- saving and investment. About two-thirds of all private savings and investment in Brazil is done by the richest 20% of the urban population (12% of the entire Brazilian population). Although the savings rate of the richest 10% of the selected rural population is high (22.5%), their contribution in absolute terms to total savings is much less because their average per capita incomes (6,391 \$Cr.) are much lower, lower in fact than the average per capita income for all income groups in the seven urban areas taken together (7,900 \$Cr.).

The rising share going to taxes as incomes rise indicates the presence of some progressivity in the tax system, but at 6.8% the average rate paid by the richest urban income group is still quite small. The share going to transportation services does not change dramatically as incomes rise. However the proportion spent on one's own vehicle rises substantially while that spent on public transport falls. Similarly, although the share of expenditure going to services is almost constant across income classes, a further disaggregation reveals that the more basic services such as home rental and maintenance and the provision of food outside of the home are proportionately more important to the poorer groups, while medical, educational and recreational services are proportionately more important for the wealthier groups. Within the category of manufactured products, the rise in budget share as incomes rise results

primarily from an increase in expenditure on automobiles, with some increase occurring also in the clothing share until incomes reach a middle level where the share begins to decline.

Budget Share as a Welfare Measure?

In the previous section the allocation of expenditure between broad categories of expenditure was considered. One could also consider the share of expenditure by a family as a measure of welfare. In particular the share going to food is one indication of the purchasing power of incomes. Thus if family i , belonging to class k , spends a share S_{ik} of its income on food then \bar{S}_k is the average of these shares for the class k where

$$\bar{S}_k = \frac{1}{N_k} \sum_{i=1}^{N_k} S_{ik}$$

N_k is the number of families in class k . For example if the class chosen encompasses all families in the urban area then \bar{S}_k equals 34 percent (see Appendix B) rather than the 20 percent obtained by the method used in the previous section. Details are given in Appendix B.

4. HOUSEHOLD EXPENDITURE ELASTICITIES BY BROAD CATEGORIES OF EXPENDITURE

The elasticity estimates for broad categories of expenditure classes are given in Table 4.1.

These are computed with respect to per capita income ("global" expenditure) for the seven urban and three rural regions taken together and individually. It also shows similar elasticities for different urban and rural income classes. All estimates reported in Tables 4.1 and 4.2 were

TABLE 4.1.-EXPENDITURE ELASTICITIES FOR BROAD
CATEGORIES OF EXPENDITURE FOR URBAN AND
RURAL BRAZIL, (1974 - 1975)

(standard errors in parentheses)

	Food	Tobacco	Manufacturing	Services	Transportation	Energy	Taxes	Savings and Investment
<u>URBAN: 7 Regions</u>	.487 (.016)	.477 (.032)	1.12 (.020)	.908 (.011)	1.15 (.049)	1.22 (.026)	1.27 (.030)	2.08 (.348)
Rio de Janeiro	.489 (.039)	.359 (.060)	1.09 (.049)	.958 (.018)	.838 (.061)	1.19 (.055)	1.27 (.032)	2.02 (.125)
Sao Paulo	.446 (.043)	.354 (.077)	1.04 (.051)	.880 (.020)	.945 (.068)	1.23 (.088)	1.10 (.029)	3.01 (.119)
Nonmet Urban South	.442 (.033)	.614 (.060)	1.18 (.054)	.882 (.050)	1.53 (.102)	1.26 (.060)	1.22 (.053)	2.15 (.103)
Nonmet Urban Northeast	.571 (.038)	.613 (.075)	1.26 (.046)	.949 (.022)	1.57 (.062)	1.21 (.076)	1.66 (.040)	2.08 (.059)
Salvador	.492 (.034)	.421 (.045)	1.13 (.048)	.903 (.013)	1.00 (.043)	1.13 (.036)	1.15 (.030)	2.37 (.079)
Belem	.532 (.048)	.428 (.051)	1.19 (.045)	1.03 (.034)	.679 (.072)	1.36 (.087)	1.44 (.053)	2.25 (.137)
<u>RURAL: 3 Regions</u>	.533 (.040)	.769 (.044)	1.30 (.045)	.871 (.040)	1.70 (.054)	1.41 (.092)	1.80 (.093)	2.65 (.102)
South	.438 (.048)	.711 (.064)	1.28 (.086)	.816 (.057)	1.64 (.124)	1.44 (.117)	1.54 (.063)	2.64 (.198)
Southeast	.520 (.067)	.910 (.096)	1.26 (.083)	.932 (.058)	1.74 (.096)	1.69 (.148)	1.91 (.135)	2.50 (.217)
Northeast	.635 (.076)	.701 (.049)	1.36 (.070)	.871 (.088)	1.71 (.061)	1.14 (.162)	1.97 (.216)	2.80 (.112)

TABLE 4.2 - EXPENDITURE ELASTICITIES FOR BROAD
 CATEGORIES OF EXPENDITURE FOR URBAN AND RURAL BRAZIL
 (1974-1975)
 (standard errors in parentheses)

	Food	Tobacco	Manufacturing	Services	Transportation	Energy	Taxes	Savings and Investment
<u>SEVEN URBAN AREAS:</u>								
Lowest 20%	1.01 (.050)	.943 (.239)	1.53 (.060)	.549 (.076)	2.14 (.225)	.641 (.105)	2.16 (.268)	2.15 (.273)
Lower 40%	.829 (.033)	1.15 (.078)	1.51 (.026)	.784 (.041)	1.72 (.111)	.895 (.060)	1.77 (.097)	2.12 (.144)
Middle 40%	.386 (.013)	.416 (.036)	1.07 (.022)	.948 (.016)	1.24 (.096)	1.38 (.053)	1.27 (.063)	2.26 (.095)
Upper 20%	.218 (.021)	.153 (.047)	.875 (.037)	.817 (.043)	.612 (.064)	.849 (.066)	1.08 (.057)	1.63 (.023)
<u>THREE RURAL REGIONS:</u>								
Lower 60%	.987 (.034)	.787 (.110)	1.63 (.055)	.382 (.060)	1.66 (.185)	.389 (.056)	1.05 (.287)	2.95 (.390)
Upper 40%	.366 (.025)	.648 (.066)	1.12 (.055)	.920 (.061)	1.67 (.099)	1.74 (.103)	1.69 (.091)	2.36 (.083)
Upper 10%	.265 (.023)	.395 (.086)	.909 (.106)	.623 (.099)	1.28 (.243)	1.46 (.250)	1.43 (.110)	1.95 (.081)

made using the log-log form of the demand equation*

$$\ln X_i = \ln \alpha_i + \beta_i \ln X$$

where X_i = expenditure on category i

X = total expenditure

β_i = elasticity of X_i with respect to X

For estimates which included different regions dummy intercept variables were included. In addition each data point used in each estimation was weighted by the square root of the number of observations (in this case the represented population) to correct for heteroscedasticity.

Elasticities for all categories of expenditure except services are higher in rural than in urban areas. In all regions food is a "necessity" (elasticity less than one) and manufactures are luxuries (elasticity greater than one). Services fall between these two, with elasticities generally slightly less than one. Transportation services are "necessities" only in large urban areas, and energy elasticities are greater than one in all cases because of the rapid rise in car ownership and housing expenditures as incomes grow. Savings and investment are particularly sensitive to income levels, with elasticities of between two and three everywhere. Taxes are progressive (the percentage take rising with incomes) but are more progressive in the northeast and southeast than elsewhere.

The income-specific elasticity estimates in Table 4.2 indicate the differential impact by income class on total demand that income generation policies can have. Increasing the incomes of the poorest persons in Brazil will lead to large marginal increases in their demand for food, manufactured items, and transportation services. The elasticity of food

*The log-log quadratic form

$$\ln X_i = \ln \alpha_i + \beta_i \ln X + \gamma_i (\ln X)^2$$

was estimated as well because it allows elasticities to change with incomes. The only commodities for which its fit was slightly better than the log-log form were food and tobacco (see Appendix C for aggregated urban/rural estimates).

expenditure among poor groups is very high, close to one. This parameter is particularly important for analysing the impact of income generation policies.* Income generation among middle income persons will have quite different results, stimulating the demand for energy and services more than an equivalent stimulus among lower income groups.** It is interesting to note that the elasticity for savings and investment is the highest among the poorest rural class and falls with income in both urban and rural areas; furthermore, the elasticity for tax is highest among the poor urban sector and falls at the highest income levels in both urban and rural areas.

5. FOOD COMMODITIES EXPENDITURE SHARES

The analysis in the previous sectors centered on broad aggregated of consumer expenditure. In this section expenditure on individual food commodities*** is analysed and elasticities are estimated for urban and rural areas, food expenditure patterns are then considered by region and income class. This level of disaggregation is essential to analyse policy interventions at the regional level for specific commodities.

A. Total Private Food Expenditure

The 1974-75 ENDEF breakdown of total private consumption of seventeen categories of food in absolute, percentage and per capita terms is shown in Table 5.1. The total value of food expenditure in the 1974-75 survey period was 137.52 billion cruzieros (August 1974 cruzieros). About one quarter of which was spent on staple foods and just over two-fifths was spent on sources of animal protein such as meat and milk.

*The calorie - elasticity estimates calculated by Knight et al (1979), are significantly lower than these food expenditure elasticity estimates.

** The marginal budget share depends on both the elasticity and the average budget share, both of which are higher for the energy and service sectors among middle income than among lower income groups.

*** Throughout this analysis "expenditure" refers to "monetary and non-monetary expenditure" and this includes home-produced and consumed commodities as well as purchased one.

TABLE 5.1. -ALLOCATION OF TOTAL PRIVATE FOOD
EXPENDITURE IN BRAZIL, 1974 - 1975

	Value of Total Food Consumption* (in Cr'000,000,000)			Percentage Breakdown of Total Food Consumption (in %)			Average Per Capita Expenditure (in Cr)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
	1. Wheat	10.01	2.91	12.92	10.78	6.51	9.39	156.2	67.6
2. Rice	8.18	4.94	13.12	8.81	11.05	9.54	127.6	114.8	122.5
3. Maize	.73	1.54	2.27	.79	3.45	1.65	11.4	35.8	21.2
Cereals	<u>18.92</u>	<u>9.39</u>	<u>28.31</u>	<u>20.38</u>	<u>21.01</u>	<u>20.58</u>	<u>295.2</u>	<u>218.2</u>	<u>264.3</u>
4. Roots	3.09	3.24	6.33	3.33	7.25	4.60	48.2	75.3	59.1
Staples	<u>22.01</u>	<u>12.63</u>	<u>34.64</u>	<u>23.71</u>	<u>28.26</u>	<u>25.18</u>	<u>343.4</u>	<u>293.5</u>	<u>323.4</u>
5. Sugar	3.48	2.40	5.88	3.75	5.37	4.28	54.3	55.7	54.9
6. Pulses	4.59	4.35	8.94	4.95	9.73	6.50	71.6	101.0	83.4
7. Vegetables	6.24	2.35	8.59	6.72	5.26	6.25	97.4	54.6	80.2
8. Fruits	4.61 [†]	1.69	6.30	4.97	3.78	4.58	71.9	39.3	58.8
9. Beef**	18.41	5.13	23.54	19.83	11.48	17.12	287.3	119.2	219.7
10. Pork	4.43	4.87	9.30	4.77	10.89	6.76	69.1	113.1	86.8
11. Poultry and Eggs	7.11	2.86	9.97	7.66	6.40	7.25	110.9	66.4	93.1
12. Fish	2.76	1.22	3.98	2.97	2.73	2.89	43.1	28.3	37.1
13. Dairy Products	8.04	3.18	11.22	8.66	7.11	8.16	125.4	73.9	104.7
Animal Protein	<u>40.75</u>	<u>17.26</u>	<u>58.01</u>	<u>43.89</u>	<u>38.61</u>	<u>42.18</u>	<u>635.8</u>	<u>400.9</u>	<u>541.4</u>
14. Vegetable Oils	4.41	.92	5.33	4.75	2.06	3.88	68.8	21.4	49.7
15. Coffee, Tea, Cocoa	4.02	2.14	6.16	4.33	4.79	4.48	62.7	49.7	57.5
16. Other Beverages***	1.73	.41	2.14	1.86	.92	1.56	27.0	9.5	20.0
17. Condiments	.98	.55	1.53	1.06	1.23	1.11	15.3	12.8	14.3
TOTAL FOOD	92.82	44.70	137.52	100.00	100.00	100.00	1448.3	1038.3	1283.6

* Since data was not collected for the rural frontier region, the seventh ENDEF region, including the north and the central-west, was assumed to have the same expenditure pattern as the rest of Brazil as discussed earlier. Numbers may not add correctly due to rounding.

** Includes all bovine and ovine meat.

*** Includes alcoholic and carbonated beverages.

The urban population groups account for just over two-thirds of national food expenditure where the per capita food expenditure level is 1448.3 Cr, in comparison with a per capita level of 1038.3 Cr. in rural areas.

The data also points to differing patterns of food consumption in urban and rural areas. Wheat is the major cereal in urban areas while rice dominates cereal consumption in the rural areas. The diet of Brazil as a whole is not dominated by one staple as in many developing countries and the percentage of total food expenditure going to cereals is approximately equal in urban and rural areas. Maize is less popular than either wheat or rice and is consumed almost entirely in rural areas. Roots are also more common in the rural diet, pushing the overall share of rural expenditure going to roots and cereal foods to 28.26% as compared to an urban share of 23.71%.

The sources of protein differ in urban and rural areas as well. Expenditure on animal protein sources accounts for a high 44% of total food expenditure in urban areas, with beef being heavily favored (19.83%). The share of total rural food expenditure going to animal protein sources is still high at 38.61% but lower than the urban figure, while pork and beef each account for approximately 11%. In per capita terms, expenditure on beef in urban areas is almost two and one half times that in rural areas, while rural expenditure on pork is over 1.6 times that in urban areas.* The share going to other animal protein sources -- poultry and eggs, fish, and dairy products -- are all slightly higher in urban areas, resulting in an absolute urban per capita expenditure level on these commodities about 1.6 times that of rural areas. The lower share of rural food expenditure going to animal protein sources in rural areas is counterbalanced, however, by the high share

*A significant portion of the pork consumed is pork fat, which substitutes for vegetable oils in many rural areas.

spent on legumes (a major source of vegetable protein), a share double that of urban areas.

Of other foods in the Brazilian diet, per capita expenditure on fruits and vegetables in urban areas is almost double that in rural areas, and per capita urban expenditure on vegetable oils and beverages (other than coffee, tea, and cocoa) is three times that of rural areas.

Tables 5.2 and 5.3 show the breakdown of total food expenditure in three rural and seven urban regions of Brazil. The analogous breakdown for rural and urban areas by income class is shown in Tables 5.4 and 5.5. The average level of per capita food expenditure in each region is indicated at the bottom of each column. Such a breakdown shows the important role of regional diversity in determining consumption patterns in a country as large as Brazil. Wheat is an important cereal in all urban areas but shows up as important in rural diets only in the south. Rice consumption is not only concentrated in rural areas as seen in Table 5.1, but is significantly more important in the southeastern rural areas of Minas Gerais and Espirito Santo. Root crops account for larger expenditure shares in the poor regions of northeast and north. They play a less important role in the diets of urban and rural families in other parts of the country. This pattern of staple consumption, generally dominated by roots in the northern areas, wheat in the southern and large urban areas and rice in southeastern Brazil, has important implications for policies of agricultural pricing and staple commodity subsidization since any particular policy will have differential impacts across regions.

Among sources of protein, beef has a larger percentage share in all urban areas. It is also important in the diet of even the poor northeastern rural families as well where it accounts for 14% of food expenditure. Consumption of pork, both pork meat and pork fat, is concentrated in the south and particularly the southeast. On the other hand fish and pulses

TABLE 5.2.-COMMODITY BREAKDOWN OF TOTAL
FOOD EXPENDITURE IN SEVEN URBAN AREAS

	Rio de Janeiro	Sao Paulo	Nonmet Urban South	Nonmet Urban Southeast	Nonmet Urban Northeast	Salvador	Belem
1. Wheat	9.5	10.9	12.1	10.0	11.2	12.8	8.6
2. Rice	8.7	8.8	7.7	11.9	7.0	3.5	3.9
3. Maize	.5	.4	.8	1.1	1.6	.5	.2
Cereals	18.7	20.1	20.6	23.0	19.8	16.6	12.7
4. Roots	3.0	2.3	3.8	3.4	6.1	3.9	10.2
Staples	21.7	22.4	24.4	26.4	25.9	20.7	22.9
5. Sugar	3.2	2.8	4.6	4.7	4.3	2.9	2.8
6. Pulses	4.8	4.7	4.2	5.2	6.3	4.2	3.9
7. Vegetables	7.3	8.0	6.4	6.7	4.2	5.2	4.9
8. Fruits	5.7	5.3	4.2	4.7	5.0	4.5	5.0
9. Beef	22.5	19.6	20.0	14.2	22.0	27.1	28.2
10. Pork	3.2	3.1	5.1	10.5	4.3	2.4	1.3
11. Poultry and Eggs	7.4	8.4	8.3	6.7	6.7	7.6	5.8
12. Fish	3.7	2.7	2.1	1.8	5.0	5.0	8.7
13. Dairy Products	8.3	10.2	8.7	7.3	7.3	9.5	6.2
Animal Protein	45.1	44.0	44.2	40.5	45.3	51.6	50.2
14. Vegetable Oils	5.3	5.9	4.5	4.5	2.8	3.2	2.5
15. Coffee, tea, cocoa	3.8	4.1	4.6	4.7	4.4	4.2	3.8
16. Other Beverages	2.2	2.0	2.2	1.5	.9	2.57	1.3
17. Condiments	.9	1.0	1.1	1.0	1.1	1.0	1.3
Average Per Capita Food Expenditure ¹ .	1700	1734	1452	1302	1076	1345	1426

¹. Not including tobacco. Figures may not add up exactly to totals due to rounding.

TABLE 5.3.-COMMODITY BREAKDOWN OF TOTAL
FOOD EXPENDITURE IN THREE RURAL REGIONS

	<u>South</u>	<u>Southeast</u>	<u>Northeast</u>	
1. Wheat	9.7	4.6	3.9	
2. Rice	10.1	14.8	8.5	
3. Maize	3.0	4.3	4.1	
Cereals		22.8	23.7	16.5
4. Roots	5.9	4.0	11.6	
Staples		28.7	27.7	28.1
5. Sugar	4.5	8.4	5.1	
6. Pulses	6.7	7.9	14.3	
7. Vegetables	6.2	6.7	3.1	
8. Fruits	3.5	3.3	4.5	
9. Beef	11.6	5.7	14.1	
10. Pork	12.7	18.5	5.7	
11. Poultry and Eggs	7.7	6.1	5.0	
12. Fish	1.1	1.2	5.0	
13. Dairy Products	7.9	6.2	7.1	
Animal Protein		41.0	37.7	36.9
14. Vegetable Oils	1.9	1.7	1.8	
15. Coffee, Tea, Cocoa	4.4	5.1	4.8	
16. Other Beverages	1.6	.5	.4	
17. Condiments	1.5	1.0	1.0	
	100.0	100.0	100.0	
 Average per capita food expenditure ¹ .	 1346	 1071	 787	

¹. Not including tobacco

TABLE 5.4

COMMODITY BREAKDOWN OF TOTAL RURAL
FOOD EXPENDITURE BY INCOME GROUP

	Lower 60%	Middle 30%	Upper 10%	Upper 40%
1. Wheat	4.4	7.0	8.4	7.4
2. Rice	10.5	11.2	8.2	10.4
3. Maize	4.3	3.7	2.4	3.4
Cereals	19.2	21.9	19.0	21.2
4. Roots	11.0	6.8	5.0	6.2
Staples	30.2	28.7	24.0	27.4
5. Sugar	6.2	5.4	4.3	5.1
6. Pulses	14.2	8.7	4.7	7.5
7. Vegetables	4.1	5.4	6.0	5.6
8. Fruits	3.4	3.9	5.0	4.2
9. Beef	10.0	11.0	14.9	12.2
10. Pork	8.9	11.9	13.4	12.3
11. Poultry and eggs	4.9	6.9	7.6	7.1
12. Fish	4.2	2.1	1.0	1.7
13. Dairy Products	5.1	7.9	9.9	8.5
Animal Protein	33.1	39.8	46.8	41.8
14. Vegetable Oil	1.9	1.8	1.7	1.8
15. Coffee, tea and cocoa	5.6	4.4	3.6	4.1
16. Other Beverages	.3	.7	2.5	1.2
17. Condiments	1.0	1.2	1.4	1.3
	100.0	100.0	100.0	100.0
Average per capita	720	1166	1858	1312

¹. not including tobacco

TABLE 5.5

COMMODITY BREAKDOWN OF TOTAL
URBAN FOOD EXPENDITURE FOR FOUR
INCOME CLASSES

	Lower 20%	Lower 40%	Middle 40%	Upper 20%
1. Wheat	10.4	11.1	11.0	10.0
2. Rice	10.6	11.0	8.7	4.9
3. Maize	1.9	1.4	.7	.5
Cereals		22.9	23.5	20.4
4. Roots	6.8	5.3	3.3	2.8
Staples		29.7	28.8	23.7
5. Sugar	5.2	4.6	3.4	3.1
6. Pulses	9.3	7.7	4.6	2.8
7. Vegetables	4.5	5.4	6.7	7.5
8. Fruits	2.9	3.2	5.0	7.2
9. Beef	15.8	17.2	20.8	23.9
10. Pork	6.9	6.2	4.2	3.1
11. Poultry and Eggs	5.1	6.3	8.2	7.7
12. Fish	4.7	3.8	3.0	3.3
13. Dairy Products	4.9	5.7	8.5	11.7
Animal Protein		37.4	39.2	44.7
14. Vegetable Oils	3.3	4.2	5.0	4.4
15. Coffee, tea and cocoa	6.3	5.4	4.0	3.3
16. Other Beverages	.5	.6	1.9	3.0
17. Condiments	1.1	1.0	1.0	1.0
TOTAL	100.00	100.00	100.00	100.00

are eaten primarily in the north and northeast. The expenditure shares going to poultry, eggs and dairy products show less variation across regions than the other sources of protein mentioned above.

6. FOOD COMMODITIES EXPENDITURE ELASTICITIES

Expenditure elasticities were estimated for the seven urban and three rural regions of Brazil. These are reported in Tables 6.1 and 6.2. These tables also give estimates of the elasticity of expenditure on individual commodities with respect to total ("global") expenditure.* Tables 6.1 and 6.2 show estimates of mean elasticities with respect to both total food and global expenditure for all urban and all rural regions taken together. Tables 6.3 through to 6.6 record estimates made for each of the seven urban and three rural regions and for the selected four urban and three rural income classes. Estimates of the elasticities with respect to food expenditure are given in Appendix D. For most estimates the log-log form of the demand equation was used. This form implies constant elasticities across income groups. In a few estimates the log-log form did not provide a good fit.** In these situations the semi-log or the log-log quadratic was used. The semi log form is given by

$$X_i = \alpha_i + \beta_i \ln FX$$

where

X_i = expenditure on commodity i

FX = total food expenditure

β_i/X_i = elasticity of expenditure
on i with respect to total
food expenditure

The log-log quadratic is

$$\ln X_i = \alpha_i + \beta_i \ln FX + \gamma_i (\ln FX)^2$$

*These are obtained by multiplying the corresponding elasticity by the food-expenditure elasticity. This two-step approach in estimating elasticities with respect to global expenditure was necessary because of the different sample breakdown in the global expenditure and the food expenditure data.

**Fit was judged by the standard error of the parameter estimates, the overall \bar{R}^2 , and the pattern of the residuals.

TABLE 6.1 -FOOD EXPENDITURE ELASTICITIES
FOR SEVEN AGGREGATED URBAN AREAS

	Urban Mean Elasticity w.r.t Food Expenditure	Urban Mean Elasticity w.r.t Global Expenditure	Formula for Elasticity w.r.t. Food Expenditure (standard errors in parentheses under estimate)
1. Wheat	.97	.47	.97 (.036)
2. Rice	.15	.07	12.36 - 2(.840) In F (1.08)
3. Maize	.14	.07	.14 (.086)
4. Roots	-.58	-.28	-4.14 + 2(.325) In F (.997) (.069)
5. Sugar	.68	.33	.68 (.025)
6. Pulses	-.12	.06	1.86 - 2(.136) In F (.876) (.061)
7. Vegetables	1.30	.63	1.30 (.034)
8. Fruit	1.95	.95	1.95 (.045)
9. Beef	1.43	.70	1.43 (.029)
10. Pork	.53	.26	.53 (.053)
11. Poultry and Eggs	1.33	.65	1.33 (.061)
12. Fish	.99	.48	.99 (.075)
13. Dairy	1.76	.86	1.76 (.028)
14. Vegetable Oil	1.05	.51	1.05 (.061)
15. Coffee, Cocoa and tea	.41	.21	.41 (.022)
16. Other Beverages	2.62	1.28	2.62 (.113)
17. Condiments	1.05	.51	1.05 (.033)

TABLE 6.2-ELASTICITIES OF EXPENDITURE ON
INDIVIDUAL COMMODITIES FOR THREE
AGGREGATED RURAL AREAS

	Rural Mean Elasticity w.r.t. Total Food Expenditure	Rural Mean Elasticity w.r.t Global Expenditure	Formula for Elasticity (standard errors in parentheses under estimates)
1. Wheat	1.45	.77	1.45 (.067)
2. Rice	.93	.50	.93 (.131)
3. Maize	.56	.30	11.72 -2(.808) In FX (1.34) (.098)
4. Roots	.50	.27	.50 (.072)
5. Sugar	.58	.31	.58 (.045)
6. Pulses	.11	.06	3.56 -2(.250) In FX (1.44) (.105)
7. Vegetables	1.20	.64	1.20 (.072)
8. Fruits	1.76	.94	1.76 (.083)
9. Beef	1.77	.94	1.77 (.067)
10. Pork	1.03	.55	1.03 (.040)
11. Poultry	1.53	.82	1.53 (.086)
12. Fish	.27	.14	7.32/X (2.45)
13. Dairy	2.12	1.13	2.12 (.081)
14. Vegetable Oil	.90	.48	16.41/X (2.13)
15. Coffee, Cocoa Tea	.38	.20	.38 (.042)
16. Other Beverages	2.57	1.37	-13.71 +2(1.18) In FX (7.95) (.579)
17. Condiments	.93	.50	.93 (.064)

X = Per capita expenditure on same commodity
FX = Total per capita food expenditure

TABLE 6.3- FOOD EXPENDITURE ELASTICITIES FOR URBAN BRAZIL BY REGION*
1974-75 WITH RESPECT TO TOTAL EXPENDITURE
(standard errors in parentheses)

	Rio de Janeiro	Sao Paulo	Nonmet Urban South	Nonmet Urban Southeast	Northeast	Salvador	Belem
1. Wheat	.35	.40	.36	.63	.69	.35	.45
2. Rice ^{1.}	-.08	-.16	-.05	.20	.46	.53	.44
3. Maize	-.13**	.08	.04	.20	.41	.41	.48
4. Roots	.40	.35	.24	.39	.05**	.14	-.01
5. Sugar	.34	.38	.28	.26	.38	.33	.36
6. Pulses ^{4.}	.08	.08	-.22*	.03	-.07*	.13	.22
7. Vegetables	.54	.60	.50	.56	.91	.70	.89
8. Fruits	1.04	.92	1.00	1.04	.91	.86	1.02
9. Beef	.73	.62	.68	.85	.76	.45	.65
10. Pork	.24	.34	.16	.21	.21	.51	.72
11. Poultry and eggs	.43	.42	.66	.84	.95	.69	.69
12. Fish	.63	.67	.40	.69	.16	.41	.21
13. Dairy Produce	.86	.72	.80	1.00	.97	.85	1.04
14. Vegetable Oil	.38	.29	.34	.63	.89	.52	.77
15. Coffee, tea cocoa	.22	.22	.19	.13	.22	.23	.22
16. Other Beverages	1.26	1.17	1.59	1.22	1.32	1.42	1.51
17. Condiments	.57	.57	.33	.54	.55	.46	.43

* All estimates are log log unless stated otherwise

** Not significant at .05 level, one-tailed test

TABLE 6.4 -FOOD EXPENDITURE ELASTICITIES WITH RESPECT TO TOTAL EXPENDITURE FOR RURAL BRAZIL BY REGION
(standard errors in parentheses)

	South	Southeast	Northeast
1. Wheat	.47	.73	1.05
2. Rice	.01*	.45	.77
3. Maize	.11	.20	.58
4. Roots	.32	.34	.20
5. Sugar	.24	.19	.46
6. Pulses	-.15	.13	.18
7. Vegetables	.57	.44	.87
8. Fruit	.95	.84	1.06
9. Beef	.93	1.02	.95
10. Pork	.39	.59	.65
11. Poultry and eggs	.59	.88	.96
12. Fish	.05*	.64	.09
13. Dairy	.88	1.14	1.37
14. Vegetable Oil	1.32	.34	1.07
15. Coffee, cocoa and tea	.10	.26	.23
16. Other Beverages	1.77	1.42	.97
17. Condiments	.52	.42	.56

* not significant at .05 level, one-tailed test

TABLE 6.5 -FOOD EXPENDITURE ELASTICITIES FOR URBAN BRAZIL BY INCOME CLASS
1974-75 WITH RESPECT TO TOTAL EXPENDITURE
(standard errors in parentheses)

	Lower 20%	Lower 40%	Middle 40%	Upper 20%
1. Wheat	1.43	1.11	.28	.17
2. Rice	1.48	.86	.09	-.13
3. Maize	1.28	.30	.02*	.20
4. Roots	.25	.23	.21	.19
Staples	1.05	.74		
5. Sugar	.60	.44	.25	.26
6. Pulses	.13*	.07*	.004*	.02*
7. Vegetables	1.72	1.31	.51	.26
8. Fruits	1.20	1.33	.75	.37
9. Beef	1.37	1.24	.50	.24
10. Pork	.69	.56	.23	-.07
11. Poultry and Eggs	2.14	1.64	.38	.21
12. Fish	.79	.62	.39	.33
13. Dairy products	1.81	1.48	.64	.37
Animal Protein	1.36		.47	.25
14. Vegetable Oils	2.08	1.18	.33	.07
15. Coffee, Tea, Cocoa	.16	.17	.20	.17
16. Other Beverages	2.15	1.38	1.19	.12
17. Condiments	.98	.77	.35	.34

* not significant at .05 level, one-tailed test.

TABLE 6.6 -FOOD EXPENDITURE ELASTICITIES WITH RESPECT TO TOTAL EXPENDITURE FOR RURAL BRAZIL BY INCOME CLASS (standard errors in parentheses)

	Lower 60%	Upper 40%	Upper 10%
1. Wheat	1.44	.43	.16
2. Rice	1.55	.10	.14
3. Maize	1.42	-.04	-.22
4. Roots	.44	.25	.13
5. Sugar	.69	.18	.16
6. Pulses	.41	.01*	.25
7. Vegetables	1.49	.37	.18
8. Fruit	1.56	.64	.21*
9. Beef	1.46	.72	.57
10. Pork	.91	.37	.17
11. Poultry and Eggs	1.83	.38	.12*
12. Fish	.70	.17*	.31*
13. Dairy	2.37	.56	.23
14. Vegetables	1.74	.31	.14*
15. Coffee, cocoa, tea	.31	.20	.24
16. Other Beverages	1.33	1.33	.88
17. Condiments	.83	.41	.24*

* not significant at 0.5 level, one-tailed test.

The semi-log form which allows elasticities to vary with rising incomes tends to fit many food commodities well, but for this data set it was true only in a few instances. The log-log inverse - here the food expenditure elasticity is given by $\eta_i = \beta_i + 2\gamma_i \ln FX$ - provided a good fit to commodities that are luxuries at low income levels and become necessities and eventually inferior goods as incomes rise, such as rice, maize, roots and pulses.* Only the log-log form was used for the income-class specific estimations because the fit was good.

A comparison of urban and rural elasticity estimates shows the very different reactions that would occur to policies of income generation carried out in the two sectors. The elasticity of expenditure on all staple foods is much higher in rural than in urban areas, and that of beef, pork, and dairy products is significantly higher as well. Raising incomes in urban areas would have negligible or negative effect on the total demand for rice, maize and roots, while rising incomes in rural areas would stimulate demand for all three products significantly. The only food commodities bordering on luxuries (global expenditure elasticity greater than one) are fruit and alcoholic/carbonated beverages in urban areas and fruit, beef, dairy products and similar beverages in rural areas.

Tables 6.3 and 6.4 permit a more disaggregated analysis of the effect of changes in income on demand in various regions of the country. As with budget shares, elasticities vary significantly across Brazil, particularly for staples and sources of animal protein. Rice and Maize, for example, have quite high elasticities of about 0.50 in northern and northeastern urban areas but are inferior goods in urban areas further to the south. Roots seem to follow the opposite pattern, while wheat maintains a positive elasticity of between 0.35 and 0.70 in all urban areas. The elasticities for all forms of animal protein except pork and fish are quite high in all areas

*It also provides a good fit when expenditure rises very rapidly with income, as in the case of other beverages in rural areas.

(generally between 0.50 and 1.00) but exceed one only in a few cases for dairy products and in the southeast for beef. The only food commodity that is typically a luxury is alcoholic/carbonated beverages.

This average picture changes dramatically when elasticities are estimated separately by income class, as shown in Tables 6.5 and 6.6. Most commodities are luxuries for the lowest 40% of the urban and the lowest 60% of the rural population when classed by per capita income. Even staples such as wheat, rice and maize are luxuries to the poor as are vegetables, fruits and all types of animal protein except pork and fish. In contrast, staples have very low or negative elasticities in upper income groups and only beef (.54) and beverages (.88) among the rural rich have elasticities greater than 0.50.

7. POLICY ISSUES

In this section we discuss a few issues which may be of interest to policy makers. While there has been a substantial amount of analysis done on production in Brazil there are only a limited number of studies readily available on the demand side. There has been increasing criticism voiced of Brazil's economic development which is said to emphasise growth with little concern for equity. In order to investigate equity considerations one must move beyond the mask of broad national aggregate figures.* Consider first the general composition of consumption expenditures.

Cost of Living

Section 3 indicated that food accounts for 45.3 percent

*There are some that suggest, Taylor (1980), that even at this level one may make certain deductions such as the relatively low level of public spending on education.

of rural expenditure and close to 20 percent in the urban areas. In urban areas housing and transportation tend to be more important. Thus price change in these consumption items can be expected to produce a significant change in the cost of living.

The patterns become clearer when one observes the regional values. - Table 3.2. Note in particular the rural northeast where close to 57% of the consumption expenditures of that regions 17.7 million inhabitants goes to food. Thus any policy to improve the standard of living of those inhabitants requires careful consideration of the price of food and the associated purchasing power. Similarly the share on transportation costs is higher in Rio than the other regions considered.

For policies to assist the low income groups (Table 3.3) one is immediately struck by the extremely high values in rural and also urban areas at 65 and 48 percent respectively. Also in urban areas the share for services (housing) at 27 percent does not vary much across income groups.

Food costs

Given the dominant role of food in the consumption basket one is led to a more detailed consideration of food commodities.

- Urban

In most urban areas wheat accounts for about 10% of food expenditure while rice varies across regions. Beef expenditure is quite substantial at around 20 percent but rises above 27 percent in Salvador and Belem. Across income groups the share for roots and pulses falls with income while that for wheat stays essentially constant.

- Rural

In rural areas wheat is not as important but the maize and roots shares are significantly higher. In the northeast roots account for 11.6 percent of food expenditure. Among animal protein sources pork is far more important in rural areas particularly in the southeast. Across income groups the most notable variation is for roots, and pulses. For these the share falls with income while for wheat the pattern is opposite.

Income Changes

If population and all per capita incomes continue to grow at around 2.8 and 5 percent respectively it is interesting to surmise what changes in demand can be expected.

- Urban

In urban areas food expenditure per capita should grow at 2.5 per year. Fruit, dairy and beverages should grow at about this rate - i.e., 5 percent per capita. This pattern also seems to hold across income classes. Rice, maize and pulses will show little per capita change while roots expenditure should fall by about 3 percent per year. Beef should grow at around 3.5 percent.

- Rural

The rural areas overall food expenditure should grow by about 2.6 percent per year. Here the big increases can also be expected is fruits, dairy and other beverages at 5.6 and 7 per cent respectively. Beef expenditure should also grow at close to 5 percent. The general pattern seems to hold across regions although beverage expenditure for example may lag a little in the northeast to 5 percent. Indeed, higher

anticipated expenditure on beverages seems to hold across all income classes. The other strong commodity seems to be beef.

Quantity Estimates

These changes can be related to physical levels of consumption and serve as a useful benchmark for policy makers. For example if one assumes the 2.8 and 5 percent growth rates for population and per capita incomes then the quantity of wheat consumed should increase by the rather substantial amount of 5.8 percent annually. This assumes constant relative prices and no substitute effects. This estimate can be improved by considering different income classes by region and then aggregating

Nutritional Implications

There are some studies of nutritional intake in Brazil. These also vary a great deal in coverage and quality. The study by Fundacao Getulio Vargas (1960) suggests that close to 40% of the Brazilian population at that time were deficient in calorie intake-see McCarthy (1975). This may be somewhat an overestimate as the standard used was 2450 cal. per day. A more recent study by Ward and Sanders (1980) in the northeast suggests that nutritional inadequacies are still substantial there. From the analysis in this report it is evident that improvements in purchasing power either through higher incomes or lower food prices would be desirable to alleviate some of these problems. However some of the data from the ENDEF study suggest that the real cost of living in the northeast is actually higher than that in most other regions of the country. This would support some of the observations by Furtado (1971) on the structural imbalances. It also makes one hesitate before advocating policies to encourage industrialization in the northeast through production subsidies. Rather it seems that some form of wage subsidies would be a more direct approach.

This consumption module is now being incorporated in a general equilibrium model. It is hoped that this will cast some light on these issues.

APPENDIX A:^{1/} ENDEF - NATIONAL HOUSEHOLD EXPENDITURE SURVEY

BRAZIL 1974-75

1. DESCRIPTION OF THE SURVEY

1.1 Responsible Agency, Title and Source

Fundacao Instituto Brasileiro de Geografia e Estadistica
(IBGE)

Estudo Nacional da Despesa Familiar - ENDEF

Various volumes of preliminary data on expenditure,
anthropometry and food consumption by region

Rio de Janeiro 1977

Original language: Portuguese

1.2 Objective

The main objective was to collect extensive social statistics with emphasis on food consumption and nutrition.

1/ This is taken from FAO (1977)

1.3 Reporting Period

Seven days for collection of food consumption information.

1.4 Coverage

Rural and urban areas in 7 different zones, specifically:

- i. Guanabara and Rio de Janeiro
- ii. Sao Paulo
- iii. Parana - Santo Catarina, Rio Grande do Sul
- iv. Espirito Santo and Minas Gerais
- v. Alagoas, Bahia, Ceara, Maranhao, Paraiba, Pernambuco, Piarui, Rio Grande do Norte and Sergipe
- vi. Distrito Federal
- vii. Amazonas, Para, Acre, Amapa, Roraima, Rondonia, Goias and Mato Grosso.

1.5 Design

The survey covered 55,000 families living in the regions listed above. A multistage sample design was adopted. During the first stage municipalities were selected some of these were automatically included as considered self-representative, others were selected with probabilities proportional to population. Subsequently, were selected in order: census units as defined for the 1970 population census, sub-census units and dwellings.

1.6 Organization of Field Work

Teams consisting of one supervisor and three enumerators were formed. Seventy six percent of the field personnel was of the female sex. Of 30,000 candidates, 200 supervisors and 900 enumerators were selected and trained in theoretical and practical aspects of field work. The IBGE office located in each state was responsible for carrying out the survey in that state. Field work lasted from 18 August 1974 to the 15 August of the following year. Each dwelling was interviewed two or

three times each day for a period of seven days to obtain data on food consumption. Each enumerator interviewed two families per day.

1.7 Method of Investigation

The interview method was adopted; during their visits to the families enumerators weighed the food and recorded the name, source and type of meal during which it was consumed, in addition to the price and place of purchase or other mode of acquisition. If possible, left overs were weighed.

2. TABULATION

2.1 Scope of the Tables

On food consumption seven main tables have been published for each region covering food consumed per person either per year or per day in quantity or nutritive value broken down by various foods, in relation also to requirements and place of acquisition.

2.2 Geographical Groups

Data are presented separately for the seven regions where the survey was carried out (see 1.4) and also by urban and rural areas of the same regions.

2.3 Unit of Tabulation and Concept of Household

Unit of tabulation is the "comensal dia" (the total number of "comensais-dia" of a consumption unit, is the sum of meal attendances of the persons forming the unit during the survey week). In counting the meal attendants, the relative importance of the daily meals were also considered. The consumption units was defined as the group of persons related by blood who share meals in the same dwelling and from the same food supply. In practice also boarders or servants, or guests, when present, were included.

2.4 Food Nomenclature

About 1,650 food and 235 food preparations were considered in collecting information. Data are published for 120 food items and 9 food groups.

APPENDIX B: AVERAGE EXPENDITURE SHARE AS A WELFARE MEASURE?

B1. BROAD EXPENDITURE CLASSES

The conventional share of expenditure on a commodity by a class k is given by

$$S = \frac{E_c}{E}$$

where E_c is total expenditure by the class on the commodity. E is total expenditure by the class on all commodities. If one chooses to analyse the average share at the family level as a measure of welfare, for example, then one may compute \bar{S}_k

where

$$S_k = \frac{1}{N_k} \sum_{i=1}^{N_k} S_{ik}$$

when

S_{ik} is share of expenditure by family i in class k on the commodity of interest
 N_k is number of families in class k

Although the first approach is important for macro-economic planning and modelling, the alternate approach is arguably a better measure of welfare because all families receive equal weight in this calculation rather than receiving weights proportional to their family level of expenditure. Thus, for example, although only 19.4% of all private expenditure in the city of Rio de Janeiro goes for food, the average family spends 30.3% of its budget on food. This same effect is noticeable in all seven urban and three rural areas studied and is magnified in those areas with the most uneven distribution of income.* Results are given in Tables B1, B2, and B3.

Average family budget shares for the urban and rural areas studied are shown at the bottom of Table B1. For the seven urban areas the typical family spends about one third of its budget on food, just over one fourth on services, and just under one fifth on manufactured items. About one eleventh is saved or invested and the remainder is divided between transportation, energy, and taxes. In contrast, 57.21% of the typical rural budget in the three rural areas goes for food, with a corresponding fall from the urban figure in budget shares going to all other categories except manufacturing. The emphasis on food is strongest in the northeast, where the typical nonmetropolitan urban family spends 46.8% of its budget on food and the typical rural family spends a full 62.4% of its budget on food. The average caloric intake of persons in each of these two areas is 1,821 and 2,017 calories per day respectively.** A family with a food share that is high is very sensitive to any changes in food prices, and an entire area typified by such families is in danger of severe nutritional problems if a shortfall occurs in

*If all persons spent the same amount, the average of the individual budget shares of good i would equal the share of the average expenditure on good i out of total expenditure. When income is distributed unevenly, however, upper income persons have a disproportionately large effect on the first measure while maintaining an effect on the second measure equal to that of all other persons.

**The ENDEF survey measured food intake as well as expenditure. See Estudo Nacional da Despesa Familiar: Consumo Alimentar, Antropométrica; Dados Preliminares, 7 volumes, Rio de Janeiro, 1977.

TABLE B1 - AVERAGE^{1/} BUDGET SHARES IN BRAZIL BY REGION

	Food ^{2/}	Manufacturing	Services	Transportation	Energy	Taxes	Savings and Investment	Total
<u>URBAN:</u>								
Rio de Janeiro	30.3	16.5	31.3	4.9	3.3	5.8	7.9	100.0
Sao Paulo	27.4	17.7	30.5	4.2	3.3	6.0	10.9	100.0
Nonmet Urban South	34.8	20.5	26.1	2.0	3.2	4.1	9.3	100.0
Nonmet Urban Southeast	35.6	21.3	25.4	2.0	3.0	3.4	9.3	100.0
Nonmet Urban Northeast	46.8	20.0	20.0	1.8	2.8	3.1	5.5	100.0
Salvador	31.5	17.2	29.6	3.6	3.2	5.1	9.8	100.0
Belera	40.9	15.8	27.0	3.5	3.5	4.2	5.1	100.0
<u>RURAL:</u>								
South	48.8	18.4	19.3	2.0	1.9	1.5	8.1	100.0
Southeast	56.3	18.3	15.5	1.4	1.4	1.8	5.3	100.0
Northeast	62.4	16.9	13.6	1.1	1.7	1.5	2.8	100.0
<u>Aggregated:</u>								
SEVEN URBAN AREAS	34.24	18.74	27.24	3.19	3.15	4.68	8.76	
THREE RURAL REGIONS	57.21	17.57	15.60	1.46	1.68	1.56	4.92	100.0

^{1/} Average computed by $\bar{S}_k = \frac{1}{N_k} \sum_{i=1}^{N_k} S_{ik}$

where S_{ik} is the share by family i of class k on a given expenditure category

N_k is the number of families in class k .

^{2/} including tobacco

TABLE B2 AVERAGE^{1/} BUDGET SHARES FOR FOUR URBAN AND THREE RURAL INCOME CLASSES*

	Food**	Manufacturing	Services	Transportation	Energy	Taxes	Savings and Investment	Total
<u>Seven Urban Areas:</u>								
Lowest 20%	49.7	14.7	26.6	1.9	2.6	2.6	1.9	100.0
Lowest 40%	46.0	16.4	26.8	2.4	2.6	3.3	2.5	100.0
Middle 40%	32.0	20.1	27.9	3.5	3.1	5.0	8.4	100.0
Upper 20%	16.4	20.5	25.6	3.9	4.4	6.5	22.7	100.0
<u>Three Rural Regions:</u>								
Lowest 60%	65.1	14.9	15.2	.9	1.5	1.0	1.4	100.0
Middle 30%	55.8	19.4	15.8	1.5	1.4	1.7	4.4	100.0
Upper 10%	31.5	22.8	16.9	3.3	3.0	3.3	19.2	100.0

^{1/} See Table B1

* The following ENDEF categories of annual global expenditure per family correspond to the breakdown by income class of the population as reported in this and other tables:

Urban:

Lowest 20%	0-8999
Lowest 40%	0-15799
Middle 40%	15800-45199
Upper 20%	> 45200

(cruzeiros per family per year)

Rural:

Lowest 60%	0-8999
Middle 30%	9000-22599
Upper 10%	> 22600

To facilitate reading, exact figures on percentage breakdown were rounded to the nearest multiple of 5%; therefore these percentage figures are only approximations.

** Includes tobacco

TABLE B3-AVERAGE^{1/} BUDGET SHARES OF FAMILIES
IN EXPENDITURE CLASS EARNING LESS THAN

4,500 Cr. / per year
(Approximately 12 monthly August 1974 minimum wages in Rio de Janeiro
in Selected Urban and Rural Areas

URBAN* :	Food	Manufacturing	Services	Transportation	Energy	Taxes	Savings and Investment	Total	Average	Average	
									Global Expenditure Per Capita	Global Expenditure Per Family	
Rio de Janeiro	38.9	10.6	39.1	4.0	3.3	2.7	1.4	100.00	1,316	3,292	2.50
Nonmet Urban South	48.6	11.1	34.4	.5	3.0	1.6	.8	100.0	1,266	3,444	2.72
Nonmet Urban Southeast	47.7	12.6	34.6	.6	2.1	.9	1.5	100.0	987	2,824	2.86
Nonmet Urban Northeast	56.4	14.1	22.7	.8	3.0	1.4	1.6	100.0	989	3,047	3.08
Salvador	38.3	12.2	39.3	2.3	4.0	3.5	.4	100.0	1,342	3,180	2.37
<u>RURAL:</u>											
South	63.2	10.2	21.5	1.0	1.7	1.1	1.3	1.00	1,233	3,354	2.72
Southeast	62.8	13.9	18.9	1.3	.9	.9	1.3	1.00	1,020	3,966	3.89
Northeast	66.5	14.1	14.6	.9	1.7	1.0	1.2	1.00	930	3,943	4.24

* Data for this income level was not available for Sao Paulo or Belem.

^{1/} See Table B 1

food availability.

Table B2 shows the average family budgetary breakdown for persons from different income groups in urban and rural Brazil. Because of the smaller variance of income levels within these classes than within Brazil as a whole the shares are very similar to the corresponding breakdown by income groups in total consumption expenditure discussed earlier.

Table B3 compares expenditure patterns of families in the income class just under 4,500 Cruzieros per year, the approximate equivalent of a one year minimum wage. Even when income levels are equalized, families in the northeast spend more on food, no doubt in part due to the larger average family size. At this level of income, expenditure on services (primarily housing) and energy is higher in urban areas, while consumption of manufactures is approximately the same in all regions. Transportation is far more important in large urban centers than elsewhere, and savings is, as expected, very low everywhere.

B2 FOOD COMMODITY EXPENDITURE

One may also use this average measure the second one to analyse the food budget going to various food commodities. Tables B4 and B5 show the average budgetary breakdown of families in the selected urban and rural areas. As becomes evident when these tables are compared with Tables 5.2 and 5.3 the average family spends a larger share of its budget on staples and pulses and smaller portion on vegetables, fruits and animal proteins than the breakdown of total expenditure would reveal. The discrepancies are most significant in those commodities least favored by those with higher expenditure levels, such as rice and pulses.

To isolate the effect of income level on the average family budget, average food budget shares have been calculated for four urban and four rural income groups as shown in Tables

TABLE B4 -AVERAGE ^{1/}BREAKDOWN OF FAMILY FOOD BUDGET
IN SEVEN URBAN AREAS

	Average for Seven Areas	Rio de Janeiro	Sao Paulo	Nonmet Urban South	Nonmet Urban Southeast	Nonmet Urban Northeast	Salvador	Belem
1. Wheat	10.8	9.8	11.0	12.3	9.8	11.0	13.5	8.0
2. Rice	9.1	9.8	9.8	8.5	12.9	7.1	3.4	4.0
3. Maize	.9	.6	.4	.9	1.4	1.6	.6	.3
Cereal	20.8	20.2	21.2	21.7	24.1	19.7	17.5	13.2
4. Roots	4.2	3.1	2.4	3.9	3.5	6.8	4.5	11.5
Staples	25.0	23.3	23.6	25.6	27.6	26.5	22.0	24.7
5. Sugar	3.9	3.3	2.9	4.7	5.1	4.5	3.0	3.0
6. Pulses	5.7	5.5	5.2	4.8	6.0	7.2	4.8	4.3
7. Vegetables	6.2	7.2	7.8	6.3	6.7	3.9	4.8	4.6
8. Fruits	4.5	5.0	4.7	3.8	4.0	4.7	3.9	4.6
9. Beef	19.6	21.3	19.0	19.0	13.0	20.9	27.6	27.6
10. Pork	5.0	3.4	3.2	5.3	11.5	4.7	2.4	1.3
11. Poultry and Eggs	7.3	7.5	8.4	8.0	6.3	6.2	7.2	5.6
12. Fish	3.4	3.5	2.5	2.1	1.7	5.4	5.1	9.5
13. Dairy Products	7.7	7.5	9.6	8.1	6.4	6.7	8.4	5.6
Animal Protein	43.0	43.2	42.7	42.5	25.9	43.9	50.7	49.4
14. Vegetable Oils	4.6	5.5	6.1	4.6	4.3	2.6	3.1	2.5
15. Coffee, Tea, Cocoa	4.6	4.1	4.3	4.8	5.2	4.8	4.7	4.2
16. Other Beverages	1.5	2.0	1.7	1.8	1.2	.8	2.0	1.1
17. Condiments	1.0	.87	1.0	1.1	1.0	1.1	1.0	1.5
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

^{1/} See Table B1

TABLE B5 -AVERAGE^{1/} BREAKDOWN OF FAMILY FOOD BUDGET
BETWEEN COMMODITIES IN THREE RURAL REGIONS

	<u>Three Region Average</u>	<u>South</u>	<u>Southeast</u>	<u>Northeast</u>
1. Wheat	5.5	9.6	4.4	3.7
2. Rice	10.3	10.7	15.0	8.3
3. Maize	4.0	3.2	4.6	4.2
Cereals	19.8	23.5	24.0	16.2
4. Roots	8.8	6.0	4.2	12.2
Staples	28.6	29.5	28.2	28.4
5. Sugar	5.8	4.6	9.1	5.2
6. Pulses	11.6	7.3	8.7	15.1
7. Vegetables	4.6	6.1	6.8	3.0
8. Fruits	3.8	3.3	3.0	4.3
9. Beef*	11.0	10.6	5.0	13.5
10. Pork	10.2	12.9	18.1	5.7
11. Poultry and Eggs	5.8	7.6	5.7	4.8
12. Fish	3.3	1.2	1.2	5.4
13. Dairy Products	6.6	7.5	5.6	6.5
Animal Protein	36.9	39.7	35.6	35.9
14. Vegetable Oils	1.8	2.0	1.8	1.7
15. Coffee, Tea and cocoa	5.0	4.6	5.4	5.1
16. Other Beverages**	.7	1.3	.4	.4
17. Condiments	1.2	1.5	1.0	1.1
	100.00	100.00	100.0	100.0

* Includes goat and lamb

** Includes alcoholic and carbonated beverages.

1/ See Table B1

B6 and B7. This breakdown more than any other reveals those food commodities having the most important place in the diets of the poor and thus those commodities perhaps best suited as tools of general nutrition intervention policies. The foods whose consumption is relatively more important to low income groups include maize, roots, pulses and fish, while other forms of animal protein vegetables, and fruits take an increasing share of the family food budget as incomes rise. Wheat and rice consumption are approximately equally representative in the diets of all urban income classes, but wheat is consumed in rural areas far more by the upper income families -- a result partially of the concentration of these families in the south where wheat is primarily grown.

TABLE B6 - AVERAGE ^{1/} BREAKDOWN FOR
FOUR URBAN INCOME CLASSES

	Lower 20%	Lower 40%	Middle 40%	Upper 20%
1. Wheat	10.2	10.9	11.0	10.1
2. Rice	10.4	10.8	8.9	5.1
3. Maize	1.9	1.4	.7	.5
4. Roots	7.1	5.6	3.4	2.8
5. Sugar	5.2	4.7	3.5	3.1
6. Pulses	9.5	8.0	4.7	2.9
7. Vegetables	4.4	5.2	6.7	7.4
8. Fruits	2.9	3.2	4.8	7.0
9. Beef	15.7	17.0	20.5	23.8
10. Pork	7.0	6.3	4.3	3.1
11. Poultry + Eggs	4.9	6.1	8.2	7.7
12. Fish	4.9	4.0	3.0	3.3
13. Dairy Products	4.8	5.6	8.4	11.5
Animal Protein		37.3	39.0	44.4
14. Vegetable Oils	3.1	4.0	5.0	4.4
15. Coffee, Tea and cocoa	6.4	5.6	4.1	3.4
16. Other Beverages	.5	.6	1.8	3.0
17. Condiments	1.1	1.0	1.0	1.0
	100.0	100.0	100.0	100.0

^{1/} See Table B1

TABLE B7 -AVERAGE^{1/} BREAKDOWN OF FAMILY FOOD
BUDGET BETWEEN COMMODITIES FOR
THREE RURAL EXPENDITURE CLASSES

	Lower 60%	Middle 30%	Upper 10%	Upper 40%
1. Wheat	4.1	6.7	8.5	7.1
2. Rice	10.0	11.2	8.3	10.6
3. Maize	4.4	3.8	2.5	3.6
Cereals	18.5	21.7	19.3	21.3
4. Roots	11.0	6.9	5.0	6.5
Staples	29.5	28.6	24.3	27.8
5. Sugar	6.3	5.5	4.3	5.2
6. Pulses	14.9	9.0	4.7	8.1
7. Vegetables	3.9	5.2	6.0	5.4
8. Fruits	3.4	4.0	5.0	4.2
9. Beef	10.2	11.3	14.5	11.9
10. Pork	8.6	11.5	13.4	11.9
11. Poultry and Eggs	4.7	6.8	7.7	6.9
12. Fish	4.6	2.2	1.1	2.0
13. Dairy Products	5.0	7.8	9.9	8.4
Animal Protein	33.1	39.6	46.6	41.1
14. Vegetable Oils	1.8	1.8	1.7	1.8
15. Coffee, Tea and Cocoa	5.7	4.4	3.6	4.2
16. Other Beverages	.3	.7	2.4	1.0
17. Condiments	1.1	1.2	1.4	1.2
	100.0	100.0	100.0	100.0

^{1/} See Table B1

APPENDIX C

REGRESSIONS FOR BROAD EXPENDITURE CATEGORIES.

APPENDIX C.I.

EXPENDITURE ELASTICITIES FOR
AGGREGATED DATA FROM SEVEN URBAN AREAS, 1974-75^{1/}

	C	log G	(log G) ²	S - P	South	Central NE	non met NE	Salv.	Amaz.	R ²
			D2	D3	D4	D5	D6	D7		
Food	3.12 (.135)	.486 (.015)	-.038 (.037)	-.026 (.042)	-.044 (.044)	-.019 (.043)	-.122 (.057)	-.096 (.072)	.9533	
Tobacco	-2.24 (.551)	1.70 (.124)	-.040 (.022)	-.026 (.026)	-.162 (.027)	.091 (.027)	-.092 (.035)	.114 (.044)	.9830	
	.793 (.283)	.477 (.032)	.0008 (.08)	-.215 (.089)	-.495 (.093)	-.650 (.090)	-.455 (.120)	-.540 (.152)	.8986	
	-11.20 (1.01)	3.20 (.227)	-.154 (-12.03)	-.222 (.047)	-.432 (.049)	-.490 (.049)	-.387 (.063)	-.500 (.080)	.9719	
Manufacturing	-2.89 (.180)	1.12 (.020)	.053 (.049)	.249 (.057)	.308 (.059)	.297 (.057)	.066 (.076)	.018 (.097)	.9830	
Services	-.364 (.102)	.908 (.011)	-.020 (.028)	-.216 (.032)	-.263 (.034)	-.536 (.033)	-.087 (.043)	-.200 (.055)	.9939	
Transportation										
Services	-4.36 (.439)	1.15 (.049)	-.174 (.049)	-.928 (.138)	-.946 (.145)	-.915 (.140)	-.243 (.186)	-.255 (.236)	.9409	
Energy	-5.40 (.230)	1.22 (.026)	-.0334 (.626)	.045 (.072)	.016 (.076)	.051 (.073)	.059 (.097)	.158 (.123)	.9781	
Tax	-5.26 (.268)	1.27 (.030)	.012 (.073)	-.261 (.084)	-.441 (.088)	-.454 (.086)	-.023 (.113)	-.207 (.144)	.9773	
Savings	-12.30 (.348)	2.08 (.039)	.179 (.095)	.590 (.109)	.688 (.115)	.750 (.111)	.076 (.147)	.096 (.187)	.9812	

1/ Estimates based on the equation $\ln X_i = C + \beta_i \log G + \alpha (\log G)^2 + \sum_k S_{ik} D_k$

where X_i is expenditure on commodity i

G is total expenditure

D_k are dummy variables for the region

APPENDIX C.2.

EXPENDITURE ELASTICITIES FOR
AGGREGATED DATA FROM THREE RURAL REGIONS 1974-75

	C	log G	(log G) ²	SE	NE	R ²
Food	2.93 (.318)	.533 (.040)		-.042 (.062)	-.106 (.057)	.9240
	-7.19 (.808)	3.10 (.204)	-.162 ^{1/} (.013)	-.0026 (.022)	-.030 (.021)	.9904
Tobacco	-2.39 (.353)	.769 (.044)		-.238 (.069)	.0036 (.064)	
Manufacturing	-4.14 (.360)	1.30 (.045)		.123 (.070)	.174 (.065)	.9776
Services	-.629 (.319)	.871 (.040)		-.271 (.062)	-.451 (.058)	.9768
Transportation Services	-9.54 (.434)	1.70 (.054)		-.103 (.085)	.052 (.078)	.9821
Energy	-7.29 (.738)	1.41 (.092)		-.293 (-2.04)	.249 (1.87)	.9223
Tax	-10.60 (.749)	1.80 (.093)		.275 (.146)	.516 (.135)	.9453
Savings	-16.07 (.818)	2.65 (.102)		.080 (.160)	.324 (.148)	.9723

^{1/} See note on Table C-I

APPENDIX D

ELASTICITIES BY FOOD COMMODITY

This appendix provides estimates by food commodities for selected regions and income classes. The dependent variable in each instance is the total food expenditure. Note that in section 6 of the main text these are adjusted to yield elasticity estimates with respect to total or global expenditure.

TABLE D.I FOOD EXPENDITURE ELASTICITIES FOR URBAN BRAZIL BY REGION*
WITH RESPECT TO TOTAL FOOD EXPENDITURE 1974-75
(standard errors in parentheses)

	Rio de Janeiro	Sao Paulo	Nonmet Urban South	Nonmet Urban Southeast	Northeast	Salvador	Belem
1. Wheat	.71 (.028)	.89 (.052)	.81 (.038)	1.22 (.052)	1.21 (.094)	.72 (.059)	.85 (.037)
2. Rice ¹	-.16	-.36	-.12	.38	.81	1.07	.83
3. Maize	-.27** (.146)	.17 ²	.10 ²	-.39 (.109)	.72 (.153)	.83 (.084)	.91 (.193)
4. Roots	.82 (.057)	.79 (.029)	.55 (.084)	.76 (.035)	.08** (1.52)	.28 (.056)	-.02 ³
5. Sugar	.69 (.071)	.85 (.073)	.63 (.031)	.51 (.065)	.67 (.046)	.68 (.025)	.67 (.091)
6. Pulses ⁴	-.17	-.17	-.50*	.05	-.12*	.26	.42
7. Vegetables	1.11 (.028)	1.34 (.052)	1.12 (.023)	1.08 (.062)	1.59 (.064)	1.42 (.068)	1.67 (.068)
8. Fruits	2.13 (.105)	2.07 (.050)	2.27 (.120)	2.01 (.114)	1.59 (.068)	1.74 (.068)	1.92 (.089)
9. Beef	1.50 (.053)	1.38 (.051)	1.54 (.015)	1.65 (.072)	1.33 (.042)	.91 (.030)	1.22 (.076)
10. Pork	.50 (.166)	.76 (.158)	.37 (.074)	.40 (.048)	.37 (.103)	1.04 (.078)	1.36 (.184)
11. Poultry and eggs	.88 (.104)	.94 (.067)	1.49 (.186)	1.62 (.132)	1.67 (.100)	1.40 (.066)	1.30 (.061)
12. Fish	1.29 (.043)	1.51 (.111)	.90 (.117)	1.33 (.162)	.28 (.081)	.83 (.122)	.39 (.091)
13. Dairy Produce	1.76 (.083)	1.62 (.029)	1.82 (.074)	1.94 (.090)	1.70 (.044)	1.73 (.055)	1.96 (.149)
14. Vegetable Oil	.77 (.116)	.64 (.074)	.78 (.104)	1.22 (.084)	1.55 (.132)	1.06 (.046)	1.44 (.043)
15. Coffee, tea cocoa	.46 (.067)	.50 (.045)	.44 (.038)	.25 (.039)	.38 (.058)	.47 (.063)	.42 (.056)
16. Other Beverages	2.57 (.356)	2.62 (.289)	3.60 (.265)	2.36 (.189)	2.32 (.250)	2.88 (.302)	2.84 (.378)
17. Condiments	1.16 (.075)	1.27 (.049)	.75 (.120)	1.05 (.056)	.964 (.044)	.938 (.098)	.811 (.048)

* All estimates are log log unless stated otherwise

** Not significant at .05 level, one-tailed test

¹ Rice coefficients $[\ln FX (\ln FX)^2]$ 9.22, -.634 | 11.61, -.804 |
(1.46) (.099) | (1.55) (.104) |
6.27, -.437 | 7.25, -.48 | 10.07, -.66 | 7.80, -.465 | 7.28, -.44
(.993) (.068) | (1.19) (.084) | (2.05) (.147) | (1.53) (.106) | (.932) (.064)

² Log-log quadratic used: $\log F, (\log F)^2 = -7.76, .59$
14.20, .97 (3.48) (.239) for Sao Paulo;
(6.25) (.421) for the South

³ Log-log quadratic used: Coefficients are 7.17, -.49
(1.95) (.133)
Pulse coefficients $[\ln F, (\ln F)^2]$
5.28, -.39 | 4.19, -.29 | 4.57, -.34 | 1.40, -.102 | -2.41 .17 | 2.77, -.17 |
(1.12) (.076) | (2.04) (.138) | (6.24) (.43) | (1.27) (.089) | (2.40) (.97) | (1.93) (.134) |
6.31 -.404
(1.42) (.097)

TABLE D.2-FOOD EXPENDITURE ELASTICITIES WITH RESPECT TO TOTAL FOOD EXPENDITURE FOR RURAL BRAZIL BY REGION
(standard errors in parentheses)

	South	Southeast	Northeast
1. Wheat	1.07 (.089)	1.40 (.055)	1.66 (.091)
2. Rice	.019* (.106)	.87 [138.0 (6.19)]	1.22 [81.7 (6.08)]
3. Maize	.26 [8.37 -.563 (3.49) (.241)]	.38 [9.34 -.642 (1.96) (.142)]	.91 [18.25 -1.30 (2.60) (.195)]
4. Roots	.74 [59.0 (8.14)]	.66 [28.2 (7.39)]	.31 [28.57 (5.05)]
5. Sugar	.55 (.045)	.36 (.085)	.72 (.028)
6. Pulses	-.35 (.178)	.25 (.039)	.29 (.066)
7. Vegetables	1.30 (.138)	.84 (.080)	1.37 (.076)
8. Fruit	2.16 (.232)	1.61 (.122)	1.67 (.032)
9. Beef	2.13 (.087)	1.96 (.070)	1.49 (.024)
10. Pork	.89 (.067)	1.13 (.045)	1.03 (.072)
11. Poultry and eggs	1.35 (.226)	1.69 (.156)	1.51 (.094)
12. Fish	.11* (.269)	1.24 (.168)	.148 (.120)
13. Dairy	2.01 (.201)	2.19 (.223)	2.16 (.086)
14. Vegetable Oil	.302 (.203)	.66 (.118)	1.68 (.119)
15. Coffee, cocoa and tea	.233 (.107)	.509 (.045)	.365 (.053)
16. Other Beverages	4.05 (.403)	2.74 (.841)	1.52 (.550)
17. Condiments	1.18 (.147)	.814 (.128)	.878 (.053)

* not significant at .05 level, one-tailed test

TABLE D.3 - FOOD EXPENDITURE ELASTICITIES FOR URBAN BRAZIL BY INCOME CLASS
1974 - 1975
(standard errors in parentheses)

	Lower 20%	Lower 40%	Middle 40%	Upper 20%
1. Wheat	1.42 (.137)	1.34 (.076)	.73 (.045)	.78 (.115)
2. Rice	1.47 (.168)	1.04 (.101)	.24 (.111)	-.60 (.156)
3. Maize	1.27 (.332)	.36 (.193)	.05* (.318)	.91 (.393)
4. Roots	.25 (.164)	.28 (.085)	.54 (.084)	.87 (.088)
Staples	1.04 (.042)	.89 (.040)	.49 (.042)	.43 (.054)
5. Sugar	.59 (.056)	.53 (.036)	.66 (.044)	1.19 (.131)
6. Pulses	.13* (.12)	.07* (.06)	.01* (.127)	.07* (.180)
7. Vegetables	1.70 (.106)	1.58 (.078)	1.33 (.068)	1.18 (.063)
8. Fruits	1.19 (.157)	1.60 (.094)	1.95 (.141)	1.72 (.093)
9. Beef	1.36 (.097)	1.50 (.051)	1.30 (.075)	1.09 (.075)
10. Pork	.68 (.132)	.67 (.105)	.59 (.165)	-.33 (.289)
11. Poultry and Eggs	2.12 (.128)	1.98 (.090)	.98 (.105)	.97 (.122)
12. Fish	.78 (.285)	.75 (.143)	1.02 (.207)	1.50 (.376)
13. Dairy products	1.79 (.276)	1.79 (.094)	1.66 (.076)	1.69 (.114)
Animal Protein	1.35 (.056)	1.42 (.031)	1.23 (.028)	1.16 (.048)
14. Vegetable Oils	2.06 (.107)	1.78 (.093)	.85 (.051)	.30 (.129)
15. Coffee, Tea, Cocoa	.16 (.049)	.20 (.033)	.53 (.054)	.79 (.121)
16. Other Beverages	2.13 (.528)	1.67 (.256)	3.09 (.126)	.55 (.369)
17. Condiments	.97 (.153)	.93 (.055)	.91 (.108)	1.55 (.119)

* not significant at .05 level, one-tailed test.

TABLE D.4 -FOOD EXPENDITURE ELASTICITIES WITH RESPECT TO TOTAL
FOOD EXPENDITURE FOR RURAL BRAZIL BY INCOME CLASS
(standard errors in parentheses)

	Lower 60%	Upper 40%	Upper 10%
1. Wheat	1.46 (.078)	1.17 (.103)	.61 (.266)
2. Rice	1.57 (.081)	.27 (.144)	.54 (.141)
3. Maize	1.44 (.165)	-.10 (.161)	-.82 (.216)
4. Roots	.45 (.069)	.68 (.146)	.48 (.198)
5. Sugar	.696 (.048)	.48 (.11-1)	.60 (.169)
6. Pulses	.415 (.073)	-.02 (.179)	.93 (.175)
7. Vegetables	1.51 (.119)	1.00 (.143)	.68 (.246)
8. Fruit	1.58 (.104)	1.76 (.205)	.80 (.475)
9. Beef	1.48 (.065)	1.96 (.100)	2.05 (.158)
10. Pork	.92 (.081)	1.00 (.096)	.64 (.209)
11. Poultry and Eggs	1.85 (.147)	1.05 (.119)	.44* (.391)
12. Fish	.709 (.238)	.451* (.305)	1.16* (.574)
13. Dairy	2.40 (.182)	1.54 (.100)	.85 (.148)
14. Vegetables	1.76 (.179)	.85 (.137)	.52* (.371)
15. Coffee, cocoa, tea	.31 (.056)	.56 (.094)	.91 (.236)
16. Other Beverages	1.35* (1.09)	3.63 (.464)	3.31 (.934)
17. Condiments	.89 (.086)	1.12 (.168)	.89* (.699)

* not significant at .05 level, one-tailed test

REFERENCES

- Anuario Estatístico do Brazil. Various issues
- Bacha, E.L. 1977. Issues and Evidence on Recent Brazilian Economic Growth. World Development, 5 (1-2), 47-67
- Bacha, E.L. and L. Taylor 1978. "Brazilian Income Distribution in the 1960's 'Facts', Model Results and the Controversy". Journal of Development, Studies 14.
- Campino, A.C.C. 1979. Situação Nutricional no Brasil: Uma Descrição e Críticas as Estimativas da FIBGE. ANPEC, Atibaia.
- Conjuntura Economica. Various issues
- Estudo Nacional da Despesa. 1979. FAMILIAR - ENDEF, Rio de Janeiro
- FAO, 1977. Provisional Food Balance Sheets, 1972-74 Average, Rome
- FAO. 1979. Review of Food Consumption Surveys, Vol. 2: Africa, Latin America, Near East, Far East. Rome

- Fields, G.S. 1977. Who Benefits from Economic Development? A Reexamination of Brazilian Growth in the 1960's. American Economic Review, 67.
- Fishlow, A. 1972. Brazilian Size Distribution of Income. American Economic Review, 62.
- Furtado C. 1971. The Economic Growth of Brazil. University of California Press.
- Knight, P.T., Moran, R. Lluch, C. Mahar, D. and F. Swett. 1979. Brazil Human Resources Special Report, The World Bank, Washington D.C.
- Langoni, C. 1973. Distribuicao da Renda e Desenvolvimento Economico do Brasil, Rio de Janeiro. Editora Expressao e Cultura,
- McCarthy, F.D. 1975. Planejamento Nutricional para o Brasil Um programa multidisciplinario orientado a politica, SUPLAN.
- Syvrud, D.E. 1974. Foundation of Brazilian Economic Growth: Hoover Institution Press, Washington D.C.
- Taylor, L., E.L. Bacha, E.A. Cardoso and F.C. Lysy. 1980. Models of Growth and Distribution for Brazil. Oxford: University Press.
- Ward, J.O., and J.H. Sanders. 1980. Nutritional Determinants and Migration in the Brazilian Northeast: A Case Study of Rural and Urban Ceara. Economic Development and Cultural Change.