

NUTRITION PLANNING IN BRAZIL

INP
C/75-28

A POLICY ORIENTED MULTIDISCIPLINARY SYSTEM

#2119

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FDMjmp

SUMMARY

This paper proposes a general framework for nutrition planning. The work can be summarized as following.

The present nutrition status of the population is not very different from the early 60's. There are deficiencies in protein and fat but principally in caloric intake. Approximately 30-40 percent of the total population may be deficient in calories. For the Northeast it may be twice as high. The work proposed has four principal sections; production, consumption, P.T.D. (processing, transportation, distribution) and INTERRELATIONSHIPS WITH foreign trade. The approach is different from those conventionally used, principally because one needs information by social or income class and by region. The framework seeks to produce smooth linkages throughout and the overall system is strongly oriented towards policy. Some of the present policymaking areas are reviewed. Finally there is discussion on how agencies outside SUPPLAN may be able to suggest both short term and long term policy alternatives.

ANALYSIS OF THESE SECTIONS

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NUTRITION PLANNING IN BRAZIL
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I. INTRODUCTION

Malnutrition exists in various degrees in many countries which differ in almost all other respects. In some relatively poor countries one finds little malnutrition, while in some rich ones there is a lot. The form of political structure is of course important but again it is not the only determining factor. The great wealthy democracies may not be quite so great when judged in terms of their ability to alleviate hunger for all their citizens. In short there does not appear to be any quick answers which can work in any milieu. The problem arises from a complex evolution of historical forces conditioned by the current socioeconomic and political environment.

Brazil now recognizes that it also has a nutrition problem and is willing to pursue appropriate policies to improve the situation. President Geisel has indicated his strong interest in this work. The social development strategy for the II National Development Plan (1975-1979)^{1/} is designed to "(1) guarantee to all classes, and in particular to the middle and working classes, substantial increases of real income; (2) eliminate in the shortest possible time the pockets of absolute poverty which exist principally in the semiarid regions of the Northeast and on the outskirts of the great urban centers."

Many different branches of government are concerned with converting these goals into reality. One of the more exciting

attempts is the Nutrition Planning program, of the Ministry of Agriculture, SUPLAN. The program is being supported in part by a World Bank loan. This report is primarily concerned with this program.

The basic objective of the program may be stated quite simply even though its achievement is difficult. It is to improve the nutritional status of all citizens of Brazil and in particular those groups who are presently undernourished. The program hopes to achieve this goal in a variety of ways. A large part of the available funds is being directed to various universities and other institutions in Brazil. Their research in cooperation with a central unit at SUPLAN will be directed toward producing results which will provide the required degree of analysis so that policymakers will have available to them a number of viable alternatives. It is expected to stimulate a healthy discussion so that well proven quantitative information will evolve for those who are in a position to effect change. The core group at SUPLAN working closely with the researchers will enable the Ministry to develop a capability in the nutrition area. This will in turn enable policymakers to have a continuously updated nutrition input into their decisions.

While it is understood that in their research some may be led into relatively theoretical areas one cannot emphasize too much the need for policy oriented research. The true measure of success of this effort can only be in improvement of specific groups who are presently nutritionally deprived. In turn this can best be achieved by effective well planned policies.

This report should be viewed primarily as an attempt to coordinate and systematize some of the work envisaged. Hopefully it will provide a basis for discussion among participants and also help to give a broader perspective to those whose primary concern may be in only one part of the overall plan. There are five more sections to the report and briefly these address the following issues.

2. Present Status of Population - This is a review of the present situation. Some of the salient features of the socioeconomic environment are reviewed together with some estimates of trends in the economic status of various groups in recent years.
3. What Determines Nutritional Status - Some of the determinants of nutritional status are discussed together with possible approaches.
4. Policy Oriented Research - This is a rather difficult area to delineate at this stage. However, the importance of the area requires that the author give his views so that others may be stimulated to contribute.
5. Specific Project Orientation - One possible framework for the work is propounded.
6. What is Expected from Work? - Since this is a multidisciplinary program there are many problems which must be addressed at the outset in terms of cooperation between participants and the issues involved in successfully interfacing the results of diverse studies.

General Administration

The administration of a program of this nature is quite complex and requires cooperation on all sides. Some of the practical aspects are discussed in a companion document.

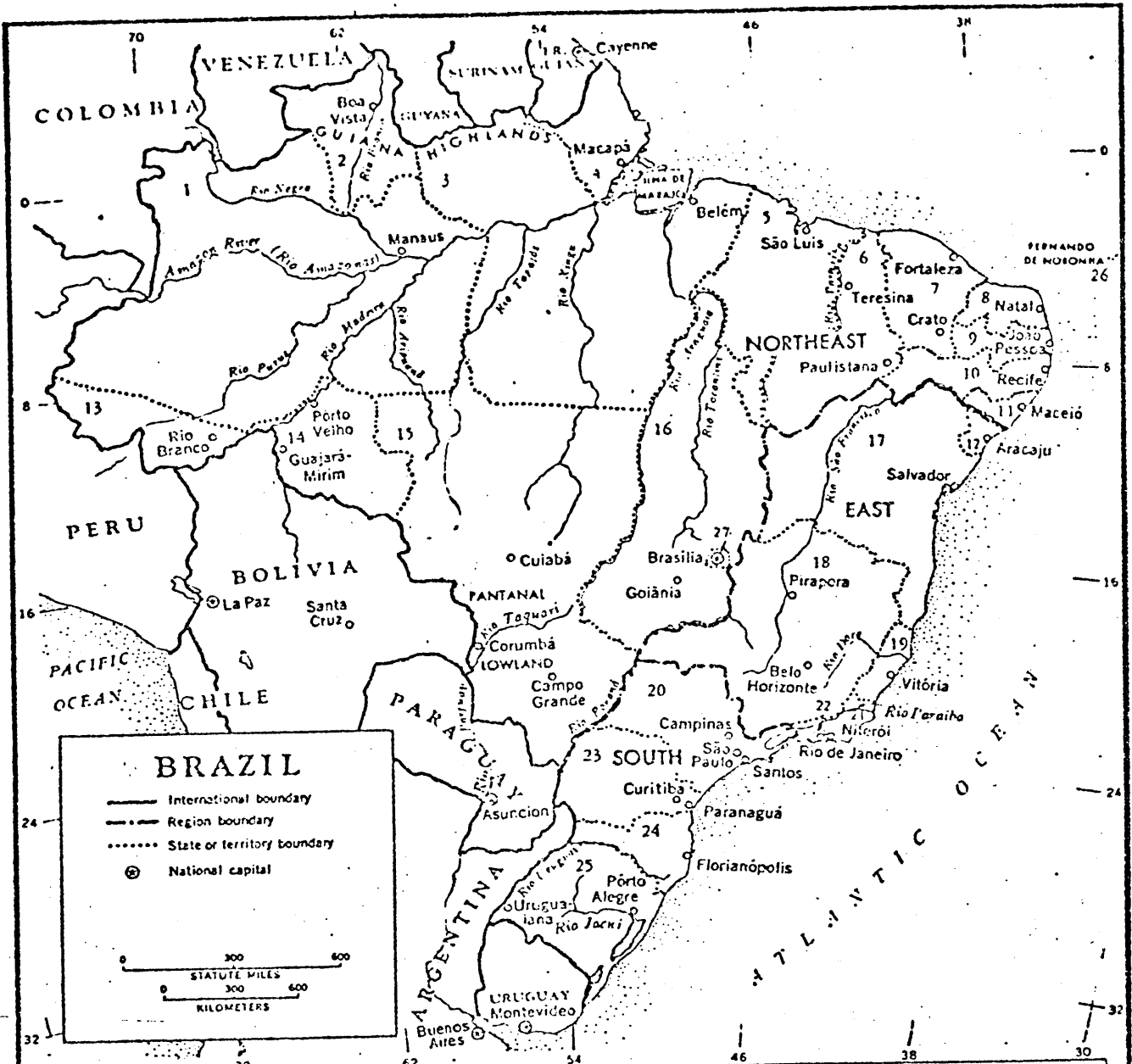
It is hoped that this will serve as a basis for discussion so that improvements can be implemented relatively easily at this stage to ensure the ultimate success of the work.

II. PRESENT STATUS OF POPULATION

The present nutritional status of the population can best be determined by an appropriate survey. The national family income survey just completed by IBGE^{2/} will be an excellent source of information. IBGE and their FAO advisors have indicated their willingness to assist all researchers. However, preliminary results are not expected until later this year or early in 1976. More detailed results are expected later in 1976. The last comprehensive survey of this scale in Brazil was done in the early 1960's and the results published in 1970. While this excellent source may be considered dated by some it does serve as a useful guide. More recent results from smaller surveys^{4/5/6/7/} together with some of the studies on income distribution^{8/9/} and other data sources^{10/11/12/13/} help to fill in the picture. The food balance information published by the Ministry of Health provides useful aggregate information for the years 1968-1970.

Nutrition in the early 1960's

First the aggregate picture is considered. The relative importance of various areas may be obtained by considering Table 2.2 based on the survey published^{3/} in 1970. One observes the distribution of population by region and by income class. (A map of Brazil in Table 2.1 may be useful to some). Here one observes that about 56 percent of the population are in the rural area. For the Northeast the number is much higher at about 66 percent. These numbers have been falling so that the 1970 census indicates that the corresponding rural population percentages for Brazil and the Northeast may be 44 percent and 59 percent.



BRAZIL

- International boundary
- - - Region boundary
- State or territory boundary
- ⊙ National capital

0 300 600
STATUTE MILES

0 300 600
KILOMETERS

INDEX TO STATES AND TERRITORIES

1. AMAZONAS	15. MATO GROSSO
2. TERRITÓRIO DO RORAIMA	16. GOIÁS
3. PARÁ	17. BAHIA
4. TERRITÓRIO DO AMAPÁ	18. MINAS GERAIS
5. MARANHÃO	19. ESPÍRITO SANTO
6. PIAUÍ	20. SÃO PAULO
7. CEARÁ	21. RIO DE JANEIRO
8. RIO GRANDE DO NORTE	22. GUANABARA
9. PARAÍBA	23. PARANÁ
10. PERNAMBUCO	24. SANTA CATARINA
11. ALAGOAS	25. RIO GRANDE DO SUL
12. SERGIPE	26. TERRITÓRIO DE FERNANDO DE NORONHA
13. ACRE	27. DISTRITO FEDERAL
14. TERRITÓRIO DE PONTA GROSSA	

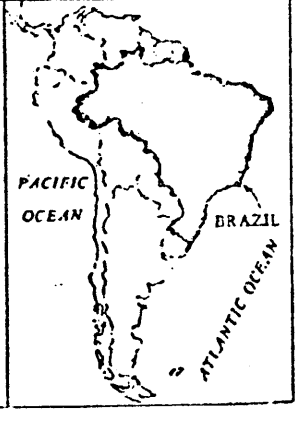


Table 2.1 BRAZIL

TABELA 2.2.
RENDA FAMILIAR ANUAL (EM CRUZEIROS NOVOS/POR ANO). 1960

Annual family income (in new cruzeiros per year) 1/	TOTAL (Urban + Rural Areas)							
	BRAZIL		NORTHEAST		EAST		SOUTH	
	Families	2/ Population	Families	Population	Families	Population	Families	Population
	----- Thousands -----							
Total.....	14,337	70,967	3,986	21,286	5,037	24,833	5,188	24,848
Under 100.....	710	2,413	456	1,709	246	765	106	338
100 to 149.....	883	3,818	551	2,627	289	1,207	159	577
150 to 249.....	2,426	11,035	1,023	5,028	867	3,849	652	3,026
250 to 349.....	2,056	10,070	647	3,489	708	3,516	714	3,223
350 to 499.....	2,404	12,036	509	3,189	808	3,953	1,005	4,716
500 to 799.....	2,670	14,002	441	2,712	976	5,016	1,134	5,636
800 to 1199.....	1,497	8,154	189	1,271	578	3,030	643	3,330
1200 to 2499....	1,309	7,168	149	1,001	474	2,622	587	3,046
2500 and over...	353	2,271	23	262	111	874	187	957
	----- Urban Areas -----							
	----- Thousands -----							
Total.....	6,985	31,991	1,519	7,337	2,577	12,035	2,914	12,619
Under 100.....	291	790	135	410	120	321	41	81
100 to 149.....	395	1,516	208	911	136	507	74	216
150 to 249.....	1,138	4,779	392	1,738	436	1,804	327	1,195
250 to 349.....	995	4,472	266	1,291	359	1,675	383	1,570
350 to 499.....	1,204	5,630	209	1,209	424	2,009	578	2,490
500 to 799.....	1,352	6,469	166	897	518	2,571	645	2,896
800 to 1199.....	782	3,964	72	442	294	1,528	404	1,936
1200 to 2499....	660	3,302	62	378	237	1,200	356	1,716
2500 and over...	170	1,069	9	59	55	420	107	520
	----- Rural Areas -----							
	----- Thousands -----							
Total.....	6,138	38,976	2,117	13,949	1,842	12,798	2,045	12,229
Under 100.....	487	2,311	374	1,760	126	675	76	336
100 to 149.....	493	2,744	300	1,730	175	1,069	91	432
150 to 249.....	1,183	7,070	536	3,345	364	2,295	330	1,858
250 to 349.....	902	5,691	277	1,932	274	1,981	315	1,748
350 to 499.....	920	5,870	217	1,749	234	1,509	373	2,209
500 to 799.....	1,041	7,101	240	1,945	252	1,806	432	2,769
800 to 1199.....	467	3,453	102	833	157	1,227	175	1,232
1200 to 2499....	487	3,652	60	554	207	1,766	183	1,227
2500 and over...	159	1,084	9	94	54	472	71	421

1/ See methodology. 2/ Cruzeiros of July 1961/June 1962 for capital cities; cruzeiros of July 1962/June 1963 for interior cities; cruzeiros of 1962 and 1963 for the rural areas. The increase in the cost of living was 252 percent between July 1961 and December 1963. Population is adjusted to a 1960 base.

TABELA 2.3 - Deficiências de Nutrição (1960)
 CONSUMIDORES COM CONSUMO PER-CAPITA DIÁRIO ABAIXO DO PADRÃO DE
 REFERÊNCIA DE 2450 CALORIAS, 55 gs. PROTEÍNAS E 40 gs. DE GORDURA

	Brasil		Nordeste		Leste		Sul	
	1,000	%	1,000	%	1,000	%	1,000	%
<i>CALOR. DEFIC. POP.</i>								
TOTAL	27,337	38.5	16,041	75.4	9,337	37.6	7,164	28.8
URB.	17,189	53.7	5,560	75.8	6,315	52.5	5,551	44.0
RUR.	12,126	31.1	10,525	75.5	4,038	31.6	336	2.8
População/Deficiência/Proteínas								
TOTAL	2,413	3.4	4,336	20.4	1,972	7.9	338	1.4
URB.	2,307	7.2	1,321	18.0	2,632	21.9	1,492	11.8
RUR.	2,311	5.9	1,760	12.6	675	5.3	-	0
População/Deficiência/Gordura								
TOTAL	710	5.0	2,677	67.1	246	4.9	-	0
URB.	685	9.8	735	48.4	255	9.9	41	1.4
RUR.	487	7.9	1,488	70.3	126	6.8	-	0

FONTE: Fundação Getúlio Vargas
 Instituto Brasileiro de Economia
 Centro de Estudos Agrícolas, 1963.

However, preliminary indications from the family income survey^{2/} are that these numbers may be a little low. The broad picture of the nutrient deficiencies is given in Table 2.3. One observes that the problem is quite extensive throughout all regions of the country (1960) but particularly bad in urban areas and in the Northeast. Many studies have established that income is a major determinant of nutritional intake. The general pattern for caloric intake may be seen in Table 2.4. Here caloric intake rises steadily with income. The main sources of calories also indicate the steady increase of each one with income. However, a slightly more disaggregated picture of say, cereals would indicate that the cereal intake of the poor contains a higher proportion of corn meal. This may be seen by considering Table 2.5. Here one observes that the poor obtain relatively larger amounts of their cereal intake from corn meal while the richer tend to favor say, macaroni products. One also observes the relative importance of beans to the poor. The numbers would indicate that for rice the quantity consumed is positively correlated with income. This may be a little misleading however as the methodology used did not adequately account for quality effects. It might be better to depend on expenditure data of the survey. One may review various food consumption patterns by income and by region. This gives a general picture for the early 1960's. In particular it permits one to estimate what the poor consume, in what quantities, and also to obtain estimates for income elasticities.

It is difficult at present to obtain estimates for income elasticities. One of the few sources available is given in Table 2.6. It does indicate some of the difference between regions. However, for policies directed towards specific groups

TABELA 2.4 - Calorias Diárias Consumidas Por Pessoa - Cont.

Region, and annual family income (New cruzeiros por year) ^{2/}	Total Calories	MAIN FOOD GROUPS						
		Cereale	Roots & Tubers	Meat, Poultry Fish & Eggs	Milk & Cheese	Fruits	Fats	Sugar
----- Calories per day -----								
BRAZIL (rural areas)								
All familias	2.640	1.155	475	216	130	102	288	274
Under 100	1.755	804	394	112	37	65	136	207
100 to 149	2.242	979	483	162	78	76	217	247
150 to 249	2.291	981	498	167	106	77	235	227
250 to 349	2.505	1.091	471	189	104	106	293	251
350 to 499	2.649	1.151	449	257	139	91	288	274
500 to 799	2.751	1.230	468	247	148	101	286	271
800 to 1199	3.536	1.424	609	333	190	158	476	346
1200 to 2499	3.333	1.373	417	334	218	137	440	414
2500 and over	4.015	1.733	528	468	207	132	557	390
NORTHEAST BRAZIL (rural areas)								
All familias	2.145	743	698	215	118	64	108	199
Under 100	1.503	568	534	142	39	30	55	135
100 to 149	1.812	591	682	148	80	47	89	175
150 to 249	2.135	670	813	195	100	67	107	183
250 to 349	1.820	587	650	182	109	49	80	163
350 to 499	2.282	854	615	222	151	67	170	203
500 to 799	2.373	839	715	276	132	57	115	239
800 to 1199	3.381	1.186	914	384	213	145	217	322
1200 to 2499	2.868	1.035	550	302	261	175	195	350
2500 and over	2.901	1.052	853	282	182	55	230	247
EAST BRAZIL (rural areas)								
All familias	2.770	1.305	364	160	114	157	360	310
Under 100	1.424	635	286	67	16	128	181	111
100 to 149	2.103	983	392	126	46	130	271	155
150 to 249	2.211	1.019	372	131	83	115	272	219
250 to 349	2.720	1.390	339	135	80	164	326	285
350 to 499	2.673	1.190	420	154	123	116	352	318
500 to 799	2.920	1.438	366	161	123	164	386	282
800 to 1199	3.058	1.319	454	196	142	196	377	374
1200 to 2499	3.042	1.308	289	206	160	135	514	430
2500 and over	4.102	2.055	267	283	197	239	584	477
SOUTH BRAZIL (rural areas)								
All familias	3.057	1.487	331	292	163	89	369	326
Under 100	2.385	1.219	348	126	58	40	298	386
100 to 149	2.895	1.436	351	208	115	53	306	426
150 to 249	2.499	1.284	255	164	135	52	327	282
250 to 349	2.863	1.368	402	250	127	110	288	318
350 to 499	2.974	1.446	286	341	148	87	360	306
500 to 799	2.999	1.468	295	302	192	85	359	298
800 to 1199	3.777	1.814	425	412	212	131	433	350
1200 to 2499	4.155	1.817	403	472	225	95	647	496
2500 and over	4.772	2.178	433	612	249	106	733	461

1/ See methodology.

2/ Cruzeiros of July 1961/June 1962 for capital cities; cruzeiros of July 1962/June 1963 for interior cities; cruzeiros of 1962 and 1963 for the rural areas. The increase in the cost of living was 252 percent between July 1961 and December 1963. The increase in the cost of living was percent between July 1961 and June 1963.

TABELA 2.5 - CONSUMO MÉDIO ANUAL PER CAPITA DE ALGUNS ALIMENTOS POR PESSOAS DE BAIXA RENDA

Região, urbanização e renda familiar anual (em cruzeiros novos/por ano)	arroz	feijão	fubá	farinha de trigo	pão	massas	biscoitos	trigo equivalente em produtos
(áreas urbanas e rurais)	----- em kilos per capita -----							
1. - Total (áreas urbanas e rurais)								
1.0 - <u>Brasil</u>								
Total.....	39.443	27.945	14.839	10.466	20.730	5.144	2.122	45.750
Under 100.....	20.173	21.985	14.544	7.455	10.370	2.182	0.572	23.205
100 to 149.....	31.777	25.261	14.521	6.957	13.371	3.000	0.715	25.198
150 to 249.....	32.398	26.877	14.338	7.023	15.985	3.376	1.210	33.307
250 to 349.....	36.657	27.706	15.930	10.734	17.561	4.067	1.444	41.263
350 to 499.....	39.294	28.006	15.708	9.320	21.144	4.565	1.762	44.457
500 to 799.....	41.260	28.742	15.876	11.987	23.660	5.544	2.450	53.033
800 to 1199.....	50.591	32.307	13.178	13.907	26.706	5.433	3.206	59.766
1200 to 2499.....	49.534	30.715	13.235	14.389	26.125	7.080	4.206	65.430
2500 and over.....	57.666	33.187	18.326	17.277	30.426	9.769	4.077	75.504
1.1 - <u>Nordeste Brasil</u>								
Total.....	23.324	37.665	5.334	0.720	17.752	2.403	2.790	27.368
Under 100.....	12.591	34.135	5.124	0.316	7.142	0.517	1.219	10.520
100 to 149.....	16.379	31.004	6.170	0.174	10.981	0.885	1.813	15.815
150 to 249.....	16.502	38.580	4.546	0.293	14.419	1.580	2.415	21.489
250 to 349.....	22.849	31.453	3.392	0.644	17.855	2.074	2.351	26.385
350 to 499.....	24.297	42.581	8.032	0.656	21.615	3.299	2.952	33.027
500 to 799.....	26.400	38.493	5.490	1.114	23.722	3.908	3.719	37.757
800 to 1199.....	43.325	50.625	3.867	2.043	29.613	4.006	5.100	47.309
1200 to 2499.....	41.301	45.040	5.135	2.569	26.227	5.595	5.218	46.672
2500 and over.....	57.608	28.744	8.910	4.365	27.446	6.995	4.173	51.156
1.2 - <u>Leste Brasil</u>								
Total.....	44.606	24.621	22.348	5.754	20.865	6.163	2.070	42.020
Under 100.....	18.928	13.716	17.335	0.832	10.546	3.114	0.169	17.439
100 to 149.....	34.656	20.733	17.464	2.224	13.042	4.741	0.365	24.588
150 to 249.....	36.976	21.600	21.000	2.840	14.489	3.914	0.768	26.338
250 to 349.....	43.572	24.247	27.936	6.357	17.530	5.640	0.932	37.023
350 to 499.....	41.224	20.697	23.434	4.275	20.342	5.520	1.408	37.758
500 to 799.....	48.654	27.259	24.071	6.910	23.067	6.717	2.497	47.298
800 to 1199.....	53.300	24.612	16.225	7.770	24.906	6.385	1.538	48.914
1200 to 2499.....	48.959	24.089	17.917	9.924	27.529	7.899	9.252	66.042
2500 and over.....	54.764	41.998	26.338	11.447	38.698	4.516	4.080	69.395
1.3 - <u>Sul Brasil</u>								
Total.....	48.094	22.950	15.480	23.527	23.144	6.472	1.020	67.412
Under 100.....	27.913	19.845	19.824	20.194	12.959	2.677	0.402	45.581
100 to 149.....	42.063	24.867	19.595	17.502	15.746	3.074	0.170	45.333
150 to 249.....	41.156	22.125	16.071	16.969	18.817	4.375	0.601	50.391
250 to 349.....	41.353	22.242	14.674	23.756	17.339	4.203	1.177	58.250
350 to 499.....	50.213	22.827	14.564	21.766	21.539	4.694	1.153	60.940
500 to 799.....	46.601	21.872	14.906	26.378	24.195	5.830	1.342	71.846
800 to 1199.....	55.113	24.306	18.113	30.208	26.010	5.702	1.942	79.496
1200 to 2499.....	57.167	25.067	15.996	28.981	30.342	7.535	3.030	86.571
2500 and over.....	60.623	28.190	16.389	34.147	24.708	7.818	3.993	88.785

- -

one would also like some estimates of elasticities at various income levels. Certain features are however of interest; the low values for beans for all regions; the value for corn meal (fubā) is negative or negligible everywhere except in the urban northeast where it is 0.66! The aggregate values for manioc flour are all low but this may mask the major differences in consumption patterns between income groups. The elasticities for poultry are all greater than in urban sectors, but approximately 0.33 in rural sectors. This would indicate the luxury nature of the food which may be due to taste but is likely also to be caused by price, availability, etc.

A lot of this data is quite useful but it is essential to try to get some insight into the pattern existing in the 1970's. This may be done by seeking some linkages via say income distribution.

Trends from 1960's to 1970

Since the publication of the 1970 census there has been considerable discussion on how the population fared during the decade. This discussion has often centered on the issue of income distribution. In view of the strong correlation between income and food consumption, the nutritional implications are obvious. There is general agreement that:

- a. the distribution of income as measured by say the Gini coefficient has become more unequal;
- b. those at the highest and lowest levels have had an increase and decrease respectively in real purchasing power;
- c. it is difficult to assess at what level of income there been a gain in real purchasing power. This involves

COEFICIENTE DE ELASTICIDADE-REND A DA DEMANDA PARA
OS PRODUTOS AGRÍCOLAS, NO MEIO RURAL E URBANO
DO BRASIL. VALORES ESTIMADOS COM DADOS
COLHIDOS EM 1962 E 1963

P r o d u t o s	Setor Urbano				Setor Rural			
	Nordeste	Leste	Sul	Brasil	Nordeste	Leste	Sul	Brasil
Carne Bovina				0,64				0,27
Fresca	0,71	0,71	0,79	0,72	0,37	0,56	0,59	0,50
Seca	0,16	0,15	0,12	0,15	-0,72	-0,25	0,10	0,25
Carne Suína	1,23	1,00	0,93	1,02	0,37	0,45	0,38	0,40
Carne Ovina e Caprina	-0,37	0,54	0,79	0,24	0,44	-0,26	0,37	0,16
Banha	0,29	-0,04	-0,10	-0,04	0,33	0,28	0,28	0,29
Toucinho	0,32	0,04	0,10	0,08	0,52	-0,11	0,68	0,26
Carne Industrializada (em geral) ..	0,78	0,72	0,81	0,77				
Pescados				0,80	-0,08	0,22	0,29	0,07
Frescos	0,58	0,85	0,83	0,74				
Industrializados	0,71	1,00	1,05	0,93				
Aves	1,91	1,09	1,45	1,31	0,38	0,25	0,31	0,33
Ovos	0,95	0,72	0,60	0,70	0,73	0,41	0,49	0,57
Leite				1,00				0,56
In Natura	1,10	0,90	0,55	0,76	0,57	0,58	0,42	0,50
Em pó	0,78	0,04	0,24	0,35	-0,08	-	0,06	0,02
Queijo	2,33	1,41	1,11	1,38	0,63	0,67	0,70	0,68
Manteiga	1,00	1,33	1,26	1,21	1,25	0,96	1,03	1,09
Arroz	0,53	0,19	0,14	0,21	0,53	0,30	0,21	0,33
Feijão	0,18	0,02	-0,03	0,04	-0,01	0,12	0,05	0,04
Trigo				0,36				0,41
Farinha	1,39	0,66	0,30	0,51	2,01	0,67	0,35	0,43
Pão	0,43	0,31	0,26	0,32	0,63	0,34	0,35	0,45
Massas	1,08	0,37	0,38	0,46	0,56	0,17	0,29	0,30
Milho								-0,02
Verde					-0,25	0,16	0,07	-0,18
Fubá	0,66	-0,22	-0,10	-0,08	-0,10	-0,07	0,09	0,01
Mandioca				-0,04				0,01
Aipim	0,41	0,43	0,35	0,40	0,53	0,11	0,07	0,18
Farinha	-0,10	0,08	-0,11	-0,06	0,05	-0,13	-0,17	-0,01
Batata	1,09	0,45	0,41	0,48	1,80	0,84	0,45	0,59
Açúcar	0,33	0,24	0,19	0,24				-0,21
Branco					0,30	0,45	0,08	0,26
Rapadura					-0,35	-0,55	0,63	0,01
Melado					-	-1,81	-0,16	-1,63
Aguardente de Cana					-1,13	-0,58	0,46	-0,19
Café	0,28	0,22	0,18	0,22	0,15	0,05	0,05	0,08
Banana	0,73	0,69	0,46	0,64	0,46	-0,06	0,23	0,18
Laranja	1,07	0,73	0,67	0,74	-0,08	0,63	0,47	0,47
Óleos Vegetais	0,53	0,82	0,45	0,55	-0,03	0,74	0,23	0,21
Margarina	1,27	0,83	0,11	0,44				
Alimentação Total	0,62	0,56	0,50	0,55	0,44	0,38	0,36	0,40

FONT E: Instituto Brasileiro de Economia - FGV.

Tabela 2.6

Coeficiente de Elasticidade-Renda da Demanda

TABELA 2.7 Diferentes Estimativas da Distribuição de Renda 1960
(Dados do Censo - renda individual)

INCOME CLASSES	PERCENTAGE OF POPULATION				PERCENTAGE OF INCOME			AVERAGE INCOME (Cr\$ of 1960 per month)		
	1 ^a	2 ^b	3 ^a	4 ^b	1 ^a	2 ^b	3 ^a	1	2	3
2.10	25.3	24.8	26.1	24.8	5.2	5.0	5.2	1.2	1.2	1.3
2.11...3.30	17.1	17.1	16.9	17.1(58.75) ^c	7.7	7.7	7.0	2.6	2.7	2.7
3.31...4.50	13.1	13.2	12.3	13.2(14.45)	8.9	8.6	7.4	4.0	3.9	3.9
4.51...6.00	15.2	15.2	15.4	15.2(8.84)	13.8	13.2	12.3	5.2	5.2	5.2
6.01...10.00	16.7	16.8	16.2	16.7(9.13)	21.3	21.4	20.0	7.5	7.60	8.0
10.01...20.00	9.2	9.3	9.6	9.3(5.46)	20.7	21.1	22.2	13.2	13.5	15.0
20.01...50.00	2.9	3.6 ^d	3.0	3.6(3.37) ^d	14.8	23.0 ^d	16.4	29.4	38.4 ^d	35.0
50.01	0.5		0.6		7.6		9.4	87.9		108.7
TOTAL								5.9	6.0	5.5

Observations: a - does not include those "without income."
b - includes those "not economically active" with income; values in parenthesis correspond to estimates based on Log-Pareto Functions.
c - adjusted value until Cr\$ 3.30.
d - correspond to the class of Cr\$ 20.00 and more.
e - do not exist these estimates in the CEPAL/ILPES study.

Sources: 1. Langoni, Distribuição da Renda, op.cit.
2. Hoffman, Contribuição, op.cit.
3. Fishlow, "Brazilian Size Distribution" op.cit.
4. CEPAL/ILPES, La Distribución del Ingreso, op.cit.

TABELA 2.8 Comparação da Distribuição de Renda a Partir de Diferentes Fontes 1970

PERCENTILE	PERCENTAGE OF INCOME			AVERAGE INCOME (Cr\$ Of 1970 per month)			RELATIVE INCOME (in relation to the median income)		
	D.C.	IT.	2/3 L.	D.C.	IT.	2/3 L.	D.C.	IT.	2/3 L.
1+	14.10	10.50	8.69	3,976	9,692	3,394	26.19	17.09	13.95
5+	34.06	26.96	24.73	1,920	4,975	1,930	12.65	8.77	7.93
10+	46.47	39.02	36.36	1,309	3,600	1,419	8.63	6.35	5.83
10	15.14	15.73	15.40	426	1,451	601	2.81	2.56	2.47
10	9.95	10.91	10.88	280	1,006	424	1.85	1.77	1.74
10	7.21	8.40	8.51	203	775	332	1.34	1.37	1.36
10	6.17	6.77	6.89	174	625	268	1.14	1.10	1.10
10	5.02	5.62	5.70	141	519	222	0.93	0.91	0.91
10	3.81	4.72	4.94	107	435	192	0.71	0.77	0.79
10	3.00	3.85	4.34	85	355	169	0.56	0.63	0.70
10	2.05	2.94	3.96	58	271	155	0.38	0.48	0.64
10-	1.16	2.02	3.02	33	186	118	0.21	0.33	0.48
75-	33.03	39.39	42.43	124	484	221	0.82	0.85	0.91
25+	66.96	60.61	57.57	755	1,853	899	4.97	3.94	3.69
	AVERAGE INCOME			MEDIAN INCOME			GINI		THEIL
D.C.	282.			152.			0.56		0.66
IT.	922.			566.			0.48		0.46
2/3 L.	390.			243.			0.44		0.37

Observations: D.C. = demographic census; IT. = income tax; 2/3 L. = 2/3 Law

Aources: Langoni, Distribuição da Renda, p. 273, Table A2.1.

the usual problems of making intertemporal comparisons--
the technical problems of what deflator to use, besides
the broader issue of how one should take into account
taste changes, different availabilities, etc.

Two sets of data are given in Tables 2.7 and 2.8. These
indicate that income distribution has ^{become} been more unequal during
the 10 year period. It is of interest to see what happened to
food availability in this period.

Food Availability in 1970

The food balance sheet provides an excellent source of
data but the per capita availability should be viewed as an
upper bound on the quantity actually consumed due to losses in
storage, processing, etc. The details are given in Table 2.9
(four pages).

Some of the average availabilities are given in summary in
Table 2.10.

Table 2.10 - FOOD AVAILABILITY

<u>Average in grams-capita-day</u>		
	<u>1960</u>	<u>1970</u>
Rice	115.1	133.0
Beans	61.6	58.9
Beef	42.6	43.0
Milk (fresh)	138.4	145.8
Bananas	111.0	165.8
Oranges	51.8	80.6

(Centro de Estudos Agrícolas-IBRE/FGV)

BALANÇO ALIMENTAR DO BRASIL - 1968/1970

1 - BALANÇO E DISPONIBILIDADE PARA CONSUMO HUMANO (Consumo aparente, SEGUNDO O ANO

3. Discriminação, por grupos e gêneros alimentícios, relativa a 1970

Unidade: Tonelada (t)

NÚMERO DE ORDEM	GRUPOS E GÊNEROS ALIMENTÍCIOS (a)	B A L A N Ç O				DISPONIBILIDADE PARA CONSUMO HUMANO (Consumo aparente)			
		PRODUÇÃO (b)			DISPONIBILIDA- DE BRUTA (c=b+c-d)	CONSUMO NÃO HUMANO (11) (f)	TOTAL (g=c-f)		
			IMPORTAÇÃO (c)	EXPORTAÇÃO (d)				QUILO-ANO (h = $\frac{g}{95305}$)	GRAMA-DIA (i = $\frac{h}{365}$)
	I - Cereais								
1	Arroz (1)	7.553.083	45	139.668	7.413.460	2.864.973	4.548.487	47,726	130,8
2	Milho (2)	14.216.009	6.743	1.470.638	12.752.114	9.668.126	3.083.988	32,359	88,7
3	Trigo (2)	1.844.263	1.992.564	-	3.836.827	1.285.105	2.551.722	26,774	73,4
	II - Raízes e Tubérculos								
4	Batata-doce	2.133.983	-	21	2.133.962	640.195	1.493.767	15,674	42,9
5	Batata-inglês	1.583.465	2.120	25	1.583.560	512.156	1.071.404	11,242	30,9
6	Mandioca-brava (3)	17.678.565	-	165.326	17.513.239	13.700.888	3.812.351	40,002	109,6
7	Mandioca-mansa	11.785.710	-	-	11.785.710	5.421.427	6.364.283	26,779	183,0
	III - Açúcar								
8	Açúcar-de-cana (4)	5.069.919	0	1.126.223	4.943.696	-	4.943.696	51,872	142,1
	IV - Legumes e hortaliças								
9	Alho	36.377	16.526	-	52.903	8.880	44.023	0,462	1,3
10	Cebola	284.603	2.507	1.500	285.610	28.460	257.150	2,698	7,4
11	Tomate	764.119	-	11.493	752.626	114.618	638.008	6,694	18,3
	V - Leguminosa seca								
12	Feijão	2.211.449	1.747	905	2.212.291	205.734	2.006.557	21,054	57,5

Tabela 2.9

Balanço Alimentar para 1970 (pag. 1 de 4)

BALANÇO ALIMENTAR DO BRASIL - 1968/1970

1 - BALANÇO E DISPONIBILIDADE PARA CONSUMO HUMANO (Consumo aparente), SEGUNDO O ANO

3. Discriminação, por grupos e gêneros alimentícios, relativa a 1970

Unidade: Tonelada (t)

NÚMERO DE ORDEM	GRUPOS E GÊNEROS ALIMENTÍCIOS (a)	B A L A N Ç O				DISPONIBILIDADE PARA CONSUMO HUMANO (Consumo aparente)			
		PRODUÇÃO (b)	COMÉRCIO EXTERIOR		DISPONIBILIDADE BRUTA (e=b+c-d)	CONSUMO NÃO HUMANO (11) (f)	TOTAL (g=c-f)	POR HABITANTE	
			IMPORTAÇÃO (c)	EXPORTAÇÃO (d)				QUILO-ANO $(h = \frac{g}{95305})$	GRAMA-DIA $(i = \frac{h}{365})$
VI - Frutas frescas									
13	Abacaxi (5).....	423.903	-	14.283	409.620	33.912	375.708	3,942	10,8
14	Banana (5).....	6.407.700	-	204.247	6.203.453	640.770	5.562.683	58,367	159,9
15	Caju (5).....	162.305	-	-	162.305	16.231	146.074	1,533	4,2
16	Laranja (5).....	3.099.440	-	51.160	3.048.280	309.944	2.738.336	28,732	78,7
17	Limão (5).....	81.340	-	2	81.338	8.134	73.204	0,768	2,1
18	Manga (5).....	644.552	-	12	644.540	64.455	580.085	6,087	16,7
19	Melancia (5).....	412.225	-	-	412.225	41.223	371.002	3,893	10,7
20	Tangerina (5).....	244.485	-	126	244.359	24.449	219.910	2,307	6,3
21	Uva (5).....	598.016	5.474	-	603.490	358.810	344.680	3,617	9,9
VII- Carnes									
22	Em geral (7).....	2.289.497	1.305	122.617	2.168.185	-	2.168.185	22,749	62,3
23	Frescas (7).....	2.057.486	1.222	105.438	1.953.270	-	1.953.270	20,494	56,1
24	Industrializadas(7)	232.011	83	17.179	214.915	-	214.915	2,255	5,2
25	Avícola.....	85.661	274	-	85.935	-	85.935	0,901	2,5
26	Fresca.....	84.627	274	-	84.901	-	84.901	0,890	2,5
27	Industrializada.	1.034	0	-	1.034	-	1.034	0,011	0,0
28	Bovina (8).....	1.652.512	587	115.335	1.537.764	-	1.537.164	16,135	44,2
29	Fresca (8).....	1.561.713	579	98.309	1.463.983	-	1.463.983	15,351	42,1
30	Industrializada.	90.799	8	17.026	73.781	-	73.781	0,774	2,1

Tabela 2.9

Balanco Alimentar para 1970 (pag. 2 de 4)

BALANÇO ALIMENTAR DO BRASIL - 1968/1970

1 - BALANÇO E DISPONIBILIDADE PARA CONSUMO HUMANO (Consumo aparente), SEGUNDO O ANO

3. Discriminação, por grupos e gêneros alimentícios, relativa a 1970

Unidade: Tonelada (t)

NÚMERO DE ORDEM	GRUPOS E GÊNEROS ALIMENTÍCIOS (a)	B A L A N Ç O					DISPONIBILIDADE PARA CONSUMO HUMANO (Consumo aparente)		
		PRODUÇÃO (b)	COMÉRCIO EXTERIOR		DISPONIBILIDADE BRUTA (e=b+c-d)	CONSUMO NÃO HUMANO (11) (f)	TOTAL (g=c-f)	POR HABITANTE	
			IMPORTAÇÃO (c)	EXPORTAÇÃO (d)				QUILO-ANO (h = $\frac{g}{95505}$)	GRAMA-DIA (1 = $\frac{h}{365}$)
31	Caprina.....	21.963	-	-	21.963	-	21.963	0,230	0,6
32	Fresca.....	21.963	-	-	21.963	-	21.963	0,230	0,6
33	Ovina.....	34.453	2	218	34.237	-	34.237	0,359	1,0
34	Fresca.....	34.337	2	218	34.121	-	34.121	0,358	1,0
35	Industrializada.....	116	-	-	116	-	116	0,001	0,0
36	Suina (9).....	298.145	49	2.129	296.065	-	296.065	3,107	8,5
37	Fresca (9).....	266.966	1	2.129	264.838	-	264.838	2,779	7,6
38	Industrializada (9).....	31.179	48	-	31.227	-	31.227	0,328	0,9
39	Visceras, miúdos, rabos, chispes e mocotós.....	96.422	366	4.922	91.866	-	91.866	0,964	2,6
40	Frescos.....	87.880	366	4.782	83.464	-	83.464	0,876	2,4
41	Industrializados.....	8.542	0	140	8.402	-	8.402	0,088	0,2
42	Embutidos (salames, sal sicnes, etc.).....	100.341	27	13	100.355	-	100.355	1,053	2,9
VIII-Ovos									
43	Ovos.....	420.493	0	-	420.493	46.254	374.239	3,927	10,8
IX -Feixes									
44	Frescos.....	449.322	5.826	4.214	450.934	224.662	226.272	2,374	6,5
45	Industrializados..	134.797	48.100	31	182.866	-	182.866	1,919	5,3

Tabela 2.9

Balanço Alimentar para 1970 (pag. 3 de 4)

BALANÇO ALIMENTAR DO BRASIL - 1968/1970

I - BALANÇO E DISPONIBILIDADE PARA CONSUMO HUMANO (Consumo aparente), SEGUNDO O ANO

3. Discriminação, por grupos e gêneros alimentícios, relativa a 1970

Unidade: Tonelada (t)

Nº de Ordem	GRUPOS E GÊNEROS ALIMENTÍCIOS (a)	B A L A N Ç O				DISPONIBILIDADE PARA CONSUMO HUMANO (Consumo aparente)			
		Produção (b)	COMÉRCIO EXTERIOR		Disponibilidade de bruta (e=b+c-d)	Consumo não humano (II) (f)	Total (g=e-f)	por habitante	
			Importação (c)	Exportação (d)				Quilo-ano $\left(h = \frac{g}{95305}\right)$	Gramas-dia $\left(I = \frac{h}{365}\right)$
X - Leite e queijo									
Leite									
46	"In natura"	7.338.999	51	-	7.339.050	2.006.230	5.332.820	05,955	153,3
47	Industrializado (10)	880.680	179.174	259	1.059.595	-	1.059.595	11,118	30,5
48	Queijo, requeijão e ricota	50.614	577	333	50.858	-	50.858	0,534	1,5
XI - Gorduras e óleos									
De origem animal									
49	Banha	105.347	59	-	105.406	-	105.406	1,105	3,0
50	Manteiga	28.155	64	4	28.215	-	28.215	0,295	0,8
51	Toucinho	275.468	4	-	275.472	-	275.472	2,890	7,9
De origem vegetal									
52	De amendoim	131.308	2	222	131.088	-	131.088	1,375	3,8
53	De babaçu	85.472	-	-	85.472	-	85.472	0,897	2,5
54	De caroço de algodão	146.574	62	5	146.631	-	146.631	1,539	4,2
55	De soja	165.517	4.604	2.654	167.667	-	167.667	1,759	4,8

(1) Os números registrados nas colunas "b" a "f" correspondem ao gênero com casca e os das colunas "g" a "I" ao gênero descascado. (2) os núme-

Tablea 2.9

Balanço Alimentar para 1970 (pg. 4 de 4)

Again the situation is mixed. For the poor the increase in rice is good but the bean situation look ominous! At least the situation should be further analysed. A fall in the average availability together with the trends in income distribution is not a good sign.

More recent data on consumption by income group are given for the São Paulo region.^{4/} Some idea of the relative share of food in the family budget may be gained from Table 2.11. In the upper half one notices that up to salary levels of 3.49 minimum salaries families spend more than 50 percent of their income on food! In the lower half one observes that of this expenditure about 50 percent goes on cereals and beef. In conclusion one may say that there is not any evidence readily available which suggests that the lower income levels are better off from a nutritional point of view than they were in the early 1960's. Hence the general picture of Table 2.3 may be a reasonable estimate for 1975 with the appropriate adjustment for population growth in the intervening period.

The problem is greatest in the Northeast region and also it seems that the population is more deficient in calories. A food which would give more calories to the poor (together with some additional protein) would be desirable. Possible foods will now be discussed in more detail.

Tabela 2.11

- Relação entre consumo e renda das famílias investigadas, por classes de renda familiar - trimestre de 1-4 a 30-6-67

Classes de renda familiar (em salários mínimos trimestrais)	Propensão média a consumir	Propensão marginal a consumir	Elasticidade renda das despesas correntes	Porcentagem da renda familiar disponível gasta com alimentação
TOTAL	0,950	0,932	0,8728	38,54
Até 1,00 salário mínimo	1,135	1,010	1,3756	86,81
De 1,00 a 1,49 salários mínimos	1,000	0,947	0,8257	67,16
De 1,50 a 2,24 salários mínimos	1,121	0,927	0,8231	65,76
De 2,25 a 3,49 salários mínimos	1,023	0,932	1,0163	50,83
De 3,50 a 5,24 salários mínimos	1,021	0,876	0,8845	47,44
De 5,25 a 7,99 salários mínimos	0,976	0,919	0,8366	44,42
De 8,00 a 11,99 salários mínimos	0,875	0,926	0,9430	33,15
De 12,00 a 17,99 salários mínimos	0,788	0,905	0,7166	28,76
De 18,00 e mais salários mínimos	0,610	0,943	0,5809	15,15

- Notas: 1 As propensões média e marginal a consumir se referem a propensões intra-classes, excetuando-se o resultado para o total que representa uma média simples dos valores encontrados para cada classe de renda.
- 2 As elasticidades renda das despesas correntes são elasticidades-arco e, também se refere, as elasticidades intra-classes.

- Consumo médio trimestral por família, segundo classes de renda familiar - produtos do consumo alimentar preparado no domicílio - trimestre de 1-4 a 30-6-67 - percentuais

Especificação	Classes de renda familiar (em salários mínimos trimestrais)									
	Total	Até 1,00	De 1,00 a 1,49	De 1,50 a 2,24	De 2,25 a 3,49	De 3,50 a 5,24	De 5,25 a 7,99	De 8,00 a 11,99	De 12,00 a 17,99	De 18,00 e mais
CONSUMO ALIMENTAR NO DOMICÍLIO - TOTAL	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
1.0 - Cereais e produtos derivados	17,12	26,35	23,74	18,96	20,43	17,67	16,28	14,45	12,88	13,45
2.0 - Raízes, tubérculos feculentos e derivados	3,77	4,47	4,31	4,69	3,64	3,95	3,96	3,66	3,25	2,24
3.0 - Açúcares e doces	4,50	7,71	4,61	4,51	4,78	4,91	4,03	4,34	4,08	4,38
4.0 - Leguminosas secas, castanha e nozes	3,25	6,01	6,47	4,00	3,99	3,49	2,98	2,39	2,35	1,69
5.0 - Verduras	9,40	7,21	8,01	9,53	8,78	9,95	10,04	8,90	9,68	8,26
6.0 - Frutas	8,07	4,27	5,07	6,70	7,08	7,82	7,57	9,38	10,85	10,62
7.0 - Carnes	30,06	22,29	24,92	28,57	27,98	29,10	30,88	32,19	32,27	34,45
8.0 - Ovos	3,25	3,38	3,72	3,13	3,69	3,02	3,59	3,12	3,02	1,84
9.0 - Pescado: peixes, crustáceos e moluscos	3,43	1,69	2,86	3,14	2,91	2,85	3,57	4,29	4,10	4,62
10.0 - Leite e produtos lácteos	8,45	5,32	5,14	7,21	6,95	8,17	8,96	9,59	9,75	11,15
11.0 - Gordura, azeites e óleos	6,32	8,17	8,59	7,11	7,33	6,54	6,01	5,52	5,10	5,06
12.0 - Outros produtos	2,38	3,13	2,56	2,45	2,44	2,53	2,13	2,17	2,67	2,24

III. WHAT DETERMINES NUTRITIONAL STATUS?

A person's nutritional status is affected by a whole complex of ^{INPUTS} inputs which range through economic status, traditional belief patterns, local health and sanitary services, education, composition and availability of local foods. Depending on the particular group under investigation one or more of these issues may assume primary importance. In order to focus on some of the broader issues that may be of specific interest to agricultural policymakers it is necessary to consider a somewhat simplified model.

The model is shown schematically in Fig. 3.1. This program does not concern itself specifically even with this model. INAN has indicated that its work will include the link from nutrient intake to nutritional status. Here one needs specialists in the medical area to examine morbidity problems, chemists to analyse the water supply, etc. The resources of SUPLAN are best used in addressing problems to the left of nutrient intake in Table 3.1. Thus one is concerned with the flow of food to the household or family consumption unit.

Again it is desirable to decompose the malnutrition problem into two principal areas: (1) protein calorie malnutrition (P.C.M.); (2) specific nutrient deficiencies. Within the second category one includes, for example, vitamin A, iron, iodine deficiencies. These often causes lethargy especially in pregnant and lactating women. In Brazil the numbers affected may be as high as 50 percent. However, technology is presently available which can remove a large part of these deficiencies, by various

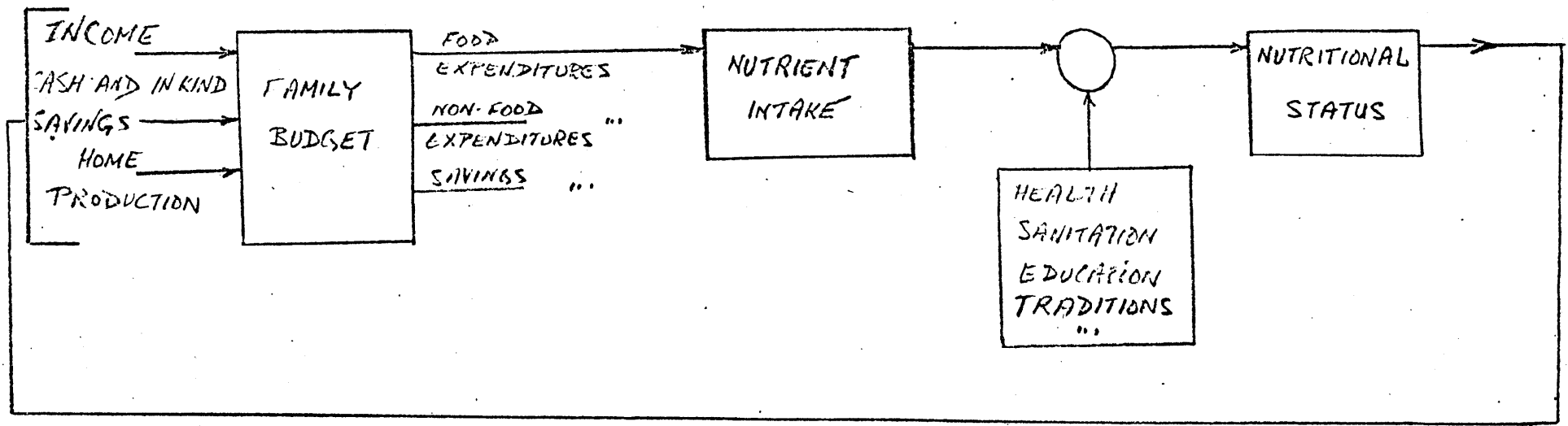


FIG. 3.1 SIMPLIFIED MODEL FOR NUTRITIONAL STATUS

fortification schemes for example, once a political decision is made. Again the research effort of SUPLAN is focusing on the first category P.C.M.--Protein Calory Malnutrition.

One further simplication is needed. In order to obtain a proper measure of malnutrition and in particular variations in nutritional status one should really obtain information on an individual basis. The problem of analysing distribution within the family is often quite important. In India, for example, it often happens that young girls are systematically deprived. Some data on the distribution within the family may be available but in general the research should concentrate on the family unit.

To summarize then the nutrition problem for SUPLAN purposes will be how to get enough food to each family so that at the family level there will be an adequate supply of calories, protein and fat.

It is desirable to analyse only a limited number of the foods consumed to avoid inordinate data problems and also to focus the attention of policymakers on the most important areas. How and which foods are selected is again not going to please everyone. Ideally one should select those foods which make up the major portion of the caloric, protein and fat intake for the population but particularly the undernourished.

In Table 3.1^{20/} one can obtain an estimate of the relative importance of various foods. From this one might analyse the following. The per capita consumption/annum is given as a guide.

TABELA 3.1
DISPONIBILIDADE DE PRODUTOS AGRÍCOLAS PARA O CONSUMO
HUMANO NO BRASIL NO PERÍODO DE 1960 A 1970

PRODUTOS	(kg/habitantes/ano)										
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Arroz	42,02	44,05	45,37	45,83	49,08	55,51	39,00	48,39	44,43	42,00	48,60
Milho	35,36	35,61	37,02	30,45	33,30	36,66	31,91	38,47	28,47	33,22	28,89
Trigo	28,33	24,52	28,53	24,66	30,41	22,28	26,61	26,41	28,61	29,46	22,97
Feijão	22,47	21,85	20,77	23,04	22,41	25,82	23,46	27,25	24,74	21,81	21,51
Batata-doce	12,91	13,15	13,71	14,17	14,23	14,90	16,08	18,19	16,84	16,79	16,03
Batata-inglesa	9,72	8,89	9,20	9,15	9,97	9,73	9,98	11,01	12,06	11,09	11,44
Mandioca-brava	34,55	34,78	37,37	41,02	40,62	39,86	37,37	41,67	44,19	44,90	-
Mandioca-mansa	46,42	46,67	50,17	53,56	62,20	64,96	63,32	66,01	67,01	63,89	-
Açúcar de cana	36,34	35,63	37,62	33,30	40,35	48,22	34,56	38,73	36,06	34,37	42,31
Carne bovina fresca	15,56	15,00	14,53	14,32	14,51	14,61	14,40	14,60	15,50	16,08	15,71
Carne bovina industrializada	1,26	1,08	1,03	0,99	1,11	0,89	0,72	0,06	0,93	0,79	0,79
Carne suína fresca	2,08	2,35	2,70	2,60	2,53	2,54	2,73	2,71	2,82	2,78	2,84
Carne suína industrializada	0,32	0,38	0,39	0,38	0,35	0,34	0,36	0,33	0,35	0,32	0,35
Carne avícola fresca	0,08	0,11	0,10	0,10	0,20	0,22	0,30	0,35	0,48	0,69	0,91
Carne avícola industrializada	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01
Carne caprina fresca	0,24	0,24	0,25	0,26	0,26	0,26	0,26	0,25	0,24	0,24	0,24
Carne ovina fresca	0,31	0,34	0,36	0,35	0,37	0,39	0,35	0,36	0,39	0,37	0,37
Carne ovina industrializada	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Leite In natura	50,50	51,6	49,68	52,41	58,78	63,93	60,60	57,65	57,33	55,22	53,22
Leite industrializado	7,52	8,74	10,12	10,47	9,88	10,01	12,22	12,67	12,00	12,21	13,52
Queijos	0,61	0,54	0,58	0,53	0,55	0,48	0,54	0,56	0,59	0,61	0,64
Manteiga	0,36	0,36	0,40	0,33	0,42	0,31	0,30	0,31	0,38	0,34	0,36
Ovos	3,30	3,35	3,43	3,54	3,67	3,72	3,78	3,79	3,87	3,97	4,02
Peixe fresco	1,74	1,89	2,76	3,11	1,84	2,01	2,78	2,45	2,92	2,35	-
Peixe industrializado	1,07	1,11	1,30	1,32	1,26	1,27	1,25	1,41	1,46	1,77	-
Bananas	40,53	41,80	45,49	46,20	48,47	48,60	48,42	53,72	54,82	58,60	60,45
Laranjas	18,93	20,41	21,03	22,93	22,29	23,46	24,49	25,27	26,92	28,09	29,38
Bananas	1,24	1,35	1,24	1,08	1,08	1,17	1,21	1,07	1,13	1,05	1,13
Toucinho	2,37	2,52	2,73	2,67	2,66	2,62	2,83	2,85	2,94	2,90	2,97
Óleo de amendoim	0,90	1,27	1,18	0,91	0,53	1,27	1,47	1,22	0,78	0,96	1,07
Óleo de algodão	1,32	1,59	1,81	1,66	1,70	1,34	1,62	1,27	1,56	1,95	1,58
Óleo de milho	0,04	0,09	0,06	0,07	0,06	0,06	0,08	0,08	0,08	0,08	0,08
Óleo de oliva	0,17	0,12	0,14	0,07	0,13	0,10	0,12	0,13	0,13	0,11	0,14
Óleo de soja	0,24	0,30	0,39	0,41	0,46	0,68	0,88	0,95	0,96	1,13	1,80
Café	4,38	4,81	5,03	5,30	5,74	6,03	5,84	6,04	5,96	5,79	5,72

Fonte: Centro de Estudos Agrícolas, IBRE/FGV.

Nota: A série de população foi calculada tomando-se como referência os dados dos Censos de 1960 e 1970.

Table 3.2 - CONSUMED FOODS PROPOSED FOR ANALYSIS

	kg/capita/annum for 1970
1) Rice	----- 48.60
2) Maize	----- 28.89
3) Wheat	----- 28.97
4) Beans	----- 21.51
5) Potatoes	----- 27.47
6) Manioc	----- 108.79 (*)
7) Meats	----- 21.3 (aggregate est.)
8) Milk	----- 66.74 (est.)
9) Fruits	----- 90.00 (est.)
10) Sugar	----- 42.31

(*) 1969 estimate

Hopefully, nutritionists can provide a key input here in deciding which foods are chosen as the aggregate estimate tends to mask regional and income group differences.

IV. POLICY ORIENTED RESEARCH

One of the most important requirements of the problem is that it should produce results which may be readily adapted to the policymaking process. For nutrition planning this problem is particularly difficult. The interdisciplinary nature of the research and the lack of central policy authority for nutrition makes careful planning even more necessary than for many of the usual areas of investigation.

It is desirable that researchers be aware of existing approaches to policy formation and suggest new options. A preliminary review of the Brazilian approach indicates that the authority for policy formation in the general area of nutrition is spread among a number of agencies. Most of authority rests with the Federal Government and principally among the ministries of Agriculture, Finance, Health, Interior and Planning (not necessarily in order of importance).

Policymaking involves a great variety of inputs and usually includes a bargaining process sensitive to many political and economic forces. The following analysis is simplified and excludes many issues that may even be critically important in special instances. Three examples of general policy areas of fundamental importance for nutrition are considered (1) production, (2) consumption, and (3) marketing.

Production

The primary concerns of Ministry of Agriculture policy are:

1. Exports - y_1
2. Increasing domestic production - y_2
3. Satisfying the needs of the domestic market - u .

In order to achieve these objectives there are a number of policy instruments available to the Ministry. These include:

1. Control of prices at the production stage - U_1
2. Control of prices for various inputs - U_2
3. A significant voice in the allocation of credit - U_3

The system is shown symbolically in Fig. 4.1.

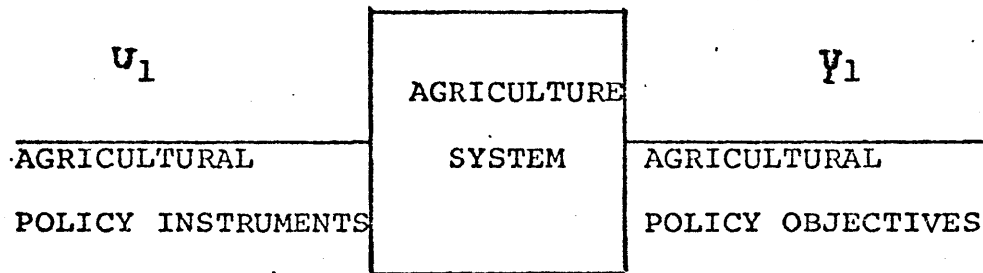


Fig. 4.1 AGRICULTURAL POLICY SCHEMATIC

A cursory review indicates that currently, while agricultural policy does not consciously concern itself with a nutrition objective-- Y_4 it does affect it.

$$Y_4 = f(u_1, u_2, u_3, \dots)$$

If policymakers were aware of how their policies effected nutrition then this could serve as an added input. For example, the 40 percent subsidy for fertilizer favors certain crops more than others. It is of interest to see whether nutritionally important foods like rice, manioc and beans are systematically favored or hindered by such a policy. Certain policies may in fact help exports and have complementary beneficial effects on nutrition. Conceivably a policy to favor arboreal cotton would be in this class. Here one has an export market and in addition a production structure which is both labor intensive, involves a lot of small farmers, and is associated with the production of

food crops, beans and corn. Useful research in this general area would produce results which could for example, take the form shown in Table 4.1. Here a typical term a_{ij} gives a measure of the increase in the objective j in response to a unit increase in the policy instrument i . This would simultaneously indicate the concomitant change in income and home consumption (and hence nutrition). At a later stage the research could become a little more sophisticated and include some cost-benefit analysis. A planning model can then be developed with an objective function including various weighting combinations. At a later stage substitution effects between various crops and dynamic effects can be added.

Thus the Ministry of Agriculture policies have their principal impact on the production and marketing side, and research in this area should be conscious of this reality. For example, it is not very useful to direct research in this area to improving nutrition by say various health or electrification schemes as the Ministry of Agriculture does not normally concern itself with policies in that area.

The policies discussed here are principally short term in nature. Researchers should inform themselves about the complete organization of the Ministry of Agriculture so that they can also consider some of the more complex and longer term policies.

These may include:

- a. The problem of storage and warehousing, location of facilities--policies of CIBRAZEM;
- b. Commercial policy, stock regulation--COBAL.
- c. Long term research on various seeds, etc.--EMBRAPA and its executive partner, EMBRATER.

C R O P O R F O O D

Policy Instrument	Export	Production	Domestic Market	Home Consumption	Employment by Income Class		
					0-100	100 - 200	...
+ Production price supports							
+ fertilisers subsidies	- - - - -	a _{ij}					
+ Credit							
Technology							
+ Taxes							
...							

TABLE 4.1 POLICY IMPACT TABLEAUX

d. Land tenure system--INCRA.

On the other hand policy at the consumption level is strongly influenced by the Ministry of Finance so that researchers working in this area should reflect the realities of the present situation.

Consumption

The Ministry of Finance affects nutrition both by playing a major role in setting many price levels and in determining the minimum wage. The government holds a monopoly position in bread and enforces a fixed price for the basic variety. It also decides prices for coffee and for some of the lower priced varieties of meat. This latter policy is quite ingenious and some researchers might consider the possibility of extending the approach to other commodities.

Some implications for nutrition policy may be obtained by considering one of the instruments. The Ministry of Finance "suggests" prices at the Supermarket level for goods in all state capitals each month. For example, in São Paulo the prices for 52 items are set. A portion of a typical list is shown in Table 4.2. Now the question arises of how this policy affects nutrition and in particular how nutrition considerations may be included. Again, to obtain some insight one must try to understand the policymaking process. Here it is quite different from the Ministry of Agriculture. The typical groups, involved are supermarket owners, food processors and wholesalers and various political interests. For example, politicians are much more sensitive to the price of wage goods in São Paulo or Rio than they are in Recife. Perhaps the dominant consideration is

TABELA 4.2

LISTA DE PREÇOS MÁXIMOS - CIP/SUNAB A PARTIR DE

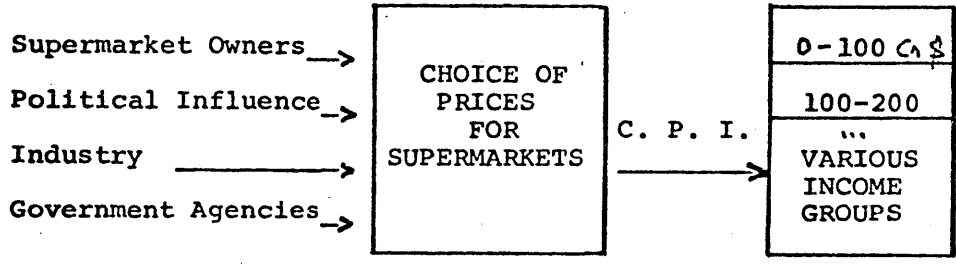
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SÃO PAULO

ORDEM	PRODUTOS	UNIDADE	PREÇOS MÁXIMOS
01	- Alcool comum hidratado - 96º GL todas as marcas	Litro	4,00
02	- Arroz Amarelão extra dos Estados Centrais, empacotado, com até 20% de quebrados, todas as marcas	Kg.	4,50
03	- Arroz importado italiano, empacotado com até 15% de quebrados - qualquer marca	Kg.	4,10
04	- Arroz Gaúcho empacotado, com até 20% de quebrados, das marcas Vera, Fronteira, Agape, Patinho, Pilon, Índio, Arca, Chico, Delicioso, Geca, Gazela, Tche, Riso Tri lhotero, Blue Patna, Coparrez, Celina, Aristocrata, Lígia, Gaçapava, Jaguar, Imec, Anita, Diamante, Diploma ta, Agulhinha, Jóia, 5 Irmãos, Queroquero, Faizão, Maí nardi, Trevisan, Tio João, Tanagi Figuera, Alvo Luxo, Alfredão, Piaziro, Oriente Extra, Neli Osório, Sogenal da, Gauchita, Teten, Goiânia, Palmares, Butui, Cooriz ca, Rialto, Gege e Lanceiro e demais marcas	Kg.	4,10
05	- Arroz amarelão, extra dos Estados Centrais, com até 20% de quebrados, a granel	Kg.	4,30
06	- Arroz Gaúcho com até 20% de quebrados, a granel	Kg.	3,90
07	- Arroz empacotado com mais de 20% de quebrados - todas as marcas	Kg.	3,20
08	- Arroz com mais de 20% de quebrados a granel	Kg.	3,00
09	- Biscoito Maria e Maizena, empacotado, todas as marcas.	200 grs.	2,00
10	- Biscoito Cream-Craker, empacotado, todas as marcas ...	200 grs.	2,25
11	- Biscoito Maria e Maizena, a granel todas as marcas ...	Kg.	8,00
12	- Biscoito Cream-Craker, a granel, todas as marcas	Kg.	9,10
13	- Carne Seca - dianteiro	Kg.	17,00
14	- Carne Defumada - costela	Kg.	18,50
15	- Carne Defumada - Lombo	Kg.	24,50
16	- Carne Salgada - Costela	Kg.	12,00
17	- Creme Dental "Colgate", Gessy" e "Kolinós"	67 a 70 grs.	1,90

inflation. This is typically reflected in the Consumer Price Index (C.P.I.). Thus a simplified model of pricing policy is shown schematically in Fig. 4.2.

FIG. 4.2. - CONSUMER PRICING POLICY FOR SUPERMARKETS



In this framework one observes that policy outcome is focussed on the level of the C.P.I. Policies which tend to increase it are not desirable while those which reduce or even moderate the increase are desirable. However, the C.P.I. does not affect all income groups in the same way. Conceivably one could have two policies under consideration which would have similar effect on the C.P.I. but significantly different effects on low or upper income groups, e.g., a small increase in say the price of rice or a significant increase in say biscuits. If the analytical results were available then policymakers could include these distributional effects in their decision making.

Even for specific foods one observes significant variations for different qualities. One notices for example, in Table 4.2. that the prices for rice vary from 3,00 Cr\$/kg to 4,50 Cr\$/kg. Thus the consumption research should determine:

1. What qualities are actually consumed by various income groups.
2. How quality varies as income changes.

3. Are there demonstration effects?
4. Does the composition of the C.P.I. itself have a built in distributional effect.

The nutritionists could provide essential information on whether nutrient content varies with quality.

While the government does control bread and a few other prices at all outlets, the large list of 52 items is only for the supermarkets and the prices are maintained by a form of moral suasion. Marketing research could provide a useful input here.

Marketing

Since supermarkets are controlled but not other outlets the question arises of who uses them. Currently the available information is not adequate. However, a recent study by SUDENE/^{25/} U.F.Pe. does cast some light on the subject. This study is concerned with five urban regions in the Northeast. Consider the purchasing pattern shown in Table 4.3. This yields an interesting pattern. There are four principal retail outlets: (1) Open market; (2) Supermarket; (3) Small shops; (4) Butcher shops.

Supermarkets are used much more by upper income groups, open markets by lower income groups but the lowest income groups exercise a strong preference for small shops. The reasons for this are somewhat complicated--the availability of credit for example, is a big element for low income groups. However, research in this area must address the question of what are the distributional effects of a policy which concerns itself mostly with supermarkets. Questions which spring to mind are:

TABELA 4.3
 GRANDE RECIFE
 HÁBITOS DE COMPRAS POR NÍVEIS DE RENDA SEGUNDO OS FORNECEDORES
 (Em percentagens dos gastos)
 1973

TIPO DE FORNECEDOR	NÍVEIS DE RENDA (1)									
	0 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7	7 - 9	9 - 15	15 e +
Feira Livre	20,68	22,85	22,36	18,18	16,14	17,57	17,40	15,94	12,29	9,18
CEASA	0,00	0,23	0,32	0,38	0,63	0,89	0,84	0,67	2,81	4,69
Supermercado	15,36	16,37	19,18	22,86	28,03	27,90	32,64	33,73	39,26	46,40
Armazém/mercearia	29,89	25,94	19,12	19,51	14,35	13,71	10,42	8,48	5,10	1,26
Padaria/confeitaria	5,54	7,18	9,64	9,55	9,40	8,22	9,31	8,92	8,05	7,38
Açougue/frigorífico	14,55	12,74	14,83	16,12	17,01	17,55	18,96	18,63	19,57	18,53
Quitanda/frutaria	0,62	0,95	0,69	0,98	0,98	0,44	0,40	0,54	0,31	0,49
Mercado Público	7,55	8,00	7,55	5,93	7,71	6,84	5,00	7,61	6,54	6,52
Peixaria	0,15	0,14	0,09	0,13	0,12	0,04	0,03	0,07	0,22	0,38
Ambulante	3,02	2,68	1,87	1,52	1,79	2,95	1,64	2,49	2,31	2,34
Cooperativa/subsistência	0,25	0,87	1,70	2,36	1,51	1,26	0,61	0,80	1,21	1,25
Produtor	0,94	1,39	1,64	1,99	1,87	2,17	2,07	1,39	1,69	1,31
Distribuidor/representante	0,33	0,06	0,21	0,00	0,15	0,26	0,05	0,30	0,38	0,01
Outros	1,04	0,52	0,72	0,41	0,24	0,13	0,56	0,37	0,19	0,18

FONTE: Levantamento direto do PIMES - CME.

(1) Os níveis de renda são medidos em termos de salário mínimo mensal que na época da pesquisa era de Cr\$ 213,60.

- a. To what extent are supermarkets price leaders.
- b. If the Government can control bread prices at all outlets what would be required to extend control for some other essential commodities.

Supervision is difficult. The current structure requires about 110 inspectors in the Rio area alone! Perhaps research may find some better approaches or indeed more imaginative policies.

It is emphasized that this is only a small sampling of some policy oriented research capabilities. It is mainly an attempt to indicate some lines of work that might be fruitful. In the more complete analysis one must study the complete processing, transportation distribution system. (P.T.D.). As countries develop the P.T.D. component increases (for example, see Kuznets²⁶ on this issue in U.S. and Sweden). Brazil is now rapidly going through this stage. So it is desirable to see how the marketed surplus passes through various stages to the consumer. At one extreme you have the traditional farmer who uses intermediaries, at the other you have the advanced food processing industries. One can focus on some questions:

- a. Why is food and in particular bread so expensive in Brazil?
- b. Is the dependence on gasoline for transportation critical?
- c. Do any components of the food industry exercise monopoly or oligopoly power?
- d. How will consumption patterns change as income increases?

These later set of issues may be difficult to address in the current situation but should be of interest for long term planning.

V. SPECIFIC PROJECT ORIENTATION

The previous sections have treated the general picture of malnutrition in Brazil and given some indication of what policies might be usefully considered. The problem of malnutrition as far as Ministry of Agriculture policies is concerned has been reduced to one of assuring an adequate supply of food so that each family will have sufficient calories, protein and fat. (Specific nutrient deficiencies are being considered by INAN). When a significant impact has been made on this, it would be appropriate to consider some of the more subtle problems. One of the more difficult areas for decisions at the outset of the program is not so much trying to determine what are all the possible areas of interest but rather trying to focus on key areas. Inevitably this will mean that some problems which may be significant for some groups or regions will not be given adequate treatment. On the other hand a program which is too broad may not produce results with sufficient thrust and depth of analysis to effect change.

The main approach of this section is then to suggest a framework for analysis which will connect the nutrition problem, in a broad sense, to the area of policy formulation. This section may be viewed in three parts:

1. Where to focus the research.
2. A general framework for analysis.
3. How specific projects may allocate their efforts.

Where to focus the Research

The distribution of the economically active population by occupation and income is given in Table 5.1. Here one observes

TABELA 5.1 - População Economicamente Ativa de 10 Anos ou Mais. Renda in Cruzeiros (1970)/Capita/mês

Atividade	Rendimento											TOTAL
	S/Rend.	Até 50	51-100	101-150	151-200	201-300	301-400	401-500	501-1000	1001	S/Declar	
Agricult	2.561.010	1.957.044	4.136.150	1.998.828	1.240.863	506.425	149.857	131.717	127.501	56.367	224.596	13.090.358
Indust	21.967	164.312	456.449	670.864	1.501.747	934.251	471.164	291.274	455.921	239.200	88.278	5.295.427
Comerc	23.802	94.807	239.747	267.404	497.207	347.137	172.497	160.154	275.354	149.951	35.479	2.263.539
Serviços	14.199	1.036.912	832.049	418.181	510.856	304.580	136.589	103.852	144.182	48.201	73.893	3.626.494
Transpor	3.557	18.189	66.024	106.591	236.731	269.456	183.880	135.486	161.806	44.821	17.860	1.244.395
Act Sociais	25.423	58.650	111.460	169.535	269.406	268.112	155.909	98.278	188.070	110.137	17.632	1.470.621
Ad - Public	-	14.633	74.242	78.554	155.256	202.536	139.778	109.112	221.897	146.554	9.779	1.152.341
Outras	223.084	28.771	65.088	66.067	140.460	145.812	90.233	78.949	176.959	162.065	236.561	1.414.049
TOTAL	2.873.042	3.373.312	5.981.218	3.714.024	4.555.526	2.978.302	1.499.907	1.108.822	1.751.690	957.296	704.078	

FONTE: Censo Demográfico 1970 IBGE (Tab. 24).

the large numbers in the low income groups for agriculture. For industry the incomes are a little higher. However, one should keep in mind that urban dwellers typically have higher expenses for housing and transportation and so need a higher income than their rural counterparts to achieve the same level of food intake.

For the urban population one may focus on the level of real income and the consumption pattern. For the rural population, agricultural policy affects the real income directly through employment in various branches of agriculture and again through the consumption pattern. It is desirable to have the following information:

Urban Population

- a. The consumption pattern of each income group and how this may vary as income changes.
- b. The source of income for each group in particular those who are involved in agriculturally related work, food processing, distribution, marketing.

Rural Population

- a. The consumption pattern of each income group and changes over time.
- b. The source of income both cash, in kind, and indirect (from home production) for each group and the social structure of production for the principal products.

The economic policy of Brazil relies heavily for foreign exchange earnings on its agricultural sector. About 80 percent of the export earnings come from agriculture, so that the industrial sectors' welfare is heavily dependent on it both for food

TABELA 5.2 - AGRICULTURA (1973)

Valor dos Principais Produtos Agrícolas

Cr\$ 1.000,00

CULTURAS PERMANENTES - 1973

Café em coco	4.988
Algodão arbóreo	1.321
Laranja	1.295
Cacau em amêndoas	1.005

CULTURAS TEMPORÁRIAS - 1973

Soja em grão	5.564
Milho em grão	5.123
Arroz em casca	4.410
Feijão em grão	4.317
Mandioca	3.464
Cana-de-açúcar	3.177
Algodão herbáceo	2.567
Trigo em grão	1.495
Batata-inglesa	1.088

PECUÁRIA

Bovinos 119,413 (Rebanho-Valor)

Fonte: Anuario Estatístico do Brasil, 1974. IBGE, 1975.

and as a source of foreign capital. Table 5.2 gives some indication of the principal products in terms of value of output. It would be desirable that those products chosen should also reflect both quantity and distribution of labor content. The only crop which is imported in significant amounts is wheat (US\$376 million in 1973).

From an employment point of view these fourteen may be considered significant products; for consumption there are ten foods listed in Table 3.2.

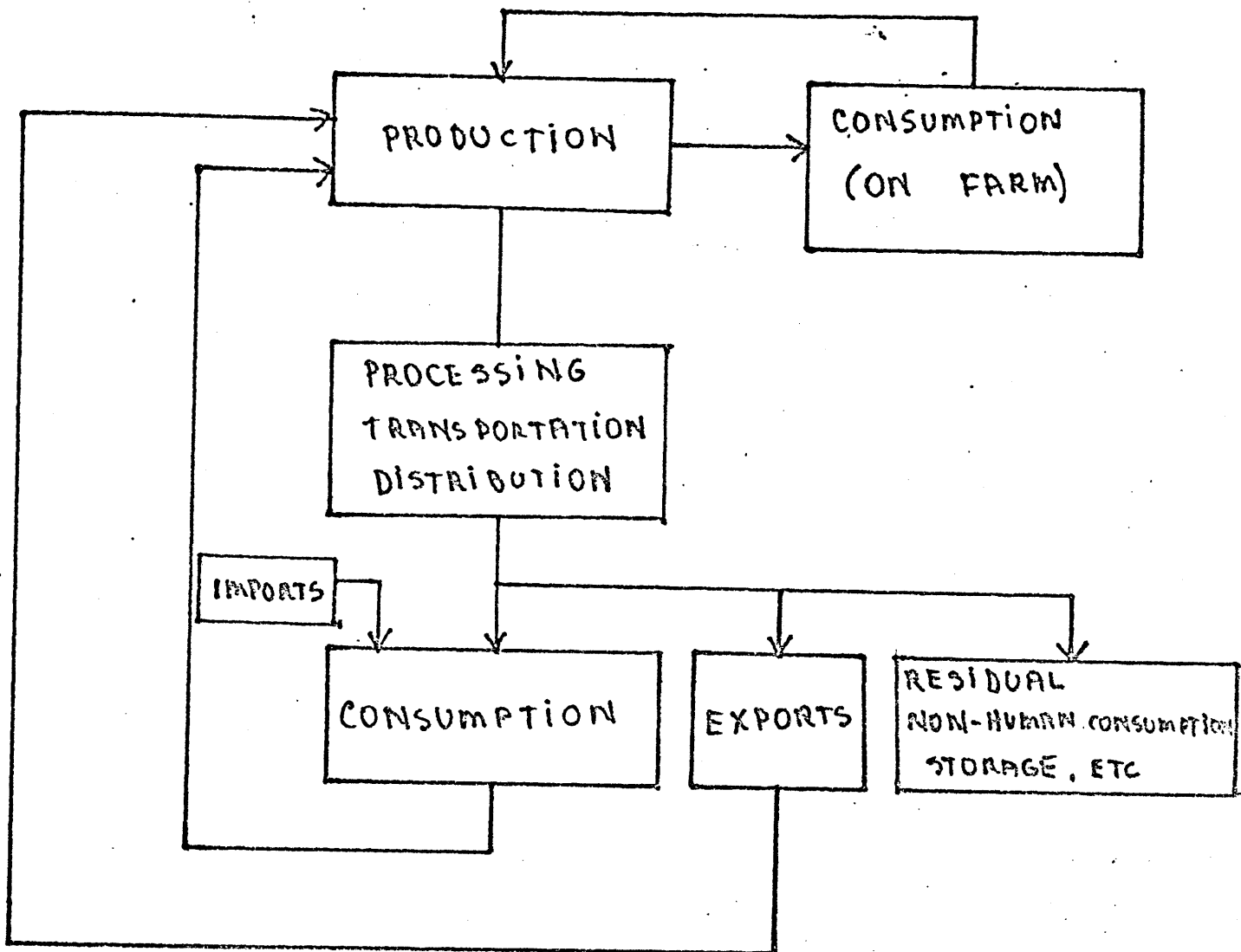


TABLE 5.3. AGRICULTURAL MACRO SYSTEM

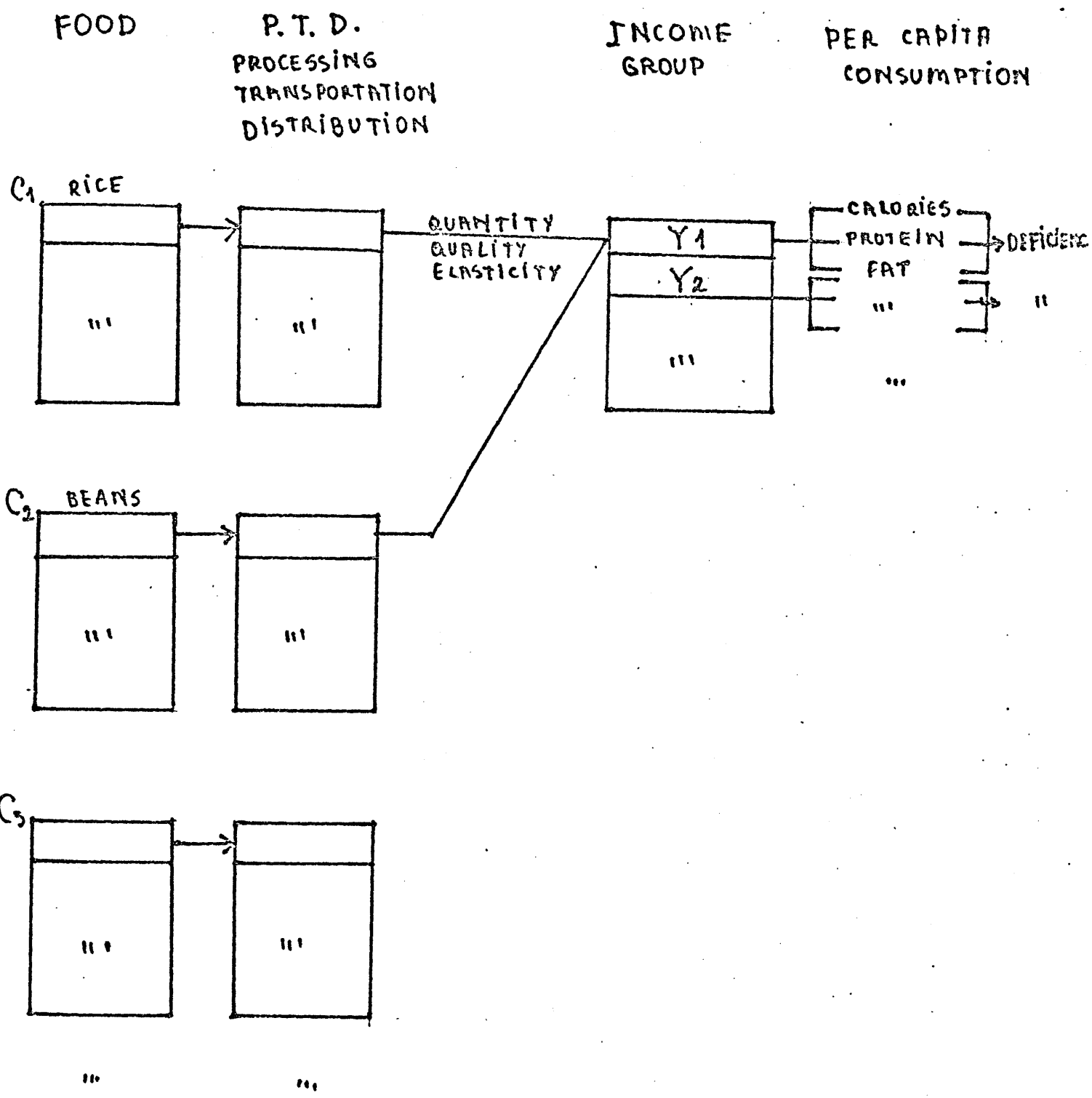


TABLE 5.4 SCHEMATIC FOR URBAN NUTRITION

EMPLOYMENT BY
PRODUCT FOR
EACH INCOME
GROUP

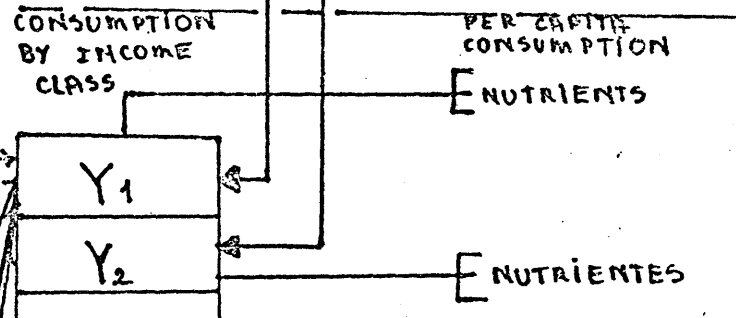
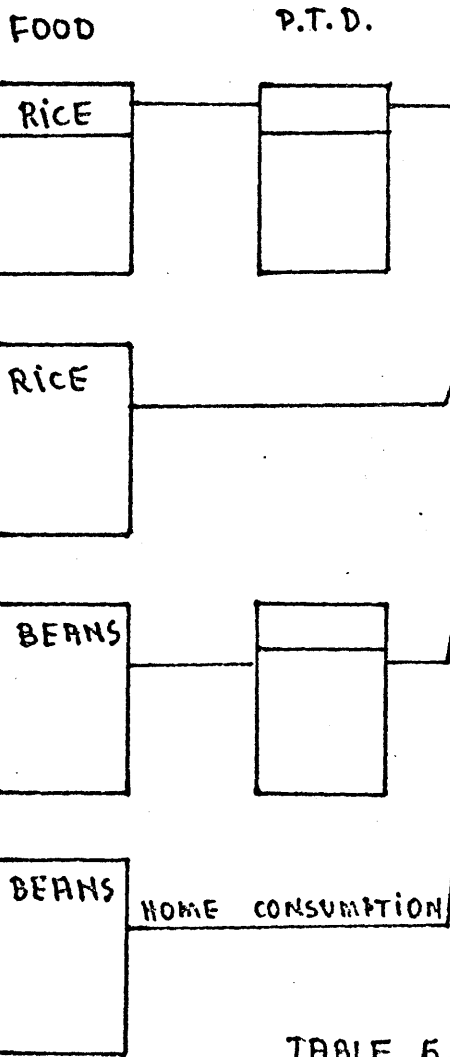
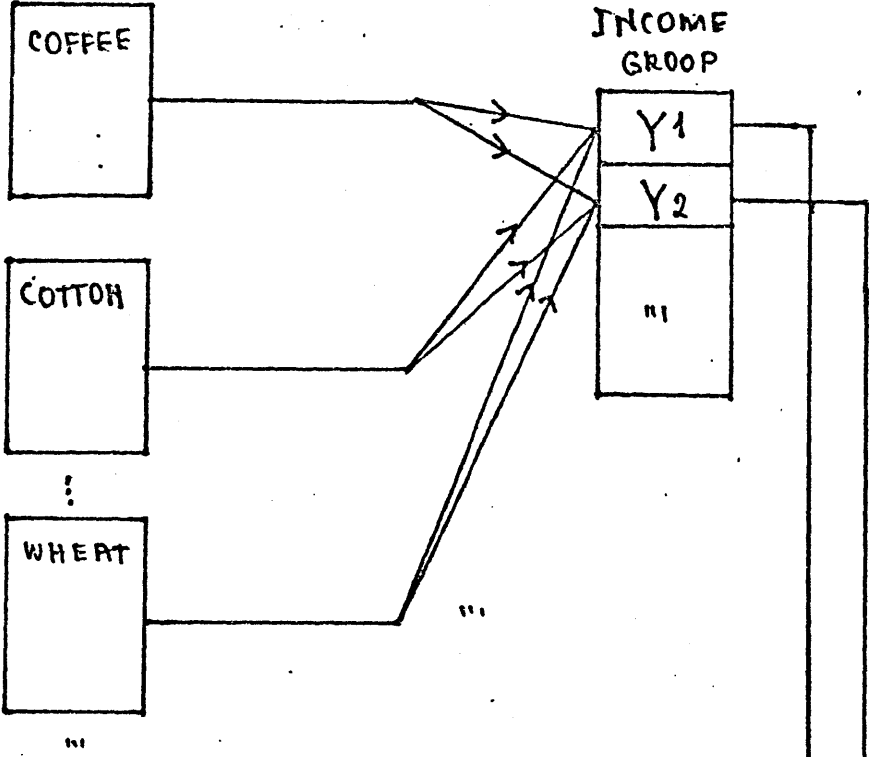


TABLE 5.5. SCHEMATIC FOR RURAL NUTRITION

A General Framework for Analysis

First in macroterms one can visualize a schematic as shown in Table 5.3. Many of the linkages are omitted for simplicity. The essential features are that some of the production goes to farm consumption; the remainder goes through some form of market system where there is some value added and eventually reaches the consumer. While the aggregate picture is useful in estimating the overall availability, one must move quickly towards a more disaggregated view. The aggregate figures for Brazil in fact indicates that there is more than enough food available but Table 2.3 gives a better picture of how important distributive effects can be. The research must focus on the distributive effects to be of use for nutrition planning.

Urban Groups - (Table 5.4)

For urban groups one can consider various income groups, Y_i , $i=1,2,\dots,9$. These might be 0-CR\$100, CR\$100-200..., for example. For each of these groups one can estimate the consumption (quantity) of each food group C_{ij} , $j=1,2,\dots,10$ for say the 10 foods listed in Table 3.2.

For each one can also obtain expenditure elasticity, n_{ij} . From this data one learns how quantity and quality vary for each income group. The pattern for where various groups make their purchases with an appropriate analysis of the P.T.D. component can be established.

Rural Groups - (Table 5.5)

For the rural area the problem is somewhat more complex.

This is because employment and hence income is provided in the agricultural sector both by food and non-food products, and in also th significant on-farm consumption, especially among low income groups.

Ideally one would like to understand the social structure of production so that one could estimate the numbers and salary levels for workers in the production of each principal crop (as listed in Table 5.2). This would enable policymakers to assess the effects of policies, directed towards crops, on the employment situation. Obviously some crops are much more labor intensive than others--see Table 5.6. for example. So the analysis of production hopefully will indicate where policies in this direction might be most effective.

Rural consumption must also be analysed by income group and include that share of the production consumed at home. In summary, one would like to know the source of all income for each group and their associated consumption pattern.

Allocation of Effort by Specific Groups

A number of projects have been invited and proposed by various universities and institutions. These have been subjected to a preliminary screening process at SUPLAN. These are now being evaluated in more detail so as to fit into an overall framework. This may be assisted by considering the accompanying plan in Table 5.7. and the summary of general coverage in Table 5.8.

Here the principal areas are identified together with approximate coverage of present projects. It is seen that some areas are not adequately covered at the moment. The more obvious features that need attention are:

TABELA 5.6 - Custo de Produção com Técnicas Tradicionais

	Beans ^{/1}	Maize ^{/1}	Rice ^{/1}	Cotton ^{/1}	Beans and maize ^{/1}	Beans and cotton ^{/1}
Labor requirements (man days) ^{/2}						
Soil preparation ^{/3}	13	13	13	13	13	13
Planting	10	7	17	10	12	15
Cultivation	22	22	40	30	25	30
Harvesting	<u>17</u>	<u>21</u>	<u>21</u>	<u>10</u>	<u>28</u>	<u>25</u>
Total man days	62	63	94	63	78	83
	(1974 current cruzeiros)					
Non-labor inputs						
Seed ^{/4}	100.50	7.20	56.00	16.25	107.00	116.00
Tools	10.50	10.50	10.50	10.50	10.50	10.50
Sacks ^{/5}	<u>24.00</u>	<u>32.00</u>	<u>55.00</u>	<u>24.00</u>	<u>47.20</u>	<u>33.60</u>
Total direct operating costs	135.00	49.70	121.50	50.70	164.70	160.10

^{/1} Yield levels (kg/ha): Beans-600 kg., maize-800 kg., rice-1,377 kg., cotton-511 kg., interplanted beans-480 kg., maize-700 kg., interplanted beans-400 kg., cotton-408 kg.

^{/2} Based on various studies of SUDENE, IPEANE and the state secretaries of agriculture.

^{/3} After initial land clearing.

^{/4} Seed: Beans-67 kg. @ Cr\$ 1.50 = Cr\$ 100.50; maize-12 kg. @ Cr\$ 0.60 = Cr\$ 7.29; rice-70 kg. @ Cr\$ 0.80 = Cr\$ 56.00; cotton-32.5 kg. @ Cr\$ 0.50 = Cr\$ 16.25.

^{/5} Sacks: Cr\$ 2.40 ea/60 kg. bag.

Source: Kenneth D. Frederick, Agricultural Development in the Brazilian Northeast, California Institute of Technology, Dec. 1970, Servico de Informacoes do Mercado, Abril 1974 for Maranhao, Ceara and mission estimates.

TABELA 5.6 (2) Custo Estimado de Produção Para Tecnologia "Moderna"

	Beans			Maize			Rice	Cotton	Beans & maize	Beans & cotton
	(1)	(2)	(3)	(1)	(2)	(3)				
I. Yield (kg/ha) ¹	810	1,000	2,000	1,120	2,650	4,200	2,244	733	600/910	580/522
II. Labor requirements (man days)										
(A) With traditional techniques										
(B) Additional labor with modern technology ²	62	62	62	63	63	63	94	63	78	83
1) Soil Preparation	6	8	8	6	8	8	8	6	6	6
2) Planting	2	2	2	2	2	2	2	2	2	2
3) Cultivation and weeding	5	7	7	5	7	7	6	6	5	5
4) Fertilizer and insecticide application	8	10	15	8	10	15	8	8	8	8
5) Harvesting	4	8	27	6	50	68	7	3	5	7
(C) Total (man days)	87	97	121	90	140	163	125	88	104	110
III. Non-labor inputs										
(A) With traditional techniques	Cr\$ 135.00	135.00	135.00	49.70	49.70	49.70	121.50	50.75	164.70	160.10
(B) Increment in costs with "modern" technology										
1) Seed ³	123.95	123.95	123.95	22.68	25.20	28.00	187.00	36.00	145.00	310.00
2) Insecticides	24.00	48.00	48.00	28.00	47.00	47.00	180.00	171.50	48.00	171.00
3) Sacks	32.40	40.00	80.00	44.80	106.00	168.00	90.00	40.00	60.40	63.00
4) Tools	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50
5) Fertilizers	536.00	536.00	1,334.40	1,000.00	1,320.00	1,908.00	720.00	800.00	499.00	510.00
Total direct operating costs	728.85	760.45	1,598.85	1,107.98	1,510.70	2,163.50	1,139.50	1,060.00	764.90	1,067.00

¹ c.f. Kenneth D. Frederick, Agricultural Development in the Brazilian Northeast, California Institute of Technology, Dec. 1970.

² This assumes maintenance of labor intensive practices and utilization of improved seed, fertilizers, cultivation, etc., but does not include adopting mechanical planters, cultivators, etc.

³ The increments shown are for improved seed, including treatment as follows: Beans, 67 kg. x Cr\$ 1.85 = Cr\$ 123.95; maize, 20 kg. x Cr\$ 1.40 = Cr\$ 28.00; rice, 170 kg. x Cr\$ 1.10 = Cr\$ 187.00; cotton, 40 kg. x Cr\$ 90 = Cr\$ 36.00.

1. Policy orientation of research.
2. Research on foreign trade.
3. Role of infrastructure, storage, spoilage.
4. Adequate treatment of distribution between various classes.
5. Linkages between different areas.

Now that some further ideas are available on the general framework hopefully these shortcomings may be rectified by modifying some projects and introducing some new ones. Details are given in the accompanying document on general administration.

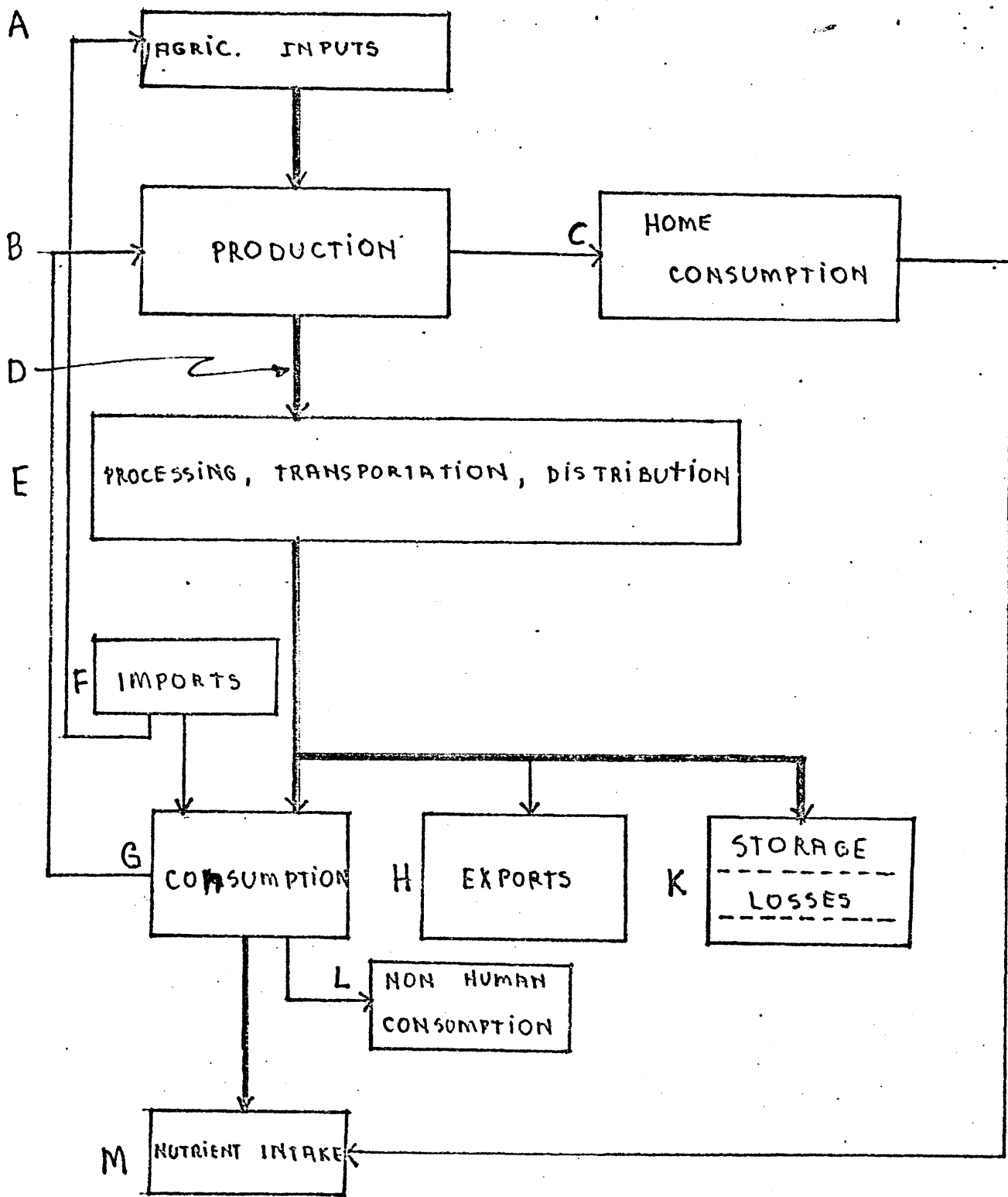


TABLE 5.7. RESEARCH AREAS

LETTERS REFER TO TABLE 5.7

- A. POLICIES . TAXATION, LAND TENURE, RISK AVERSION
- B. PRODUCTION . BY CROP, INCOME GROUP, REGION
SOCIAL ORGANISATION, COOPERATIVES
RESTRICTIONS IMPOSED BY SOME LAND OWNERS
ALTERNATE POSSIBILITIES
- C. HOME CONSUMPTION. QUANTITY, QUALITY, STORAGE, ROLE OF
EXTENSION SERVICE
- D. ANALYSIS OF PRESENT PRICE POLICIES AND POSSIBLE ALTERNATIVES
- E. NOT SUFFICIENT STRESS ON LINKS TO POLICY
- F AND H, K, L . LITTLE !
- M Need to UNDERSTAND PROBLEMS BY INCOME GROUP
AND REGION.

TABLE 5.8 AREAS WHICH ARE NOT
ADEQUATELY COVERED (PROCESSES)

VI. WHAT IS EXPECTED FROM WORK?

There are two broad issues which arise in the projected work for this program.

1. A large part of the effort is borne by a number of universities and institutions outside of SUPLAN.
2. The interdisciplinary nature of the work poses special problems.

Interdisciplinary Work

The second issue is first considered. The intrinsic nature of nutrition requires specialists in a number of diverse areas including nutritionists, economists, sociologists, econometricians, agronomists. Because of tradition, individual biases, etc., many do not "speak the same language". It is proposed that most groups involved should meet at regular intervals so that problems can be resolved. However, it is also important that as many problems as possible be identified and resolved before work begins. A conference of participants before January 1976 will assemble with prepared suggestions in this area. Some of the problems which suggest themselves are in those phases of the work which (a) may be common to two or more groups, (b) interact between groups.

For example, a number of research teams will use food consumption tables. There are a number currently either available or in process of preparation. A rather comprehensive table has been prepared by Dr. João Bosco Salomon. A typical portion is shown in Table 6.1. His table includes 290 foods. For many workers a more aggregated table would be useful. It would help if the nutritionists could agree on appropriate caloric,

CÓDIGO	ALIMENTO 100 g	CAL.	PROT. g	GORD. g	H.C. g	CÁLCIO mg	FOSFORO mg	FERRO mg	VITAMINAS				
									A mcg	B ₁ mg	B ₂ mg	Nia- cina mg	C mg
24	AMENDOIA	639,70	18,60	54,10	19,60	254	475	4,40	0	,25	,67	4,60	
25	AMENDOIM C/ PELE	583,20	25,50	44,00	21,30	6	393	3,00	10	,91	,21	17,60	1
26	ARROZ INTEGRAL	352,70	7,20	1,50	77,60	14	231	2,60	0	,22	,05	4,00	0
27	ARROZ POLIDO	353,00	7,20	,60	79,70	9	104	1,30	0	,08	,03	1,60	0
28	ASPARGO FRESCO	27,40	2,00	,20	4,40	27	43	1,20	285	,12	,10	,50	3
29	ASPARGO ENLATADO §	19,70	1,70	,10	3,00	21	40	1,00	150	,07	,13	,90	16 +
30	AVEIA FLOCOS §	328,60	14,00	1,40	65,00	-	-	-	0	,53	,11	,80	0
31	AVEIA	591,20	10,80	63,20	19,80	254	319	3,60	65	,46	,55	5,00	7
32	AZEITE DE DENDÊ	893,50	0	99,10	,40	7	8	5,50	13640	-	,03	0	-
33	AZEITONA PRETA §	181,80	1,60	19,00	1,10	61	17	1,00	81	,01	,01	-	0
34	AZEITONA VERDE §	138,70	1,50	13,50	2,80	61	17	1,00	75	-	-	-	6 +
35	BACALHAU SALGADO	352,40	81,80	2,80	-	50	891	3,60	0	,08	,45	10,90	0
36	BACON	627,80	9,10	65,00	1,60	13	108	,80	(0)	,38	,12	1,90	0
37	BAMBU BRÔTO	35,40	2,30	,20	6,10	33	41	,40	10	,15	,07	,60	4
38	BANANA TODOS TIPOS	108,20	1,20	,20	25,40	9	27	,60	50	,04	,04	,60	11
39	BANANADA + §	288,50	3,20	,50	67,80	-	-	-	0	,14	,10	0	4
40	BANHA DE PORCO	894,60	0	99,40	0	0	0	0	(0)	0	0	0	0
41	BATATA DOCE AMARELA	122,30	1,30	,30	28,60	31	37	1,00	1815	,11	,04	,80	31
42	BATATA DOCE BRANCA	122,30	1,30	,30	28,60	31	37	1,00	30	,11	,04	,80	31
43	BATATA DOCE ROXA §	94,90	1,80	,10	21,70	40	62	,90	1050	,09	,02	,40	23
44	BATATA INGLÊSA S/C	79,70	1,80	,10	17,90	6	40	,80	-	,09	,03	1,50	16 *)
45	BELDROEGA	31,60	2,00	,40	5,00	79	32	3,60	750	,02	,10	,50	23
46	BERINGELA	31,90	1,00	,30	6,30	23	31	,80		,04	,04	,80	5

TABELA 6.1. COMPOSIÇÃO DE ALIMENTOS (DR. JOÃO BOSCO SALOMON, UNB)

N.º	ALIMENTO 100 g	CAL.	PROT. g	GORD. g	H.C. g	CÁLCIO mg	FOSFORO mg	FERRO mg	VITAMINAS				
									A mcg	B ₁ mg	B ₂ mg	Nia- cina mg	C mg
24	AMENDOÁ	659,70	18,60	54,10	19,60	254	475	4,40	0	,25	,67	4,60	—
25	AMENDOIM C/ PELE	583,20	25,50	44,00	21,30	6	393	3,00	10	,91	,21	17,60	1
26	ARROZ INTEGRAL	352,70	7,20	1,50	77,60	14	231	2,60	0	,22	,05	4,00	0
27	ARROZ POLIDO	353,00	7,20	,60	79,70	9	104	1,30	0	,08	,03	1,60	0
28	ASPARGO FRESCO	27,40	2,00	,20	4,40	27	43	1,20	285	,12	,10	,50	3
29	ASPARGO ENLATADO \$	19,70	1,70	,10	3,00	21	40	1,00	150	,07	,13	,90	16
30	AVEIA FLOCOS \$	328,60	14,00	1,40	65,00	—	—	—	0	,53	,11	,80	0
31	AVEIÁ	591,20	10,80	63,20	19,80	254	319	3,60	63	,46	,55	5,00	7
32	BEIRE DE BENDÊ	293,50	0	99,10	,40	7	8	5,50	13640	—	,03	0	—
33	AZEITONA PRETA \$	181,80	1,60	19,00	1,10	61	17	1,00	81	,01	,01	—	0
34	AZEITONA VERDE \$	138,70	1,50	13,50	2,80	61	17	1,00	75	—	—	—	6
35	BACALHAU SALGADO	352,40	81,80	2,80	—	50	891	3,60	0	,08	,45	10,90	0
36	DACON	627,80	9,10	65,00	1,60	13	108	,80	(0)	,38	,12	1,90	0
37	BAMBU BRÔTO	35,40	2,30	,20	6,10	33	41	,40	10	,15	,07	,60	4
38	BANANA TODOS TIPOS	108,20	1,20	,20	25,40	9	27	,60	50	,04	,04	,60	11
39	BANANADA + \$	288,50	3,20	,50	67,80	—	—	—	0	,14	,10	0	4
40	BANHA DE PORCO	894,60	0	99,40	0	0	0	0	(0)	0	0	0	0
41	BATATA DOCE AMARELA	122,30	1,30	,30	28,60	31	37	1,00	1815	,11	,04	,80	31
42	BATATA DOCE BRANCA	122,30	1,30	,30	28,60	31	37	1,00	30	,11	,04	,80	31
43	BATATA DOCE ROXA \$	94,90	1,80	,10	21,70	40	62	,90	1050	,09	,02	,40	23
44	BATATA INGLESA S/C	79,70	1,80	,10	17,90	6	40	,80	—	,09	,03	1,50	16
45	BERROEÇA	31,60	2,00	,40	5,00	79	32	3,60	750	,02	,10	,50	23
46	BERINGELA	31,90	1,00	,30	6,30	23	31	,80	—	,04	,04	,80	5

TABLE. 6.1 FOOD COMPOSITION BY DR JOÃO BOSCO SALOMON (U. of B.)

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protein and fat content quantities for the principal foods proposed in section III to facilitate other workers in the program and ensure uniformity. A second ambiguous area is to estimate the food residuals which can be quite significant for many foods in relating quantities purchases to quantities actually consumed. Dr. Sizaret, IBGE, has made available some of his preliminary results in this difficult area. A portion of the work is shown in Table 6.2. The magnitude of some of the residuals warrants inclusion in any meaningful estimates.

For interfacing, each research group will be responsible for informing the groups it affects. For example, if those working on production decide to analyse by say six groups they may categorize them by income levels, b-100, 100-200,..... The group which works on consumption will also categorize, so that it is desirable that they should use a similar classification. Hence groups, being aware of each others interests will immediately inform both each other and the center at SUPLAN when decisions are taken affecting linkages. Similarly SUPLAN, for its part will seek to disseminate information to all groups at regular intervals but to the groups that may be affected as soon as possible. An early decision will be taken on how income will be specified, e.g., by cruzeiros, in terms of minimum salaries, by region, and also, how prices might be best adjusted by all groups to account for inflation effects.

Special Advantages of Outside Institutions

The problems raised by having work done by universities and other outside agencies are many. It is not a very great secret that past attempts at this type of collaboration have often failed. The fault is probably on both sides. However, by

Código do alimento	Nome do alimento	Número de observações	Peso Total:		100 gramas do produto com resíduo		Coef. de correl R
			Do produto com resíduo (kg)	Do resíduo (kg)	Parte comest.	Resíduo	
010108	Arroz com casca	58	56,000	17,130	69,5	30,5	0,77
010210	Milho verde em espiga	240	298,860	99,000	64,0	36,0	0,79
010936	Milho verde em lata	16	13,580	5,510	58,6	41,2	0,57
010944	Milho assado em espiga	7	5,010	2,600	48,2	51,8	0,90
011210	Milho seco em espiga	171	254,560	76,810	66,3	33,7	0,69
020511	Banana da terra com casca	993	59,080	17,850	69,1	30,9	0,66
020516	Batata baroa com casca	306	74,010	13,740	51,3	18,2	0,80
020713	Batata doce com casca	2778	2.679,100	487,820	80,6	19,4	0,66
020820	Batata doce cozida, com casca	100	864,400	141,200	84,1	15,9	0,79
020910	Batata inglesa com casca	17949	9.206,040	2.109,000	77,2	22,8	0,81
020918	Inhame com casca	1299	1.238,470	239,670	78,7	21,3	0,86
020919	Aipim com casca	2317	2.965,300	912,670	70,2	29,8	0,83
021032	Banana cozida com casca	25	10,760	3,010	72,1	27,9	0,72
021113	Cará com casca	320	225,500	51,260	75,3	24,7	0,72
021210	Batata de erva doce com casca	4	1,405	0,180	87,5	12,5	0,79
021312	Banana São Tomé com casca	32	19,660	7,650	63,2	36,8	0,92
021310	Mandioca brava com casca	8	7,470	2,370	68,3	31,7	0,57
021717	Cará inhame com casca	29	17,550	3,890	77,8	22,2	0,26
021814	Inhame taia com casca	13	11,090	2,450	77,9	22,1	0,97
022012	Batata nambu com casca	14	8,950	2,460	72,6	27,4	0,75
022110	Batata aipo com casca	102	20,390	4,090	81,2	18,8	0,70
030317	Cana de açúcar	166	226,890	110,720	52,9	47,1	0,90
040116	Amendoa com casca	3	1,000	0,720	48,4	51,6	1,00
040215	Amendoim com casca	45	14,990	4,230	74,6	25,4	0,95
040410	Castanha do Pará com casca	1	0,910	0,210	76,9	23,1	-1,23

TABELA 6.2. ESTIMATIVAS DE RESÍDUOS ALIMENTARES (DR. FRANÇOIS SIZARET, IBGE)

identifying past difficulties and resolving them the present work may be facilitated. Quite often the Ministry has been at fault for not clearly indicating what was expected in return for the research funding. Sometimes the research has been too theoretical and not particularly useful for policymakers. The situation is of course not desirable for both parties; the Ministry is frustrated, and on the other hand, researchers will lose this source of funding. It is expected that the performance of the outside agencies can be improved by an appropriate set of checks through a better communication system using seminars, formal and informal progress reports and annual reviews by peers. The details are discussed under General Administration in ^{a separate document.} ~~section VII~~. SUPLAN on its part is also seeking to transmit what it would like. Some of the views are already promulgated in the previous sections. These can be spelled out reasonably well. In carrying out their work it would be helpful if the outside institutions could adopt a broader perspective in their work than that done at the Ministry. This aspect does not readily lend itself to detailed specification. Perhaps in formulating their work universities can keep in mind that the specific issues in relation to policy orientation already considered are essential to the Ministry but the broader perspective is desirable.

A lot of SUPLAN's policymaking is short term and often lacks detailed analysis. It is felt that the somewhat detached atmosphere outside of SUPLAN should be suitable for more profound conceptualizing and in addition, the intelligentsia there should be able to provide a view incorporating comparative work in other countries.

To address some of these issues one might consider some of the following questions which could not be conveniently handled at SUPLAN. Depending on the particular area of work researchers may consider these.

1. Estimate what would be required to ensure an adequate supply of basic foods for all urban dwellers. The current pricing mechanism is a powerful short term policy instrument. If the government for example, were willing to subsidize the foods for the low income groups what would it cost? What general equilibrium effects would follow? Initially one could imagine a lag in the production response. One can envisage that a lot of the initial cost might be defrayed in the longer term by stimulation of employment opportunities, increased turnover tax (ICM) revenues, improved quality of labor supply, etc.
2. The rural poverty is in some ways more difficult. Many lament the sad condition of the Northeast. Now that the government is willing to try and resolve some of these problems the time is ripe to look at some of the broader issues. Consider for example, the fertilizer subsidy. A small farmer in the Northeast who produces a small surplus of rice and beans may use little fertilizer or indeed credit availability. However, he must pay a turnover tax (ICM) on his marketed surplus. These taxes are then used for various governmental programs so that one may examine the hypothesis that the impoverished small farmer is not only getting minimal assistance but in effect he is subsidizing the larger and more commercialized farmers! The situation can hardly be corrected at the state level because typically the states which have

a high proportion of these small farmers are also highly dependent on this form of taxation. One may ask-- how should the present fiscal system be modified so that at say, the regional level some the great disparities may be reduced. Regions whose inhabitants are in a better position to capture the benefits of government programs should pay proportionately more taxes. It is of interest to estimate the benefit to tax ratio M for each region and possibly for each social group where M is given by:

$$M = \frac{\text{total benefits, subsidies, etc. obtained}}{\text{total taxes paid}}$$

This may give some insight into why the rich regions seem to get richer, and also, why within ^{these} ~~these~~ regions, the richer groups seem to become steadily better off.

3. What are comparative situations in other countries? For example, in other sugarcane or cocoa producing countries of the world does one find malnutrition--why or why not?

If the government should decide to let market forces take over would the sugar producers of the South dominate those in the Northeast? If this did happen what other types of cultivation might be viable?

What crops are produced in other countries with similar conditions. Should sorghum, millets or peanuts be pushed more?

Is the current foreign trade pattern very rational. What is the true cost of producing wheat domestically? Then, those who emphasize the "value" of political independence can see the price of this objective.

What other marketing systems may be viable? For example, the farmers in Thailand responded very rapidly to market forces for maize, cassava in the mid-sixties. What were the salient features of this phenomenon--the Government, the small merchants going into the countryside--the availability of technical know-how?

Brazil is a great producer of cassava (mandioca). This is a strongly labor intensive crop. In many countries it supplies a large share of the domestic demand for industrial starch. In Brazil however this is supplied by maize. It would be interesting to understand the reasons behind this as in some parts many consider maize to be a relatively expensive source.

In short, one expects from universities a broader and deeper analysis but also more detached from the everyday political pressures. Again, one hopes that researchers will continue to ask how their work may lead towards policy as specific results in this area are the minimum expected.

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