

# **BASIC INFORMATION**

## **Romanian Integrated Household Survey (RIHS) 1994**

Poverty and Human Resources  
Development Research Group  
The World Bank  
August 1998

## **PRINCIPAL ABBREVIATIONS AND ACRONYMS USED**

AES	Adult Equivalence Scale
FBS	Family Budget Survey
LSMS	Living Standards Measurement Study
NCS	National Commission for Statistics
RIHS	Romanian Integrated Household Survey

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This document is part of an expanded program of documentation and further development of the Living Standards Measurement Study (LSMS), managed by Margaret Grosh, in the Poverty and Human Resources Division of the Development Research Group (DECRG). It was prepared by Meera Venkataraman (consultant), Diane Steele (DECRG) and Tilahun Temesgen (DECRG) under the guidance of Margaret Grosh. Mansoor Rashid (EC1/2HR) provided several important inputs and advice. Other necessary inputs were provided by Beth Jacinto.

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## INTRODUCTION

This paper documents the Romanian Integrated Household Survey (RIHS) which is a Living Standards Measurement Study (LSMS)<sup>1</sup> type survey providing data on household income and expenditures as well as the socio-economic characteristics of households. This survey was administered by the Romanian National Commission for Statistics (NCS) in cooperation with the Ministry of Labor and Social Protection and with the technical assistance of the World Bank.

The RIHS is a nationally representative data set collected between April 1994 and March 1995. It is the first large-scale nationally representative survey in Romania.<sup>2</sup> The RIHS collects detailed information on income and expenditure patterns of households, housing conditions, some aspects of health, fertility, education, and anthropometric outcomes for children for approximately 2,600 households each month.

This paper documents the contents of the RIHS questionnaire, and covers the following additional topics: survey organization, sampling issues, data issues and information, measurement errors, and constructed variables and datasets. The data were processed by the World Bank (EC1/2HR) as part of the Romania Poverty Assessment Report. Additional information that is likely to be of interest to data users is contained in the appendices.

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<sup>1</sup> For more information on the Living Standards Measurement Study visit the LSMS Web Site at: <http://www.worldbank.org/lsm/lsmshome.html>. Or see M. Grosh and P. Glewwe, "A Guide to Living Standards Measurement Study Surveys and Their Data Sets." LSMS Working Paper No. 120, The World Bank, Washington, DC.

<sup>2</sup> The Romanian Family Budget Survey, conducted in 1989 and 1993, was a large scale data collection, but the sample used was not nationally representative (see Appendix 5).

## CONTENTS OF THE INTEGRATED HOUSEHOLD SURVEY QUESTIONNAIRE

The RIHS used a household questionnaire and a family diary to collect information. Participants in the survey were provided with diaries in which they recorded monthly cash flows (incomes, expenditures and savings).

The RIHS household questionnaire contained 21 sections, each of which covered a separate aspect of household activity (see Appendices 4 and 5 for more details). The various sections of the household questionnaire included:

0	Cover and Control Page
1	A. Household Roster B. Household Structure C. Number of days Non-Household Members Ate with Household Members
2	Education
3	Migration
4	A. Dwelling Information Characteristics B. Availability of Additional Dwelling Structures C. Household Durable Goods D. Incomes from Leasing Land and Buildings
5	Present Occupational Status
6	Wage Related Activity
7	Independent Workers
8	Non-agricultural Non-wage Self-employment Activities
9	A. Agriculture B. Agricultural Production C. Agricultural Expenditures D. Farm Output obtained through Farming Cooperatives/Commercial Farming E. Durables used in Agriculture
10	Livestock
11	Labor Force History
12	Food Expenses
13	Non-Food Expenses
14	Expenditure on Services
15	A. Savings B. Loans Incurred by Household
16	Health
17	Anthropometric Measurements
18	Fertility
19	Incomes and Other Money Inputs
20	Expenses and other Money Outputs
21	Public Benefits

The household questionnaire was designed to be administered in three visits (see Survey Organization and Implementation, below). During these visits, interviewers questioned respondents using the questionnaire and transcribed information from the household income and expense diary.

Responses were collected from all members who contributed fully or in part to the household budget (incomes and/or expenses). This includes household members present in the household, temporarily absent from the household, or absent for a longer period of time (more than 6 months).

A typical LSMS survey also includes community and price questionnaires to gather information on community characteristics such as the quality of physical infrastructure, provision of electricity, gas and water, access to education and health care facilities, and on markets and availability of goods and services in the locality. These questionnaires were suggested to be a part of the RIHS, but were not deemed essential by the National Commission for Statistics.

## **SAMPLING ISSUES**

The following information on sampling issues is derived from information available from the World Bank technical assistance project to the Romanian RIHS. For more information see Appendices 1 and 2 for how to obtain a copy of the complete document.

### Sampling Methodology

The sampling design was a two-stage procedure with a certain number of areas selected throughout the country in the first stage, and a fixed number of households selected in these areas in the second stage. The first-stage sampling frame was a “master sample list” developed by the National Commission for Statistics (NCS) with the aim of fulfilling all future needs of household and other surveys until the next census.

The master sample was selected as follows :

In the 1992 Census, the country was divided into 89,910 sections, each of which contained 5 to 6 census sectors. For the RIHS, a sample of 505 census sectors were selected with equal probability. The sections containing each selected census sector were identified, and these census sections were allocated to the master sample. The resulting sample of sections is therefore selected with almost equal probability. Those sections having 6 sectors have a slightly higher probability of selection, by the factor of 6/5. Only a small number of sections appear to have been replaced after the sample selection for reasons of accessibility.

This process resulted in a sample that represented both urban (Bucharest and other urban) and rural areas. The sample was approximately self-weighting and nationally representative.

The sampling frame for the second-stage or the household/dwelling stage was a list of dwellings drawn from the 1992 Census.

## **SURVEY ORGANIZATION AND IMPLEMENTATION**

Data for the RIHS were registered in two ways: first, by filling out the household questionnaire according to answers provided by respondents to household interviews; and second, by having the respondents fill out a household income and expense diary which recorded details of the household's incomes and expenses during the reference month. All the information entered in the expense diary was transcribed into relevant sections of the questionnaire by the interviewer so that each questionnaire contained a complete set of information for each household.

Responses were provided by the specific household member to whom the question pertained. If this was not possible, responses could be obtained from the household head or any other adult household member who could provide the information.

Considering the complexity of the questionnaire, and the various reference periods for which data were collected, information was collected by means of three compulsory visits to the household; along with supplementary visits, if necessary.

Between the 1st of the reference month and the 10th of the subsequent month, the interviewer was to pay the compulsory visits, as follows:

First visit: between the 1st and 15th of the reference month

Second visit: between the 16th and the last day of the reference month

Third visit: between the 1st and the 10th of the subsequent month

Supplementary visits were to be set up as required, with the agreement of the pertinent household members.

### **Survey Implementation Personnel**

Overall supervision and coordination of the field work was done by the investigation manager and the head investigator who were in charge of organizational, administrative and managerial issues. The chief of computer operations was in charge of all computer related operations and the transmission of the data to NCS headquarters.

The responsibilities of the inspectors were to check, manage and occasionally assist the interviewers in implementing the survey in the field. They performed tasks such as assisting the interviewers in locating households to be interviewed, checking for consistency between various sections of the questionnaire and checking for consistency between the questionnaire and the household expense diary, and helping with computer data entry.

The interviewers were responsible for carrying out the household interviews under the supervision of the inspectors. They also checked the household members' entries in the household income and expense diary, sometimes physically recording the entries in the diary by interview if the diary was left incomplete or if the respondents were incapacitated.

## **DATA ISSUES/INFORMATION<sup>3</sup>**

### Definition of Household in the RIHS

A household is a group of people who usually live in the same lodging, are usually related, and share income and expenses, totally or in part.

The following people were not considered household members: people hired for household work, relatives who do not share the same household budget, tenants or landlords.

### Merge-ID that enables linking between different files

The Household number (variable name, HSHLD) is the unique-id in every file that enables merging across files.

### Adult Equivalence Scales (AES)

There is a lack of agreement in Romania regarding which of two sets of adult equivalence scales (AES) should be used. The first set under consideration is the Romanian Equivalence Scale. This assigns the following weights to consumption of each member of the family.

- 1.0 for first adult person;
- 0.8 for each additional adult person, age between 15 and 61
- 0.8 for additional adult person age 62 and over
- 0.6 for each child, age 7-14
- 0.4 for each child, age 0-6

The second equivalence scale is the OECD equivalence scale that assigns the following weights to each member of the family.

- 1.0 for the first adult person, age 18 and over, household head:
- 0.5 for additional adult, age 18 and over
- 0.3 for each child under age of 18.

A comparison test of the Romanian AES and OECD AES showed that the cumulative distribution function for the Romanian AES lies entirely above OECD measure.<sup>4</sup> Thus, poverty

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<sup>3</sup> Adapted from the text by Mansoor Rashid in "Romania Poverty and Social Policy." Report No. 16462-RO. Human Resources Sector Operations Division, Country Department I, Europe and Central Asia Region.

rates would be lower if the OECD AES measure was chosen to construct consumption. Tests also showed that food poverty lines are roughly equivalent for the per capita and AES measures of consumption. However, using a proportion of mean consumption (half, quarter and three-quarters) as the benchmark would clearly yield higher poverty lines for the AES measures.

### General Measurement Problems with the RIHS

There are three broad measurement problems in the RIHS. First, the survey collects information on income and consumption of households using a diary method that forces household income and expenditure to strictly match with each other. The NCS asks individuals to keep a monthly diary recording household cash flows. Interviewers check to see whether incomes (cash in) strictly match the sum of expenditures (cash out) and net change in savings for that month. This means that consumption is not measured independently of income and is subject to the same measurement errors as income. Essentially, if individuals under-report income, consumption will also be under-reported.

Second, it is difficult to construct income from the data. Very few households report self-employment income and most households do not market their produce. Therefore, measurement of self-employment income is unreliable and annual agricultural income is extremely difficult to estimate. Although the survey provides a detailed breakdown of the components of agricultural production and associated input costs, it does not provide information on labor costs or the timing of inputs, making the estimation of profits extremely difficult. Furthermore, since few households market produce, the information on market prices is very thin. The survey also does not include a community price questionnaire. Prices can only be proxied by unit values of purchased food goods. There is an additional problem. The survey provides quantity of food goods purchased and the value of goods purchased both from the state and the private sector. Thus, prices used in the computation of consumption are quantity weighted average of state and private prices (unit values).

Finally, the RIHS uses a cash flow concept to construct aggregate household consumption and income. Although wages and other fixed incomes are defined as in other data sets, agricultural and self-employment income are revenues from sales not profits. Similarly, aggregate consumption data provided by the RIHS was based on purchases of food, non-food goods, services and durables. However, food consumption is not solely comprised of purchases (some of which may actually be stored). Households can consume from home production, by depleting existing stock of goods, or through gifts/transfers of food from friends/relatives/employers.<sup>5</sup>

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<sup>4</sup> World Bank. 1997. "Romania Poverty and Social Policy." Report No. 16462-RO. Human Resources Sector Operations Division, Country Department I, Europe and Central Asia Region.

<sup>5</sup> For more details see "Romania Poverty and Social Policy".

## CONSTRUCTED VARIABLES<sup>6</sup>

The RIHS survey dataset contains aggregate variables for total household consumption and for total household income constructed by the Romanian NCS. Researchers at the World Bank have also constructed estimates of household consumption, using different criteria. The World Bank total consumption aggregates will be made available upon request to eligible users (see Appendix 1 on how to obtain these data). The following information pertains only to the World Bank-constructed aggregates. Any manipulation of the data requires that assumptions be made and, to the extent possible, those assumptions are explained below. Given the complexity and detail involved in the different expenditures modules, it is possible to construct an expenditure aggregate in different ways. Any researcher not satisfied with the assumptions made in the World Bank or NCS aggregates should build their own estimates from the household data. The descriptions given in this document (below and in Appendix 7) are the only documentation that will be provided.

### Total Household Consumption Aggregate

The World Bank total household consumption measure includes food, non-food goods, and services. It differs from the NCS consumption variable in three respects. First, it imputes a value for actual physical quantity of food consumed, rather than using expenditures on food purchases. (The physical consumption of food implicitly includes consumption of home produced food items.) Second, the World Bank consumption aggregate excludes durable purchases from expenditures on non-food goods, for reasons explained below. Third, the total household consumption variable constructed by the World Bank is based on real consumption of food, non-food and services, rather than nominal consumption values.

### The Revised Food Consumption Variable

Constructing an aggregate food consumption variable based on the value of food purchases would have been biased for two reasons. First, the values of food purchases may be erroneous due to the fact that expenditure values from the total household expenditure side of the balance were forced to match with income values from the total household income side of the accounting balance. Second, purchases of food do not necessarily reflect actual consumption of food, which may additionally draw upon existing stocks of food, home production, or gifts.

The RIHS, however, provides data on actual physical consumption of food (quantity of food consumed for 83 food goods, see Table 2 below) and information on the stocks and flows of food goods for these households. The survey provides information on the initial stock, purchases (values, quantity, from state and private sector), production, input usage, gifts received, gifts given, consumption and final stock of each food good. Food consumption is identical to an aggregate of purchases, net change in stocks, net gifts, and net output. This information on

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<sup>6</sup> Adapted from the text by Mansoor Rashid in “Romania Poverty and Social Policy.” Report No. 16462-RO. Human Resources Sector Operations Division, Country Department I, Europe and Central Asia Region

physical consumption of food was used to construct a new food consumption variable, rather than using the information on purchased value of foods from the expenditure side of the equation.

### Housing and Durables were Excluded

The World Bank total consumption aggregate does not include income flows from stock of housing and durables owned by the household. The RIHS does provide data on the value of housing and the stock of durables owned by each household. Housing flows were not incorporated into consumption because the value of housing is estimated by households themselves and is likely to be erroneous, particularly as the housing market is very thin in Romania--most households own the dwelling in which they reside. Only 2.8 percent of all households rent their own dwelling. Of these, a large proportion rent from the state at subsidized rents. Durable flows were also excluded from consumption because of errors inherent in a self-imputation of the current value of durables. The value of durables at time of purchase is not provided in the data.

### Consumption Aggregate Adjusted with Price Deflators

Simply using nominal consumption would result in measurement error. A higher (lower) inflation rate at the end of the year or end of a month would yield a higher (lower) nominal consumption to households surveyed at the end of the month or year. Similarly, consumption would be higher and poverty would appear lower in regions where transportation, rent or other fixed costs result in higher prices of food, non-food goods and services. This is a particular problem in Romania where in 1994 the inflation rate was 162 percent per annum. Controlling for spatial price variations is important as well. Romania is not a well integrated market economy (as of 1996) and as such, regional price variations are likely in transportation, distribution and other fixed costs.

Real expenditures on food were derived by constructing a price index that fully deflates the price of food within a region. This was done by multiplying household food consumption (quantities) of a particular food good by the average national price of that food good. Assigning the same price to the consumption of the same good controls for price variations that may be a result of inflation and other fixed costs, and allows a comparison of real food consumption across all households. To control for price variations over time, monthly national price deflators were used to deflate food consumption over the year.

Controlling price variations within as well as across regions was done for three reasons. First, regions over which we can construct robust deflators are quite large in Romania and encompass a significant stretch of territory--rural areas in the Northeast, for example. Higher (lower) prices in the more remote regions of the Northeast would result in lower (higher) poverty to these regions than is really the case. The ideal deflator would be constructed for the smallest spatial unit for which variations in prices are truly reflective of quality variations in food consumed. But these are likely to be small villages rather than large regions.<sup>7</sup> Fully deflating

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<sup>7</sup> Deaton, A. 1997. *The Analysis of Household Surveys: A Microeconomic Approach to Development Policy*. Baltimore, Johns Hopkins University Press.

prices errs on the side of constructing price deflators that are closer to village level deflators than to regional deflators. This is only possible for food goods because only here do we have quantities of goods consumed by households that allow us to construct a basket on which to base a price index.

Second, despite the liberalization of prices, the Agricultural Strategy Paper (ASP), 1994, notes that there remain two channels of food supply in Romania. This two-pronged supply network can cause a large variation in prices in state and private markets. This occurs because the Government fixes the prices of food goods at the beginning of each year. As a result, state prices vary much less than private market prices in response to market conditions. Households would of course want to buy at the cheapest time and place. But, low price state stores or markets may not have an adequate supply of goods forcing households to buy the same good in a higher priced private markets. In addition, perishable food goods may not be amenable to hoarding. The ASP also notes that quality differences in food are not large in Romania. This is supported by anecdotal evidence from Romania. Prices paid by consumers within and across regions are therefore more likely to reflect the interplay in the availability of food goods in private and state markets, inflation rates, and high distribution or transportation costs, than quality variations in food.<sup>8</sup> Unless controlled, these inter-temporal and regional variations may attribute a higher (lower) consumption or welfare to households, regions, and time periods that report higher (lower) prices. Finally, using national rather than individual prices also controls for intra-month inflation. This was a specific concern of the National Commission of Statistics, given that inflation was not insignificant in the year under study.

The RIHS data did not allow for the construction of non-food and service price indices. A price index was constructed based on what was available - i.e. temporal (monthly) food deflators for each region, by rural and urban areas. The construction of the deflators was based on the Laspeyres price index. There are nine regional food deflators available for each month--one for Bucharest, and urban and rural deflators for four large regions (eight in total): the Northeast, Northwest, Southeast, Southwest. These are presented in Table 1.

Table 1: Food Price Index by Region

Month (1994)	National	SE Rural	SE Urban	SW Rural	SW Urban	NW Rural	NW Urban	NE Rural	NE Urban	Bucharest
April	100.00	90.89	98.58	92.21	98.60	98.03	102.54	95.30	96.03	96.24
May	100.53	95.81	101.26	95.62	100.29	100.39	104.80	93.17	98.06	103.82
June	101.19	96.57	97.77	100.23	102.22	106.15	106.32	97.48	98.37	106.74
July	102.06	99.49	102.48	97.87	111.20	96.74	106.81	90.21	99.76	110.69
August	110.31	106.55	108.45	103.25	109.96	106.15	115.81	98.22	107.31	118.96
Sept	112.35	109.82	113.54	119.28	119.96	108.16	113.96	100.27	110.42	118.56
Oct	117.94	111.58	121.86	117.25	125.47	116.47	122.68	108.15	121.27	126.48
Nov	121.13	120.28	118.87	127.21	130.33	122.07	121.43	123.67	121.21	131.36
Dec	133.62	120.43	136.60	126.73	130.40	131.46	145.87	122.43	131.62	140.90

Table 1 illustrates the considerable variation in rural and urban price movement within and across regions and over time. The table shows that price increases have been the most rapid in Bucharest (41%) and the urban Northwest (46%) and least marked in rural Southeast (21%) and

<sup>8</sup> This does not mean that quality differences do not exist--but as in any deflation, it is assumed that these are less important in explaining price fluctuations over time and across regions than inflation and fixed costs.

rural Northeast (22%). Overall, urban prices are higher than prices in rural areas, but, these differences vary over time and by region. In April 1994, the rural/urban differential was the lowest in the Northeast (1%) and the highest in the Southeast (7%). In November of that year, the rural/urban differentials were almost the same across all regions. This large variation in inter and intra-regional inflation was one reason to disaggregate temporal price indices by region.

The price indices were created by expressing the value of each regional basket (separately for urban and rural areas) relative to a national price index for April 1994. The national food price index is a representative food basket priced in national median prices. The representative price basket is presented in Table 2.

Also available is a set of national price-indices constructed by the NCS, presented in Table 3. They are disaggregated as follows: food-index; non-food price index; index for service items and a composite total price index. These indices are not available by region.

Table 3. National Price Indices

Month	Total	Food	NonFood	Services
April	100.00	100.00	100.00	100.00
May	105.00	105.50	104.10	105.70
June	107.73	106.66	107.43	112.68
July	109.45	107.30	110.33	114.93
August	111.42	107.73	113.42	119.30
September	115.77	113.12	116.48	123.71
October	120.86	118.66	120.68	129.77
November	124.25	122.46	123.81	132.76
December	126.86	125.64	125.55	135.28

A comparison of the national food price index constructed by the World Bank and the monthly food, non-food, services and total deflators constructed by the NCS shows that the increase in prices between April and December 1994 is higher (34%) for the index constructed by the World Bank than for NCS price index (27%).

Moreover, a comparison of the food and total CPI constructed by NCS can be used to assess the potential bias in the World Bank's price index which uses a food deflator to deflate consumption rather than a total CPI. The data show trends in the NCS food price index roughly correspond to total NCS price index trends. The average difference between the food price index and total price index is roughly 2 percent (it is negligible in April and May but almost 4 percent in August). Thus, using the CPI based on food prices as a deflator as opposed to using a complete CPI on food, non-food and services is not a significant source of bias, although it will tend to understate inflation levels. The difference between the food and total CPI occurs mainly because the price index for services is much higher than both food and non-food price indices. Thus, deflating expenditures on services by the food CPI is likely to understate inflation in the RIHS data.

Table 2 : List of food products used to construct food price index

Food Product	
1	Corn and rye
2	Maize
3	Flour
4	Maize flour
5	Bread
6	Bakery products
7	Biscuits
8	Bakery specialties
9	Pasta
10	Rice
11	Semolina
12	Other bakery products
13	Beans and vegetables
14	Potatoes
15	Carrots, beets, roots
16	Other edible roots
17	Tomatoes
18	Aubergines
19	Winter onions
20	Winter garlic
21	Paprika and sweet peppers
22	Green beans
23	Cabbage and cauliflower
24	Fresh greenstuff
25	Other fresh vegetables
26	Pickles and sour cabbage
27	Tomato paste
28	Vegetable preserves
29	Water melons and melons
30	Nuts
31	Apples
32	Pears
33	Cherries, sour cherries
34	Apricots, peaches
35	Plums
36	Grapes
37	Strawberries, raspberries
38	Other fresh fruit
39	Citric fruit, exotic fruit
40	Dried fruit
41	Edible oil
42	Margarine
43	Fruit compote
44	Confiture, jam, jelly, marmalade
45	Fruit syrup
46	Sugar
47	Chocolate
48	Lokum, halva
49	Other sweets
50	Coffee
51	Cocoa
52	Wine
53	Wine products
54	Beer
55	Plum brandy and raki
56	Other alcoholic drinks
57	Soft drinks
58	Beef
59	Pork
60	Mutton and goat meat
61	Poultry
62	Other types of meat
63	Meat by-products
64	Salami, sausage
65	Other meat by-products
66	Meat preserves and meat
67	Raw lard
68	Grease
69	Fresh and frozen fish
70	Dried, smoked, salty fish
71	Fish preserves
72	Cow and buffalo milk
73	Sheep and goat milk
74	Powder milk
75	Sour milk, yogurt
76	White cow cheese
77	Sheep cheese
78	Fresh cow cheese
79	Romanian pressed cheese
80	Other types of cheese
81	Butter
82	Eggs
83	Honey

## **APPENDIX 1: OBTAINING THE 1994 RIHS DATA**

The 1994 RIHS data are the property of the Romanian government. Permission to use the RIHS data must first be obtained from the Romanian National Commission on Statistics. The request, which should include a short letter explaining the proposed research and the policy relevance to the country of the proposed research, should be submitted to:

Mr. Victor Bogdan  
National Commission of Statistics  
Piata Presei Libere I,  
Bucharest, Romania

The letter should also indicate that the researcher will ask the LSMS Office to provide copies of the data and documentation.

After receiving permission from the Government, the LSMS Office will be able to distribute the data by contacting:

Living Standards Measurement Study  
Poverty and Human Resources  
Development Research Group  
Attn: LSMS Database Administrator  
The World Bank  
1818 H Street, N.W.  
Washington, D.C. 20433 USA  
fax: (202) 522-1153

Individuals requesting copies of the data from the LSMS Office should provide the following information:

- a copy of the permission to use the data;
- the research proposal sent with the permission request;
- an indication of the format in which they prefer to receive the data (SAS portable, STATA or ASCII); and
- a check made out to the World Bank for the processing fee.

There is a nominal fee associated with the data sets. The World Bank provides them on 3½” diskettes. The Development Research Group, Poverty and Human Resources Division of the World Bank requests copies of all reports and documents resulting from research that uses the data. The researcher should further note that once received, the data cannot be passed on to a third party for any reason. Other researchers must contact the National Commission on Statistics and the World Bank directly for access to these data. Any violation of this policy will result in the denial of future access to World Bank LSMS data.

For additional information on how to obtain these and other data, users can look at the LSMS Web Site:

<http://www.worldbank.org/lsms/lsmshome.html>

## **APPENDIX 2: LIST OF RELATED DOCUMENTATION**

The following documents can be obtained from the World Bank at a cost of 5 cents per page for photocopying.

### **A. Questionnaires (free of charge)**

1. RIHS Questionnaire (Romanian)
2. RIHS Questionnaire (English)

### **B. Interviewer Instruction Manuals**

1. Interviewer's manual (English), 90 pages

### **Other**

1. Data Dictionary/Record Layout (English), 99 pages
2. Data Dictionary/Record Layout (Romanian), 60 pages
3. Mills, B., J. Muñoz, D. Sahn and C. Scott. 1996. "Design of the Romania Integrated Household Survey." Food and Nutrition Policy Program, Cornell University, Ithaca, NY, 54 pages

### APPENDIX 3: LIST OF RELATED PAPERS

- Milanovic, B. 1996. "Income, Inequality and Poverty During the Transition: A Survey of the Evidence." mimeo. Policy Research Department, Transition Economics Division, World Bank, Washington, DC.
- Ronnas, P. and R. Burcroff. 1996. "Poverty and Agriculture." mimeo. Agricultural and Natural Resources Department, Sector Policy and Water Resources Division, World Bank, Washington, DC.
- Skoufias, E. 1996. "The Labor Market and the Poor in Romania." mimeo. Human Resources Sector Operations Division, Country Department I, Europe and Central Asia Region, World Bank, Washington, DC.
- Subbarao, K. and K. Mehra. 1996a. "Social Assistance and Poverty." mimeo. Education and Social Policy Department, World Bank, Washington, DC.
- \_\_\_\_\_. 1996b. "Social Sectors in Transition: The Case of Romania." mimeo. Education and Social Policy Department, World Bank, Washington, DC.
- World Bank. 1996. "Romania: Poverty and Social Policy." Report No. 14616, Human Resources Sector Operations Division, Country Department I, Europe and Central Asia Region, World Bank, Washington, DC.
- Yitzhaki, S. 1996. "The Effect of Marginal Changes in Prices on Inequality in Romania." mimeo. Human Resources Sector Operations Division, Country Department I, Europe and Central Asia Region, World Bank, Washington, DC.

## APPENDIX 4: LIST OF DATA SETS

The data sets (a total of 240 files) are broken down by sections of the questionnaire for ease of manipulation and reference/storage. Each file is given a name indicating the section (PAN or PA followed by section number (1-21), sub-section, if any (A, B, ...), and the month in which it was administered (M4 - M12). The breakdown of the dataset files and the section they belong to is summarized as follows. For details of what each section of the questionnaire covers, please refer to Appendix 5. Note: Variables in Section 0 (Cover and Control page) are included in Sections 1A and 1B.

Section	Filenames	# of files in section
I.	Household Roster/Structure	
	1A            PN01AM4 - PN01AM12	9
	1B            PN01BM4 - PN01BM12	9
	1C            PN01CM4 - PN01CM12	9
II.	Education	
	PAN02M4 - PAN02M12	9
III.	Migration	
	PAN03M4 - PAN03M12	9
IV.	Dwelling Information, Durable Goods And Incomes From Leasing Land/Buildings	
	4A            PN04AM4 - PN04AM12	9
	4B            PN04BM4 - PN04BM12	9
	4C            PN04CM4 - PN04CM12	9
	4D            PN04DM	1
V.	Present Occupational Status	
	PAN05M4 - PAN05M12	9
VI.	Wage Related Activity	
	PAN06M	1
VII.	Independent Workers	
	PAN07M	1
VIII.	Non-Agricultural Non-wage Self-employment Activities	
	PAN08M	1

IX.	Agricultural Production, Agricultural Expenditures		
	9A	PN09AM4 - PN09AM12	9
	9B	PN09BM4 - PN09BM12	9
	9C	PN09CM4 - PN09CM12	9
	9D	PN09DM4 - PN09DM12	9
	9E	PN09EM4 - PN09EM12	9
X.	Livestock		
		PAN10M4 - PAN10M12	9
XI.	Labor Force History		
		PAN11M4 - PAN11M12	9
XII.	Food Expenses		
		PAN12M4 - PAN12M12	9
XIII.	Non-Food Expenses		
		PAN13M4 - PAN13M12	9
XIV.	Expenditure on Services		
		PAN14M4 - PAN14M12	9
XV.	Savings and Loans Incurred by Household		
	15A	PN15AM4 - PN15AM12	9
	15B	PAN15BM	1
XVI.	Health		
		PAN16M	1
XVII.	Anthropometric Measurements		
		PAN17M4 - PAN17M12	9
XVIII.	Fertility		
	18A	PN18AM4 - PN18AM12	9
	18B	PN18BM4 - PN18BM12	9
XIX.	Incomes and Other Money Inputs		
		PAN19M4 - PAN19M12	9
XX.	Expenses and Other Money outputs		
		PAN20M4 - PAN20M12	9
XXI.	Public Benefits		
		PAN21M4 - PAN21M12	9

## APPENDIX 5: HOUSEHOLD QUESTIONNAIRE

Section 0 -- Cover & Control Page

Previous survey participation, month of interview, year of interview

Section 1A -- Household Roster ; List of household members

Age of respondent, occupational status (including the categories employee, employer, independent workers, member of cooperative, pensioner, unemployed, military service, student, housewife, ill and “other” )

Section 1B -- Household Structure ; List of household members

Kinship with head; gender; date of birth ; marital status; present or absent from household at time of interview; number of days absent; reason for absence

Section 1C -- Number of days persons outside the Household ate in the Household.

Section 2 -- Education

interview; number of days absent; reason for absence.

Native language of respondent (Romanian, Hungarian, German, Gypsy, Other)

Last level of schooling completed

whether person is currently attending school

whether person received scholarship and if so, the amount of scholarship

whether child allowances were received

Section 3 -- Migration

Nationality of respondent ; movement from rural to urban areas ; motivation for migration ; place where person migrated from

Section 4A -- Dwelling Information and Characteristics

How many households live in the dwelling

Number of rooms; approximate area in square meters; number of persons occupying the dwelling ; rental status; estimates of value of housing ; construction material ; whether dwelling is exposed to noise, odor or pollution problems; type of lighting (electric, kerosene, other) ; type of heating used ; fuel used for cooking ; type of water supply (whether pipe is indoor or outdoor; whether water supply is self-owned or public; etc.) ; type of sewerage system ; location of toilet ; general sanitary state of dwelling

Section 4B -- Availability of additional dwelling structures

availability of garage ; stable ; storage room / barn in dwelling

whether store or retail stand is nearby

Section 4C -- Household durable goods
Availability of commodities such as cooking stoves ; fridges ; washing machines ; sewing machine ; vacuum cleaners ; TV, radio, VCR, camera; car, motorcycle, bicycle; computer, piano

Section 4 D -- Incomes from leasing land and buildings; and income from stocks
Money cashed in during the reference month; and, during the past year, as income from the above sources.

Section 5-- Present occupational status
This section pertains to individuals 14 years and older The section records : occupations which have produced in-kind or cash incomes source of income for pensioners and unemployed people For those who are unemployed, the following information is recorded : recording at the unemployed office methods used to look for job reason for not looking for a job

Section 6 -- Wage related activity
This section pertains only to employees salaries, salary during different types of leave (sick leave, rest leave etc) in-kind earnings taxes paid

Section 7 -- Independent workers
This section pertains to employers, farm and non-farm workers, and other independent workers type of work performed (shoe repair, house painting, newspaper sales etc); basic information about the household members involved in the business (their age and occupation)

Section 8 -- Non-agricultural non-wage self employment activities
Gross revenue last month ; capital inputs ; material inputs ; labor costs ; taxes paid; in-kind payments

Section 9A -- Agriculture
Surface area devoted to a) agriculture b) meadows c) hayfield d) vineyards e) orchards Area owned and area rented is registered

Section 9B -- Agricultural Production
area under cultivation, amount of area leased, amount of rent paid for leased land, ; quantity of recent harvest ; was land irrigated ; type of irrigation used ; amount of payment for irrigation ; was portion of crop marketed ; and if so, what marketing channel was used

Section 9C -- Agricultural Inputs

Quantity used and Amount paid was recorded for the following agricultural inputs :  
a) fertilizer b) pesticides c) herbicides d) seeds e) mechanization and f) other

Section 9D -- farm output obtained through farming cooperatives and commercial farming companies

This section records incomes in-kind and cash, and expenses for households that obtain farm output from land that they own in legal farming partnerships (cooperatives?) and in commercial farming companies. Type of crop/processed food obtained; and then for each type of food: wages paid over the previous cropping cycle; amount received from association in value and in quantity

Section 9E -- Durables used in Agriculture

Quantity owned; date of most recent purchase; and, actual value of all agricultural durables such as tractors.

Section 10 -- Livestock

type of livestock owned; and for each type of livestock, number owned at the beginning of the reference month, additions and acquisitions during the reference month, outflows and losses during that reference month, number owned at the end of the month, income and expenses associated with the livestock; amount of area plowed by animal traction for own household and for others; amount paid for the animal traction services.

Section 11 -- Labor force history

The section obtains information on all previous jobs (including independent work) performed by respondent, aged 14 or more, prior to the current ongoing occupation, since 1989 until the reference month. previous occupation, profession, sector (public/private/mixed etc), date when started that work, earnings per month when started that work; date when stopped that work, earnings per month at the time when that work was stopped; reason for stopping that job; whether respondent received pension or unemployment benefits from that job at the time of leaving; whether respondent is still receiving those benefits; if payment has ceased, what was the date when payment ceased

Section 12 -- Food expenses

stock of food at beginning of month ;  
the following is measured for the reference month : quantity purchased , value of purchase, value and quantity of home produced food, food as gifts (received and given), amount used for fodder, amount used for human consumption,

Section 13 -- Non food expenses

cloth and clothing ; footwear ; furniture ; household items ; durable goods ; books and newspapers; audio and video devices ; watches & jewelry ; transport vehicles ; toiletries ; fuels; building materials

Section 14 -- Expenditure on services

expenditures on the following services are recorded :

- manufacturing and repair of clothes and shoes
- manufacturing and repair for leather goods; jewelry; housekeeping articles and furniture; medical and optic articles
- repair of clocks and watches
- car and bicycle repair
- building and repair of dwellings and household appendages
- medical tests, consultations, treatment and hospitalization
- dental work
- haircuts, cosmetics and hygiene
- travel, tourism, leisure expenses
- schooling
- rent for housing
- water supply, sewerage and salubrity
- electricity, phone, radio, TV, cable TV
- transportation
- childcare

Section 15A -- Savings

Amounts stored in savings deposits; foreign currency deposits ; deposits in the bank ; and mutual funds  
Amounts loaned to other households  
interest cashed in during reference month  
registers all withdrawals from savings banks

Section 15B -- Loans incurred by household

loan source, amounts of loans contracted during and before the reference month; and interest paid on those loans

Section 16 -- Health

For the past reference month :

registers type of disease reported by respondent, number of days absent from productive activity due to illness; whether medical consultation was obtained for illness; (for those who obtained health consult), first place of medical consultation; time taken for interviewee to reach place of medical consult; waiting time at medical unit; amount of fee for first consultation ; whether 2nd medical consult was obtained; amount of fee for second health consult; fee for medical tests; total cost of treatment including hospitalization; cost of medicines; prosthetics, eyeglasses, etc.

For people with chronic diseases, a question is asked pertaining to the number of days respondent was affected by the disease during the past year

Section 17 -- Anthropometric measurements

This section refers only to children under 5 years  
child's height in cms; child's weight in kg; child's birthplace; child's birthweight; breastfeeding issues (is baby still being breastfed; how many times per day; if not being breastfed, at what month did mother stop breastfeeding)

Section 18 -- Fertility

This section pertains to all women 14 years and older  
year when woman had her first period; whether respondent had ever been pregnant; year when respondent had first pregnancy ; whether respondent ever had miscarriage and if so, how many ; whether respondent ever had abortion ; if respondent has children, age when first child was born ; would respondent like to have (more) children ; and, if so, how many? whether respondent uses any birth control  
The section also registers all children ever born to each respondent. Also noted are the gender of each child; birthdate; if child is deceased, date when child died ; and reason for child's death

Section 19 -- Incomes and other money inputs

Gross revenue and/or wage ; bonuses and benefits ; paid sick leave from social security ; payments from social security for maternity leave and child care ; unemployment benefits ; social aid for unemployment; children allowances ; scholarships.  
Income from various types of pensions ; aid from the system of social assistance ; special aid for handicapped ; war widows and war veterans.  
records income from self employment activities  
interest on loans  
income from stocks and shares  
income from sales of home produced products  
income from rents  
income from various types of loans

Section 20 -- expenses and other money outputs

The section records expenses on :  
food products  
non-food goods  
fodder  
housing  
land  
animals & poultry  
seeds  
shares, property certificates  
service payments  
pension contributions  
contributions for unemployment benefits  
taxes on wages, land, building, car  
income taxes for self employed  
insurance for goods, persons  
remittances  
cash balance at the end of the month

Section 21 -- Public benefits

Benefits received for rail, subway, bus/train, prosthetics, canteen, telephone services and medicines

## APPENDIX 6: THE FAMILY BUDGET SURVEY, 1989 & 1993<sup>9</sup>

The Romanian Family Budget Survey (FBS) was based on a sample of 11,000 household in 1989. However, budgetary reasons forced the NCS to shrink the sample to 9,000 households from 1990 onward. The FBS data provide gross monthly income and consumption of surveyed households disaggregated by their respective components. Income and expenditure as well as the limited socio-economic data (age, sex, occupation) are provided at the household level. The survey does not collect individual data on wages and benefits, or socio economic characteristics.

This appendix discusses the basic sampling and measurement error problems with the FBS that make it less preferable than the RIHS. The FBS data are not being made available for public use as part of this documentation package, nor will this appendix attempt to document the FBS in any way.

### Sampling Issues

The FBS data are not representative of the population in three critical ways. First, the composition of households is not representative of the distribution of households in the entire population. This bias in the sample is quite severe. The 1992 census shows that 59 percent of the population reside in wage earner headed households, 8 percent in farmer headed household, while 29 percent resides in pensioner headed households. The 1993 FBS, on the other hand, is based on a sample population, 71 percent of which resides in wage earner households, 2.2 percent in pensioner headed households and 30 percent farmer headed households. There is a large difference in the composition of farmers, pensioners and workers between the sample and the census. There are differences in the rural urban populations as well. The 1993 FBS is based on a 46 percent rural and 54 percent urban population, while the 1992 census finds that these proportions are exactly the reverse for rural and urban areas. The regional make up of the population is more similar, although Bucharest is slightly over-sampled in the FBS.

Second, the reduction in the sample over time has resulted in a change in household composition that is at odds with the direction of change in household composition recorded in the population census. The census shows the proportion of wage earners in the population declined between 1989 and 1992. The increase in the ratio of pensioners to workers was the result of the early retirement policies of the government and increased unemployment in the economy. The number of farmers and other inactive population stayed fairly constant as a proportion of total population over the 15 year period. In contrast, changes in the survey sample indicate an increase in the population of wage earner households matched by an equal decline in the population of farm headed households. The population of pensioner headed households remained fairly constant in the sample over time. Finally, households headed by women or individuals on social assistance benefits are excluded from the sample. Second, the NCS systematically replaces households headed by a woman in the sample. This bias is not likely to be too severe in the years studied--very few households are headed by women.

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<sup>9</sup> This appendix is drawn from "Romania Poverty and Social Policy". Report No. 14616, Human Resources Sector Operations Division, Country Department I, Europe and Central Asia Region, World Bank, Washington, DC.

## Measurement Errors

The FBS has the same measurement problems found in the RIHS: the use of a diary method that forces the equalization of income and consumption, and, using income and consumption flows to construct household welfare indicators.

## APPENDIX 7: DETAILS OF HOW WORLD BANK AGGREGATE VARIABLES WERE CONSTRUCTED

### A. Household size

The household size and adult equivalent units were computed using Form 1a, 'List of Household Members'. The household size is the total number of members in the household. Two adult equivalent units were computed using the OECD and the Romania standards.

$$\text{HHsize} = \text{SM}_i$$

where  $M_i$  is 1, if  $M_i$  is a household member.

$$\text{OECD Adult Equivalent unit} = 1 + 0.5 \times S A_i + 0.3 \times S C_i$$

where  $A_i$  is 1, if  $A_i$  is a household member aged 18 and above  
 $C_i$  is 1, if  $C_i$  is a household member aged below 18

$$\text{Rom Adult Equivalent unit} = 1 + 0.8 \times S A_i + 0.6 \times S C_i + 0.4 \times S P_i$$

where  $A_i$  is 1, if  $A_i$  is a household member aged 15 and above  
 $C_i$  is 1, if  $C_i$  is a household member aged 7-14  
 $P_i$  is 1, if  $P_i$  is a household member aged 6 and below

### B. Regions

Variable REGION was created based on the JUDET codes.

$$\begin{aligned} \text{Region} &= 1, \text{ if JUDET is } 6 \text{ to } 10, 12, 14, 16, 19, 23, 30, \text{ or } 37. \\ &= 2, \text{ if JUDET is } 3, 11, 17, 20, 22, 26, 29, 35, 36, \text{ and } 39. \\ &= 3, \text{ if JUDET is } 1, 2, 5, 6, 13, 25, 27, \text{ and } 31-33. \\ &= 4, \text{ if JUDET is } 4, 7, 15, 18, 21, 24, 28, 34, 38, 40. \\ &= 5, \text{ otherwise.} \end{aligned}$$

Judets under Region=5 were also classified as urban, i.e. URBAN=1.

### C. Food consumption

1. Stacked up data for each food good in the household for all months from April to December
2. Price for each food good coded from 101 to 183, 187, 188 and 189 was computed as follows:  
$$\text{PWTD}_f (\text{Weighted prices for each foodcode}) = (\text{valpub}_f + \text{valpriv}_f) / (\text{qtypub}_f + \text{qtypriv}_f)$$
3. Mean of weighted price of each food good was computed over all the household
  - a. by month  
$$\text{PWTD}_{\text{mean.fm}} = S \text{PWTD}_i / N_m$$

where  $i$  is 1 to  $n$ th of food good  $f$  in month  $m$   
 $f$  is food good 101 to 183  
 $N$  is the number of food good  $f$
  - b. by month and judet (PWTDmeanj)

$$PWTD_{\text{mean.fmj}} = \sum PWTD_i / N_{mj}$$
 where  $i$  is 1 to  $n$  of food good  $f$  in month  $m$  and judet  $j$   
 $f$  is food good 101 to 183  
 $j$  is judet  
 $N$  is the number of food good  $f$  in judet  $j$

4. Median of weighted prices of food good were computed over all the household  
 a. by month

$PWTD_{\text{med.fm}}$  = the middle point of all  $PWTD_i$  in month  $m$  sorted in ascending order  
 where  $I$  is 1 to  $n$  of food good  $f$  in month  $m$   
 $f$  is food good 101 to 183

- b. by month and judet

$PWTD_{\text{med.fmj}}$  = the middle point of all  $PWTD_i$  in month  $m$  and judet  $j$  sorted in ascending order

where  $I$  is 1 to  $n$  of food good  $f$  in month  $m$  and judet  $j$   
 $f$  is food good 101 to 183  
 $j$  is judet

5. Food consumption

The household food consumption was computed as follows:

- a.  $\text{Food1I} = \sum (PWTD_f \times Q_f)$

where  $i$  = food good 101 to 183

$PWTD_f$  is the weighted price of each food good consumed by the household

$Q_i$  is the quantity of food good consumed by the household

For  $PWTD_f$  missing, median of weighted price ( $PWTD_{\text{med.fmj}}$ ) in month  $m$  and judet  $j$  was substituted and if both  $PWTD_f$  and  $PWTD_{\text{med.fmj}}$  are missing, median of weighted price ( $PWTD_{\text{med.fm}}$ ) of food good for that month was used.

- b.  $\text{Food2I} = \sum (PWTD_f \times Q_i)$

where  $i$  = food good 101 to 183

$PWTD_f$  is the weighted price of the food good consumed by the household

$Q_i$  is the quantity of food good consumed by the household

For  $PWTD_f$  missing, mean of weighted price ( $PWTD_{\text{mean.fmj}}$ ) in month  $m$  and judet  $j$  is substituted and if both  $PWTD_f$  and  $PWTD_{\text{mean.fmj}}$  are missing, mean of weighted price ( $PWTD_{\text{mean.fm}}$ ) of food good for that month is used.

- c.  $\text{Food1N} = \sum (PWTD_{\text{med.im}} \times Q_i)$

where  $i$  is food good 101 to 183 consumed in month  $m$

$PWTD_{\text{med.im}}$  is the median of weighted price of the food good consumed in month  $m$

$Q_i$  is the quantity of food good  $i$  consumed by the household

- d.  $\text{Food2N} = \sum (PWTD_{\text{mean.im}} \times Q_i)$

where  $i$  = food good 101 to 183 consumed in month  $m$

$PWTD_{\text{mean.im}}$  is the mean of weighted price of the food good consumed in month  $m$

$Q_i$  is the quantity of food good  $i$  consumed by the household

5. Nonfood expenditures of household

Form 13 of the Romania survey contained the coded nonfood items the household consumed.

The household nonfood expenditures was the total value of the nonfood items.

$$N_{\text{food}_h} = \sum N_i$$

where  $i$  is nonfood codes from 201-239, 246-250, 261-274, 279-286, 292-309, 311, 312, 313 in household  $h$

$N_i$  is value of nonfood  $i$  in household  $h$ .

For more detailed description of the codes see attached Form 13.

## 6. Services

The expenditure on services of the household was computed using Form 14 of the Romania survey.

$$\text{Services}_h = \sum S_i$$

where  $i$  is services codes from 401-453, 455, and 456 of household  $h$ .

$S_i$  is cost of service  $i$ .

## 7. Durables

Using Form 4c, total value of durables was computed as follows:

$$\text{Durables}_h = \sum D_i$$

where  $i$  is durables codes from 01-31 of household  $h$ .

$D_i$  is value of durable  $i$  in household  $h$ .

For more detailed description of the codes see attached Form 4C.

## 8. Total consumption

Each components of total consumption were deflated using deflators for region, rural and urban except Food1N which was deflated using the national deflator. The total value of durables was also inflated using the interest rates in Romania for each month.

$$C1I_h = \text{Food1I}_h + N_{\text{food}_h} + \text{Insurance}_h + \text{Dues}_h + \text{Otherexp}_h$$

$$C1N_h = \text{Food1N}_h + N_{\text{food}_h} + \text{Insurance}_h + \text{Dues}_h + \text{Otherexp}_h$$

$$C2I_h = \text{Food1I}_h + N_{\text{food}_h} + \text{Insurance}_h + \text{Dues}_h + \text{Otherexp}_h + \text{Durables}_h$$

$$C2N_h = \text{Food1N}_h + N_{\text{food}_h} + \text{Insurance}_h + \text{Dues}_h + \text{Otherexp}_h + \text{Durables}_h$$

## 9. Deflator

### a. Mean quantity consumed by food good

Rectangularize household food consumption data by food good. For households with missing food good, , the food good was added to the records of the households and the quantity of the food goods was set to zero. Then mean quantity consumed by food good ( $Q_{\text{mean.f}}$ ) was then computed over all the household in all the months.

$$Q_{\text{mean.f}} = S(SQ)/N \quad \text{where } N \text{ in the total number of food good } f \text{ in all months}$$

### b. National deflator

#### 1. Monthly consumption of each food good

$$C_{i,m} = \text{PWTD}_{\text{med.in}} \times Q_{\text{mean.f}}$$

where  $i$  = food good 101 to 183  
 $m$  = month 4 to 12

2. Total food consumption in month  $m$   
 $C_m = SC_{i,m} = S(PWTD_{med,i,m} \times Q_{mean,f})$   
 where  $i$  = food good 101 to 183  
 $m$  = month 4 to 12

3. Deflator  
 $I_m = (C_m / C_4) \times 100$   
 where  $C_m$  is total food consumption in month  $m$   
 $C_4$  is total food consumption in month 4

b. Deflator for rural urban

1. Median of weighted prices of food good were computed over all the household by month and rural/urban

$PWTD_{med,f,m,r}$  = the middle point of all  $PWTD_i$  sorted in ascending order

where  $i$  is 1 to  $n$  of food good  $f$  in month  $m$  and rural/urban  $r$   
 $f$  is food good 101 to 183  
 $r$  is rural/urban

2. Monthly consumption of each food good  
 $C_{i,m,r} = PWTD_{med,i,m,r} \times Q_{mean,f}$

where  $i$  is food good 101 to 183  
 $m$  is month 4 to 12  
 $r$  is rural/urban

2. Total food consumption in month  $m$   
 $C_{m,r} = SC_{i,m,r} = S(PWTD_{med,i,m,r} \times Q_{mean,f})$

where  $i$  is food good 101 to 183  
 $m$  is month 4 to 12  
 $r$  is rural/urban

3. Rural/urban deflator  
 $I_{m,r} = (C_{m,r} / C_{4,r}) \times 100$   
 where  $C_{m,r}$  is total food consumption in month  $m$  and rural/urban  $r$   
 $C_{4,r}$  is total food consumption in month 4 and rural/urban  $r$

b. Deflator for region and rural/urban

1. Median of weighted prices of food good were computed over all the household by month, urban/rural and region

$PWTD_{med,f,m,r}$  = the middle point of all  $PWTD_i$  sorted in ascending order

where i is 1 to n of food good f in month m, rural/urban u and region r  
 f is food good 101 to 183  
 u is rural/urban  
 r is region

2. Monthly consumption of each food good

$$C_{i,mur} = PWTD_{med,i,mur} \times Q_{mean,f}$$

where i is food good 101 to 183  
 m is month 4 to 12  
 u is rural/urban  
 r is region

2. Total food consumption in month m

$$C_{mur} = \sum C_{i,mur} = \sum (PWTD_{med,i,mur} \times Q_{mean,f})$$

where i is food good 101 to 183  
 m is month 4 to 12  
 u is rural/urban  
 r is region

3. Deflator for region r and rural/urban u

$$I_{mur} = (C_{mur} / C_{4ur}) \times 100$$

where  $C_{mur}$  is total food consumption in month m, region r and rural/urban u  
 $C_{4ur}$  is total food consumption in month 4 in rural/urban areas in region r

The total consumption in month 4 in the urban and rural of region r was used as the base in computing the deflator for urban and rural areas respectively, in the other regions.