REVIEW OF HOUSEHOLD INCOME ESTIMATES FOR
NAIROBI, LIMA AND TUNIS

AND

PRELIMINARY DESCRIPTION OF
METHODOLOGY FOR ESTIMATING
HOUSEHOLD INCOMES

OFFICE OF HOUSING

Agency for International Development

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FOREWORD

The Office of Housing as part of its commitment to advancing understandings of key development issues commissions studies to that end. The following study was the result of discussions between staff and associates on the question of methodologies for estimating household incomes.

We hope you will give the discussion presented herein a serious analysis and in collegial sharing will let us have your thoughts and opinions.

Peter M. Kimm
Director
Office of Housing
This study was conducted by the DeVoy Collaborative under the auspices of the Office of Housing of the Agency for International Development and through funding provided by this office.

The study was made under the direction of Robert S. DeVoy, with the assistance of Anne Castle. The findings and recommendations are for the purpose of discussion and review and are not to be considered the official position of the Agency for International Development.
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1.0 NATURE OF THIS REPORT

The Office of Housing has requested that DeVoy Collaborative analyze income and household data from Peru, Kenya and Tunisia and make recommendations to the Office of Housing on appropriate usage of data to establish income distribution curves.

The specific scope of work is to:

1. Analyze income and household data from Peru, Kenya and Tunisia and measure their performance against income distribution curves for Lima, Nairobi and Tunis.

2. Make recommendations to DS/H on the appropriateness of data used for income distribution curves and indicate areas in which DS/H can improve this area of data management.

3. Analyze current Census and UN Household survey mechanisms and recommend to DS/H appropriate interventions to more fully use these vehicles.

4. Make overall recommendations to DS/H for a methodology to increase and improve data bases in selected and/or all HG countries.

5. Submit to DS/H written report on aforementioned subjects.
2.0 HOUSEHOLD INCOME DISTRIBUTIONS IN LIMA, NAIROBI AND TUNIS

Income data included in Shelter Sector Analyses, Project Identification Documents and Project Papers nearly always comes from surveys of the national statistical office of the government in each country. The basic source usually is the most recent household expenditure survey. Since these surveys are one or more years old, the base data frequently are adjusted based on rates of change in the consumer price index and/or gross domestic or national product per capita. This approach to deriving household income distributions generally was used for Lima, Nairobi and Tunis as reported in the Shelter Sector Analyses and Project Papers.

2.1 General Conclusions

The quality of such income estimates has been questioned in terms of the (1) adequacy of the sources, (2) the analysis and updating approaches and, (3) the accuracy of the derived estimates. Review of these estimates leads to the following conclusions:

- The sources used were the single best available sources; however, additional direct and indirect data should have been included in the Shelter Sector Analyses of Kenya and Peru to enable a better understanding of household incomes. For example, more information would be useful on occupation distributions, salaries and wages by occupation, informal income sources and amounts, household composition in terms of income earners, rental income, and profiles of typical households at
various income levels. The three Shelter Sector Analyses each include some of this information, but in uneven ways. The Tunisia report presented much of this information but did not include a complete distribution of household incomes for Tunis or Tunisia.

- Analysis of the income information is limited to a little description for the most part. The available survey data are accepted as is, rather than tested and adjusted based on other indicators. There seems to be general agreement that the survey results probably significantly understate actual incomes, but little analysis is included to verify this conclusion and permit reasonable adjustment.

- The household income information is not presented in any similar manner, thus making it very difficult to compare findings from country to country. More comparative analysis would benefit future income estimation tasks and, moreover, enable a better understanding of the target groups of the Housing Guaranty Program.

- The household income distribution results for Lima, Nairobi and Tunis have been analyzed to see how they compare with one another and how they relate to economic indicators in their respective countries. The three city income estimates are significantly different from one another. The urban income estimates as presented.
appear reasonable in the economic context of each country. And while the income estimates may not be very accurate and are likely to be understated, they seem adequate for HG Program purposes. Nevertheless, it would be highly desirable to improve these estimates in order to sharpen the focus of HG projects on various components of the urban poor.

2.2. Analysis of Incomes in Lima, Nairobi and Tunis

This analysis reviews household incomes in these three places by: (1) ascertaining what information on household incomes is available in Office of Housing reports; (2) investigating other sources of income data; (3) assessing the reasonableness and adequacy of the estimation procedures; (4) comparing the resulting income distribution for the three cities; and (5) explaining each of the three income distributions in the context of that city's national economy. The key conclusions of the analysis case are presented in section 2.1, above; The specific analyses are described below.

2.2.1 Income Data in Office of Housing Reports

The Kenya Shelter Sector Study and AID's Experience, August 1979, includes two pages on earnings and incomes—earnings for 1975 and Nairobi household incomes for 1977 by five percentile groups as well as an estimated median of Shs 1,500 for either
1975 or 1977. The source of this household income distribution is the research Division of the Nairobi City Council.

In 1975, Real Estate Research Corporation (RERC) made a study for the Office of Housing entitled Household Income Distributions for Nairobi and Income Estimates for Other Municipalities in Kenya. The RERC estimated income distribution (prepared by this author) was constructed from wage and salary data with all adjustments for household income earners and other forms of income. The City Council distribution apparently was based on a survey. The two distributions are generally similar except that the 1977 distribution estimates lower incomes for the poor and higher incomes for the affluent. The medians are similar.

The 1979 Kenya Project Paper, Nairobi Housing and Community Facilities on page 21 includes a Nairobi household income distribution (see chart) which apparently is based on the 1977 distribution with adjustments to take account of inflation of 12.5%, with some lag because lower incomes do not quite keep pace with inflation. The factors used are not stated in the Project Paper.

The Tunisia Shelter Sector Assessment, January 1979, includes household income estimates for the District of Tunis, urban and rural areas and all Tunisia based on a 1975 household expenditure survey which has been updated to 1978 and projected to 1981 and 1985, based on estimated inflation at 6% and real income growth of 2%. This study is richly descriptive, but income data are
only presented for the 20th and 50th percentiles. The Project Paper uses the same source data and assumptions for updating and projections.

The Peru Shelter Sector Assessment, June 1979, has a chart entitled "Income Distribution and Affordable Habitat" as well as estimates of income for specific places and an annex on "median income of the target group." Nevertheless, nowhere in this report is there a straightforward household income distribution for Lima, all urban areas or total Peru.

The Peru Project Paper, Basic Services for Pueblos Jovenes, June 1979, includes median family incomes for urban places for 1978 and recommendations to the Housing Bank of Peru to keep these estimates current based on the Lima Consumer Price Index (see Annex K).

Thus, it is evident from the above examples that the household income data included in Office of Housing studies and project papers vary greatly and are generally inadequate to permit a clear definition of the target group. This conclusion raises the questions of why this is so and what can be done about it?

2.2.2 Other Sources of Income Data

Section 3.0, below, discusses available data which are useful in estimating household income distributions. In each of the three Shelter Sector Assessments, these data were mostly included, however, then little was done to use these data in constructing household income distributions and updating available distributions.
Specific additional sources of data which are relevant to the subject of household incomes in three case study countries are:

- Poverty and Growth in Kenya, IBRD, May 1979 (see especially Table 4)
- The Distribution of Incomes in Peru, Richard C. Webb, Princeton University, 1972 (old data but useful insights)
- Preliminary Report on a Methodology for Indirect Estimation of Median Family Income, National Savings and Loan League for Office of Housing, August 1978 (useful approach and data on Peru)

2.2.3 Assessing the Reasonableness and Adequacy of the Income Estimation Procedures

The Nairobi, Kenya and Tunis, Tunisia reports rely on household expenditure surveys for their data on household incomes. Such surveys undoubtedly are the best single source of income information. In both instances the reports would have been improved if supplemental data had been used to analyze the survey results, provide additional definition of the target group (as was done for Tunisia) and refine the income estimates reported from the surveys.

The Peru SSA includes a useful analysis of alternative median family income estimates in an annex. However, the bases for the income distribution used in the report are unclear, thus it is not possible to assess the adequacy of the procedures used.
2.2.4 Comparison of Three City Income Estimates

As explained above, there are no comparable income distributions available for the three cities of Nairobi, Lima and Tunis. However, the following median household incomes are indicated in the Office of Housing reports.

<table>
<thead>
<tr>
<th>Urban Area</th>
<th>Date</th>
<th>Updating Factors</th>
<th>Local Currency</th>
<th>1979 US Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nairobi</td>
<td>1979</td>
<td>none</td>
<td>KSh 1900</td>
<td>$255</td>
</tr>
<tr>
<td>Lima</td>
<td>12/30/78</td>
<td>none</td>
<td>Soles 32,751</td>
<td>147</td>
</tr>
<tr>
<td>Tunis</td>
<td>1978</td>
<td>6% inflation, 2% real income for one year</td>
<td>Dinar 124</td>
<td>329</td>
</tr>
</tbody>
</table>

As can be seen from these data, in 1979 US dollars median household incomes range widely from $147 in Lima to $329 in Tunis. Median income in Nairobi is 73% greater than in Lima, while median income in Tunis is 124% greater than Lima and 29% greater than in Nairobi. Clearly these are significant differences.

While a complete income distribution is only available for Nairobi, the 20th percentile is available for Tunis. In 1979 US dollars, the Nairobi 20th percentile income of $90 per month is 35% the median of $255. For Tunis, the 20th percentile income of $166 is 50% of the $329 median. Thus, the income curve in Tunis would seem to be more level than in Nairobi—that is, personal incomes are somewhat more evenly distributed, thus very low income households are relatively better off economically in Tunis.

While comparable income information is not available for
Lima, it is probable that the income curve is sharper there than in Nairobi and Tunis—that is, the relative economic plight of the poor is worse. One indicator of this is that households below the 40th percentile have only 8% of total income in Peru and 16% in Tunisia and 15% in Kenya.

Based on the above information, it seems evident that both the level and curve of household income distributions in Nairobi, Lima and Tunis are significantly different from one another.

2.2.5 City Incomes in National Economic Context

Household income estimates for Kenya, Peru and Tunisia are not available on a basis comparable to the median household income estimates for the three major cities indicated above. However, it has been possible to derive approximations of national personal income distributions based on information regarding personal income (Peru), personal expenditures (Tunisia) and household income (Kenya) for different years.

<table>
<thead>
<tr>
<th>Approximations of National Personal Income Distributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Percentile Group</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>Percentage</td>
</tr>
<tr>
<td>Share of National Personal Income</td>
</tr>
<tr>
<td>Personal Income</td>
</tr>
</tbody>
</table>
These rough estimates indicate that while the very poor suffer about the same in each country, those in the 30-50th percentile group in Kenya are much better off than are their counterparts in Peru and Tunisia. This relative concentration of income in the upper-lower income group in Kenya is likely to be explained more by the balanced agricultural economy than by household incomes in Nairobi. This is the case because nearly 90% of Kenya's labor force is in agriculture (see following table). Thus, while Kenya has a low per capita gross national product ($250 in 1976), the economic benefits of this production are spread more evenly than in Peru and Tunisia where GNPs are much higher ($840 and $800, respectively).

Both Peru and Tunisia have nearly one-half of their populations in urban areas, thus urban incomes influence total national incomes much more than they do in Kenya with only 10% urban population.

The income distribution in Peru is typical of Latin America in that most of the people are very poor, e.g., the lower 50% have only 13% of incomes. This fact results in the Lima median income being only $147 per month compared to $329 in Tunis, while GNP per capita are similar for Peru and Tunisia.
# Selected National Demographic and Economic Indicators for Kenya, Peru, and Tunisia

<table>
<thead>
<tr>
<th>Population</th>
<th>Kenya</th>
<th>Peru</th>
<th>Tunisia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (1976)</td>
<td>13,850,000</td>
<td>16,068,000</td>
<td>5,732,000</td>
</tr>
<tr>
<td>Percent Urban (1970)</td>
<td>10%</td>
<td>52%</td>
<td>42%</td>
</tr>
<tr>
<td>Growth Rate-Total (1960-70)</td>
<td>3.1%</td>
<td>2.9%</td>
<td>2.1%</td>
</tr>
<tr>
<td>(1970-76)</td>
<td>3.5%</td>
<td>3.0%</td>
<td>2.4%</td>
</tr>
<tr>
<td>-Urban (1960-70)</td>
<td>7.0%</td>
<td>5.0%</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

| Labor Force | | | |
| Percent in Agriculture (1970) | 90 | 45 | 53 |
| Percent Women | 34 | 23 | 24 |

| Gross National Product | | | |
| Per Capita (1976) | $250 | $840 | $800 |
| Real Growth Rate (1970-76) | 0.9% | 2.7% | 6.9% |

Sources:


While the data are 10 years old, income distributions by decile groups for Kenya, Peru and Tunis have been graphed based on a World Bank report: *Size Distribution of Income, A Compilation of Data, Shail Jain, 1975*. The distribution up to the 60th percentile are remarkably similar. Unfortunately, this finding is not consistent with the Kenya distribution described above. The basis of the inconsistency is not known.

These national statistics do not adequately explain or substantiate the urban household income estimates. This is so because there are many other factors which determine and influence personal income level and the distribution of incomes. These other factors include but are not necessarily limited to the following:
DISTRIBUTION OF INCOME IN KENYA, PERU, TUNISIA

Kenya - Table 43. Income Recipients 1969 National

Table 55 Peru 1970-1 EAP National

Derived from: Shail Jain, Size Distribution of Income: A Compilation of Data, World Bank, Washington, 1975
Internal Factors

The characteristics of the national economy including the industrial and business composition as well as emphasis on capital and technology versus labor inputs to production significantly determine wage rates, business profit levels, and the spread of income levels.

The size and training of the labor force relative to the need for workers also determines wages and salary levels.

The urban/rural economic and population mix along with the rate of urbanization influence incomes. The relative size of formal and informal urban economic activities affect income levels in that informal activities tend to be near subsistence levels. Similarly, the size of farms and their productivity largely determine rural incomes.

The policies and practices of the government determine public and private employment opportunities and set minimum wages, thereby substantially influencing the total income structure of the economy. In addition, government taxation, welfare and land reform programs affect the distribution of wealth and the incentives to earn income.

The growth rate of the economy affects incomes through the availability of jobs and business opportunities. In this context, the unemployment and underemployment rates substantially influence income curves.

Then, the traditions and practices of the society in terms of family size, structure and living arrangements substantially determine household incomes by the number of workers in the household.
External Factors

Nairobi, Lima and Tunis are cities of regional and world economic importance, thus their economies are significantly influenced by international economic factors such as import-export trade, western consumption preferences, substantial non-national populations with much higher disposable incomes, etc. These factors tend to make these cities have more similar economic characteristics, including household incomes, than their dissimilar national economies would indicate.
3.0 DATA FOR HOUSEHOLD INCOME DISTRIBUTIONS

There are many different sources of generally available data which are useful in estimating household incomes, including:

- National Census
- Household Expenditures Survey and Other Surveys reporting on personal income and household characteristics
- Salary and Wage Data by Occupation
- National Accounts
- Special Surveys
- Case Studies

The more relevant attributes of these data sources are described below.

3.1 National Census

In most developing countries, the census is taken at ten year intervals, as it is in nearly every other country as well. These censuses are scheduled for 1980 in most countries. A wealth of data are collected on housing and household characteristics, including household income. Experts agree that data collected on incomes are less accurate than any other data because of the reluctance of people to report on this sensitive topic. Further, a large share of households really do not know their total incomes. Nevertheless, the National Census provides a reasonable baseline to use in structuring more accurate estimates of household incomes. Moreover, the Census is the only complete count
of population available. Because the Census includes data on household economic and housing characteristics, it is a unique and valuable resource for cross-tabulations on important social, economic and housing patterns of households. A basic weakness in the Census is its infrequency. Considering that published results typically only become available two or three years after the census date, in dynamic urban areas the data soon suffer from being out of date. Despite these negative attributes, census data properly belong in Shelter Sector Analysis reports and Project Papers.

3.2 Household Expenditure Surveys and Other Surveys Reporting on Personal Income and Household Characteristics

A large share of national statistical offices conduct periodic surveys of households to ascertain their expenditures on goods and services. Some surveys ask questions on household incomes while others estimate incomes based on reported expenditures and savings. These surveys provide the best available household income data on the group surveyed. The key problem with these surveys is that they frequently are skewed by excluding certain housing groups (commonly the wealthy areas and/or slums). Thus, the results are not a true profile of all households. When the survey sample is adequately defined, it is possible to use supplemental information to complete a reasonable income curve for all urban households.
Another problem with these surveys is that they are not made often enough, thus the income estimates need to be updated. While updating is usually achieved by adjusting for the change in consumer prices, per capita production or a combination of these, this approach often results in significant error when incomes change unevenly (which is common) and immigration of poor persons cause this group to grow disproportionate to the total population (also common in many places). It is desirable and possible to account for these imbalances, but most income estimates for the Office of Housing do not do so.

3.3 Salary and Wage Data by Occupation

Governments in nearly all developing countries compile and publish data on salary and wages by specific occupation categories. Changes in these data over time are reliable measures to use in updating household income distributions. Percentage changes in salary and wages by occupation can be used to revise incomes by decile groups by applying the weighted average percentage increase of occupations concentrated in each group—taking account of multiple wage earner households and informal income, of course. Adjusting old household income distributions in this manner is superior to the common practice of simply updating the income distribution by applying rates of change in consumer prices and per capita product evenly to all income levels.
It is also possible to construct a household income distribution from salary and wage information, but with some difficulty and considerable uncertainty. The complications arise because of more than one wage earner per household, more than one job per worker and informal income. There are likely to be some data available which enable insights regarding these variables so that informed judgments can be made. However, statistical derivations are unlikely to be possible because of inadequate data.

3.4 National Accounts

As mentioned above, data on per capita gross national product and gross domestic product are useful in updating available household income distributions. These data when disaggregated by major economic activities (e.g., agriculture, mining, manufacturing) can be used in conjunction with information on persons per household to calculate average household income. The National Savings and Loan League observed that in Latin America, at least, there is a reasonably consistent relationship between average (mean) and median household incomes (i.e., the median centered around 66% of the mean). Using such a relationship, it is possible to estimate median household income from these data. However, it is not possible to construct an income distribution using these data alone.
Data on price changes are useful in quickly updating old income distributions, but the inherent gross assumptions that incomes rise with prices and all income levels rise at the same rate make this approach very unreliable. Nevertheless, it is useful as part of a multiple approach to household income estimation.

Information on personal savings provide a clue as to whether incomes are keeping pace with price increases or not. Such an insight can be used to factor the income distribution update relative to consumer price increases (e.g., at 90% rather than simply assuming 100%).

Along with data on salary and wages discussed above, these appear to be the most relevant national account data for household income estimation purposes. However, national account data in some countries may well provide additional perspectives on household incomes. This source of basic economic data is rich and current.

3.5 Special Surveys

It is not uncommon for surveys to have been made for prior project planning purposes. These survey results usually provide some data on household incomes. While these data are of interest, they suffer by being too narrowly focused for purposes of a Shelter Sector Analysis. Should the target group be the same or similar to that of the project under
consideration, the available survey results would be pertinent to the new Project Paper. Nevertheless, it would be necessary to use additional secondary information (as described above) and/or undertake new surveys.

It is not the common practice of the Office of Housing to have household surveys made prior to the preparation of Project Papers. While the results of such surveys would be useful in many ways, timing usually precludes them until after the Project papers are prepared and projects approved. The major exception to this general practice is slum upgrading projects where survey work is sometimes completed in early stages of project definition. More emphasis should be placed on such surveys for all types of housing projects. However, because of the general nature of Shelter Sector Analyses, the household income estimation approaches for SSAs should concentrate on greatly improving the use of secondary data.

3.6 Case Studies

Much can be learned about the target group by undertaking brief case studies of representative households living in a cross section of residential areas and housing types. Through these case studies, profiles of typical target group households can be prepared which define household characteristics and housing desires needs. Specific characteristics of household income and the capability to afford housing can be described as part of these
profiles. Such case studies can augment project surveys and even reduce much of the need for expensive surveys. Some Office of Housing documents include profiles of target group households, but nowhere near as many as would benefit by their inclusion.
4.1 Description of Present Programs

The U.S. Census Bureau has long been under contract with AID to provide technical assistance on the conduct and analysis of censuses and surveys in developing countries. A major part of the Census Bureau's work over the last few years has been to recommend Census procedures, mechanisms, questions, and presentation formats to national agencies responsible for censuses. The Census Bureau prepared a five-volume set of reports called POPSTAN to meet these objectives. On a provisional basis, these reports were first distributed in 1978, although this work of the Census Bureau is yet to be completed.

Since most countries have been planning their 1980 census for at least two years, AID's Population Office is concerned that the Census Bureau's reports are late to have maximum utility. However, both the Census Bureau and the UN have been using these reports in general multi-country seminars as well as with individual countries. Also, since there were similar reports available for the 1970 censuses, it is likely that the Census/AID efforts have had a substantial impact on censuses in developing countries.

The UN proposals on censuses and surveys are described in a report entitled Draft Principles and Recommendations for Population and Housing Censuses, Part III, June 1978. UN recommendations on income data generally are incorporated in the Census Bureau proposals for intercensal surveys but not in proposals for the census itself.
The Census Bureau **POPSTAN** reports scarcely mention household income at all in the proposed census questions and reports. This is because the Census Bureau feels that reliable data on this subject is virtually impossible to obtain as part of a general census. Total household income is asked as one simple question in their proposed census. The results apparently are not used in the proposed tabulations. This is not to indicate that the Census feels that household income data are unimportant. Rather, the Census Bureau is convinced that reliable information is best obtained in the intercensal surveys which it proposes in report Part E of the five-volume set. The Census Bureau's statements on household income for the proposed census and the intercensal surveys are summarized on following pages and included in the Annex. The UN recommendations on income are also cited in the Annex.

**POPSTAN** is a prototypical country created by the Census Bureau to serve as a framework for its census and survey recommendations. The only specific mention of income in the census proposals is on page 97 of report Part B: "With respect to income, the NSO (national statistical office) recognized the difficulty of collecting data on income in a census. But they also recognized the need for some rough measure of income level. In Phase II, individuals will be asked the amount of their income for the past year. The publication tables will show only a few broad categories. Income in kind (in the form
of food, lodging, etc.) will not be included because of the difficulty of converting such benefits into cash income."

Given this brief and casual treatment of household income by the Census Bureau, one should not expect much income information from the censuses of countries using POPSTAN as a guide. The UN proposes that the census obtain information on total cash income including occupation earnings as well as interest, dividends, rent, social security benefits, pensions and life insurance annuity benefits.

The dearth of income data from the proposed censuses is balanced somewhat by the wealth of information which would flow from the Census Bureau's "Intercensal Household Survey Program." The Census Bureau proposes that annual income and work experience be included in surveys conducted in the first quarter of each year. However, in the scheduling proposed for the system of quarterly surveys, income questions would not be asked until 1986 (page 13 of report Part E). The survey is designed to obtain information on both cash and non-cash income of each member of the household aged 12 and over.

The Census Bureau also proposes that a housing survey be undertaken approximately every three years. The Census Bureau says that the specific quarter that this survey is made is unimportant. However, from the perspective of housing programming, it would be highly valuable to combine the household and housing surveys so that cross tabulations of
characteristics could be created.

4.2 Recommendations for Action

At this time there is little that the Office of Housing can do to influence the 1980 censuses of developing countries in terms of questions asked. However, there is the possibility of influencing the tabulations of census results to encourage cross tabulations of household characteristics, including total income, with housing characteristics. The censuses in many developing countries will, if they follow the Census Bureau and UN proposals, include considerable pertinent information on households and their housing which, if properly presented, could be of substantial value to the Office of Housing in pinpointing segments of its target group. The proposed housing and household characteristics to be included in these censuses are shown in the annex.

The Census Bureau is not putting any emphasis on the collecting of household income data by developing countries. Since the Census Bureau does not maintain information on 1980 census questionnaires and planned tabulations for countries, it is not possible to learn what these countries plan to include in their censuses without obtaining the information from each country. This is too large a task for the Office of Housing directly. However, it would seem reasonable for the AID Office of Population to collect and maintain such information with the assistance of the Census Bureau under its AID contract. The Office of Housing should request that this be done.
Since the UN and the World Bank also have considerable interest in household income data, the Office of Housing should initiate discussions with their pertinent staffs to ensure coordination and cooperation. One specific early cooperative effort might well be a joint communication from AID, UN and World Bank to each national statistical office (through proper channels, of course) indicating the need for more reliable household income data and proposing tabulations of 1980 census data. In particular, census reports should include at least household income by decile groups and the median for total country, urban, rural, and each urban place. Cross tabulations with the other household characteristics as well as housing characteristics would be valuable, but they are likely to be beyond the capabilities of most countries without additional financial and technical assistance.

A more promising cooperative effort would be directed to improving the household and housing surveys undertaken by the national statistical offices. The U.S. Census Bureau in its POPSTAN report series proposes that household surveys be undertaken in the first quarter of each year, including a list of questions on various types of household income. However, the Census Bureau does not have such surveys with income questions started until 1986. More priority needs to be given to this topic. Since the POPSTAN set of five reports has just been published, this written schedule cannot be changed. Nevertheless, the Office of Housing
should request the AID Office of Population urge the Census
Bureau to assign more priority to household income, including
adding such questions to earlier surveys in specific countries
whenever possible.

A housing survey is proposed at three year intervals. The
Office of Housing should seek to have the Census Bureau encourage
countries to combine the household and housing surveys so that
valuable cross tabulations can be made. The World Bank's Division
of Economic and Local Data is investigating available household
income data to see if there are enough usable comparable data
to warrant compilation and publication of a tabulation on incomes
in 20-40 countries. At this time, data collection is underway.
Household incomes are expected to be included based on household
expenditure surveys, but this part of the work program has not
started yet.

The World Bank also has underway a Living Standard Measurement
Study. The specific work program for this study will not be
prepared until after an experts meeting this February. The
Bank hopes to act as a catalyst in having the most useful information
on living standards identified, collected, tabulated and analyzed.
Presently, this effort is funded as a research project with a
tentative completion of two to three years from now. The Bank
staff apparently would be receptive to Office of Housing staff
suggestions and other cooperation. Since the UN, Census Bureau
an other organizations will be involved as well, this could be an
effective vehicle for the Office of Housing to use in getting its household and housing information needs incorporated into a major effort which seems as likely to become accepted by national statistical offices as any other approach.
5.0 RECOMMENDED METHODOLOGY FOR ESTIMATING HOUSEHOLD INCOME

5.1 General Recommendations

There are three areas of concern which entail different actions by the Office of Housing staff and contractors: data, analysis and presentation. The subject of data and what the Office of Housing can do to improve it is discussed in above sections of this report. Specifically, section 3.0 on Data for Household Income Distributions and 4.0 on Census and UN Household Surveys include action recommendations.

As limited and crude as available data on income usually are, most Office of Housing reports could be strengthened substantially by more analysis of household characteristics, including income and housing choices. Most Shelter Sector Assessments and Project Papers describe much more than they analyze. Thus, the reports reveal little about the important attributes of the target group.

The desired analyses of household incomes are described below. It is proposed that the Office of Housing have a complete methodology prepared on all aspects of target group analysis and housing reference/affordability. The income methodology proposed below would become a part of the overall methodology.

The Office of Housing should improve the presentation of household income information in all of its report. At least, a complete income distribution should be included for the urban areas in which projects are likely. This distribution should be a chart which shows income ranges in local currency and US dollars for each decile group. The data should be for the year the report is prepared. The sources of information and methodology used to
The estimates should be clearly stated. The income distribution should be augmented with pertinent information which enables the user of the report to evaluate the estimates presented and more fully comprehend the characteristics of the target group—including sources of household income and composition of expenditures.
5.2 Methodology for Estimating Household Incomes

The best method for obtaining household income distributions is designed and properly executed household expenditure surveys. As proposed above, the Office of Housing should work with the AID Office of Population, U.S. Census Bureau, UN, and World Bank to promote more and better household surveys in developing countries. In the absence of such survey data, there are two available methodologies which should be combined to provide the best estimate of both the median urban household income and the distribution of household incomes.

The National Savings and Loan League in its report entitled Preliminary Report on Methodology for Indirect Estimation of Median Family Income, August 1978, for the Office of Housing proposes the use of mostly national account data to estimate urban median household and family incomes. This methodology has been demonstrated for Kenya, Peru and Tunisia as presented in the annex. The data are readily available, mostly in publications of the World Bank. The key judgment necessary is to estimate the ratio of median to mean income. Both of these averages may be available from existing household income data, but this is very unlikely.

The methodology simply derives mean urban disposable income per household and then applies a factor to estimate the median. The data needed are total gross national product (GNP); GNP in agricultural (GNPagr.); National Income (NI); and Urban Households (UHH). When the number of urban households is not known an estimate can be derived by using total households (HH), economically active population (EAP) and agricultural employment (AE).
The basic weakness in this methodology is that errors in any of the data are difficult to detect and whatever errors exist are multiplied right into the estimate of the median income. For example, if the number of urban households were actually 1,000,000 rather than the estimate of 1,200,000, the estimate of median income would be roughly 20% too low. While the national accounts data are valuable in that they permit comparisons over time and among economic sectors, it is generally agreed that their absolute levels may not be particularly accurate. Nevertheless, this methodology does permit one reasonable approximation of the median urban household income.

For Office of Housing purposes, it is important to have a household income distribution or curve in addition to an estimate of the median. Also, it is frequently desirable to have income distributions for a specific city or cities. The methodology proposed for this purpose requires data on employment and salaries and wages—data which most national statistical offices compile annually (or at least every few years) for the nation and each of the larger cities. This methodology was first devised and used by Robert DeVoy in Kenya for the Office of Housing. The report is Household Income Distributions for Nairobi and Income Estimates for Other Municipalities in Kenya, Real Estate Research Corporation, 1976.

The methodology proposed here is a modification of the Kenya approach. The major steps are as follows:

1. **Obtain a distribution of employment by income ranges.**
   
   In some countries this will be directly available from annual wage and employment surveys for the nation
and major cities. Where it is not, a distribution can be constructed by combining commonly available data on employment by occupations and wages by occupations.

2. **Estimate self-employment and informal employment incomes.** Information on self-employment and informal employment frequently has been obtained by central statistical offices through surveys. In many places data on self-employment and informal employment and income are compiled along with the formal employment data. Where data are not available, rough estimates need to be made in the form of an income distribution similar to that for formal employment.

3. **Construct a total employment income distribution.** This is done by combining the formal and informal distributions resulting from steps 1 and 2.

4. **Adjust the total employment income distribution to add in significant non-wage remuneration.** The central statistics office usually can provide information on additional remuneration by occupation categories. Important additions may include medical benefits, bonuses, housing allowances, meals, etc.

5. **Update the employment income distribution to the present year.** The best factors to use are actual percentage increases in wages and benefits of the largest occupation categories. If not known, use an estimate of the overall increase in salary and wages. Any increases in minimum wages are an important clue. If no other indicators are available, use the percentage change in the consumer price index.
6. Estimate the percentage of workers at each salary/wage level with more than one job. Scale down employment by these percentages to estimate the number of workers at each income level.

7. Estimate the number of workers per household by general income levels (i.e., lower, middle, upper) or major occupation categories.

8. Apply these estimates of workers per household to the number of workers at each income level (from 6) to estimate the number of households at each income level (e.g., deciles).

9. Match the employment income distribution (from 5) to the number of households at each income level (from 8) to construct a household employment income distribution which displays ranges of money income by decile group.

10. Estimate the percentage of households in each decile group who have rental income and the approximate amounts of this rental income. Factor in this additional income to derive final estimated household income distribution by money income levels for each decile group.

11. Estimate the distribution of total household income by decile group by multiplying the mean household income in each decile group by the number of households in each group.

12. Calculate the percentage distribution of total household income by decile groups.

13. Compare this median with that derived using the NSLL approach described earlier in this report. If the difference between the estimated national urban medians or medians for the
major city(ies) is greater than, say, 10-15%, repeat both methodologies checking the reasonable accuracy of the data as well as the calculations. If the major difference again results, discuss the data and methods with at least three knowledgeable people to ascertain probable weaknesses in the data or the methods. Make appropriate adjustments and reapply methods to obtain final results of each method.

14. Move estimated income distribution upward or downward to the level of the median household income estimated by the NSLL method. For example, if the NSLL median is 8% more than the median based on the salary/wage approach, increase each of the household income ranges (from 10) by this percentage. The percentage distribution of total household income will not change.
ANNEX A - U. S. Census Bureau POPSTAN Report Extracts on Household Income
Popstan

A CASE STUDY FOR THE 1980 CENSUSES OF POPULATION AND HOUSING

PART B.
Planning and Preparation for Popstan Census

Prepared under a Resources Support Services Agreement with the U.S. Agency for International Development

U.S. Department of Commerce
BUREAU OF THE CENSUS
Chapter 5

SELECTION OF TOPICS

The objective of the Popstan Census with respect to economic activity will be to identify the economically active population (employed plus unemployed) and describe the extent and kind of participation—hours worked, occupation, industry, etc. Compared with 1 week, the use of 1 month as the reference period is expected to result in a more "overall" picture of the labor force. Data on the unemployed will probably be less precise; unemployment is better measured in repetitive surveys.

9.2 Economic topics for 1980

As in 1970, Popstan will enumerate economic characteristics for persons 12 years or older. In Popstan, school attendance is compulsory up to age 12, and although some children under 12 are working the number is not significant.

Although there is a change in the reference period, Popstan will repeat the 1970 economic questions. The additional questions include: weeks worked last year, occupation and industry of secondary jobs, sector of employment (private or government), and length of time since last job (for unemployed persons).

With respect to income, the NSO recognized the difficulty of collecting data on income in a census. But they also recognized the need for some rough measure of income level. In Phase II, individuals will be asked the amount of their income for the past year. The publication tables will show only a few broad categories. Income in kind (in the form of food, lodging, etc.) will not be included because of the difficulty of converting such benefits into cash income.

10. HOUSING TOPICS

In Popstan, the need for safe and decent housing has been increasing rapidly. The 1980 Census will collect information on the quantitative and qualitative aspects of housing so that the housing agencies can assess present conditions and estimate future needs.

All the housing characteristics in Popstan will be included in Phase I so that data can be provided for small administrative divisions and thus serve local as well as national housing programs. Phase II will have only the few items that are needed to identify the sample unit for comparison with Phase I in the coverage evaluation program (see exhibit B-7-4).

10.1 Structural and occupancy characteristics

Structural characteristics include type of living quarters; number of units in the structure; material of construction of the roof, outer walls, and floors; period of the construction; number of rooms; and number of bedrooms. Occupancy characteristics include tenure and vacancy.

Except for the period of construction and material of roof and floors, the topics repeat those in the 1970 Census. Although there was considerable interest in a question on year built, pretests showed that it was not feasible. Many respondents, particularly renters, had no idea of the year of construction unless it was built very recently. Reluctantly, the housing data users agreed to identifying only construction in the past year. Questions on material of the roof and floors will be added to satisfy the interests of suppliers of building material and the interests of health agencies.

Number of bedrooms was dropped because of inaccurate reporting in 1970. The widespread use of rooms for multiple purposes makes it virtually impossible to develop a definition that the enumerators can apply with consistency.

Categories of tenure (for occupied units) and type of vacancy (for vacant units) will be the same as in 1970, and monthly rent of units rented for cash will be repeated. Rent will be the only economic item for housing.
10.2 Water and sanitary facilities

One of Popstan's housing goals is to provide safe drinking water and decent sanitary facilities to raise the standard of living in both urban and rural areas. The existence and type of sanitary facilities depend largely on the availability of water and its source in relation to the living quarters.

The topics are similar to those enumerated in 1970, with the exception that a question on source of drinking water was substituted for the 1970 question on source of water for general use. Many respondents could not answer the 1970 question, and the 1980 question on drinking water was requested by health agencies that are responsible for programs to provide safe drinking water.

10.3 Household equipment

Lighting and cooking fuel are retained for 1980 but type of cooking equipment was dropped because it seemed less indicative of level of living than cooking fuel. Radio was dropped because the 1970 results showed that 9 out of 10 households had one or more radios, and it is estimated that the percentage is now over 95. A question on television was substituted.

Many suppliers of household equipment urged the Census Planning Group to include questions on their equipment. The NSO had to convince them of the purpose of the census and the need to limit questions to basic items that are indicative of the level of living.

10.4 Home industry

One final item, the presence of home industry, was added to the 1980 list of topics. In addition to indicating how living quarters are used, the item identifies households engaged in home industries. This information will be useful in a follow-up survey of such households to supplement the data collected in economic surveys of establishments.

11. CONCEPTS, QUESTIONS, AND TABLES

As mentioned earlier, census concepts and questions are interrelated. The question wording and the answer categories that are printed on the questionnaire will necessarily need to be developed so that they will measure what the concept intended to measure. For example, the concept of unemployment defines the "hard core" unemployed as those persons who are not working and are not looking for work because they believe no jobs are available. A question needs to be included on the questionnaire to ask why the person was not looking for work. Moreover, the answer categories will include "believes job not available" as one of the reasons; otherwise, it will not be possible to identify this group.

The census tables that are to be published likewise are interrelated with the concepts. Classifications in the tables necessarily will be coordinated with the answer categories used in the questions, either directly or indirectly. For example, since the housing analysts need to know how many households live in buildings constructed of flammable material, the categories on the questionnaire will appropriately separate flammable types in the question on material of construction. Another example is the matter of unpaid family workers. If some of the tables exclude unpaid family workers who worked less than 15 hours per week, then the questionnaire must be designed to report hours worked per week for unpaid family workers. Tables, questionnaires, and concepts will be reviewed thoroughly before data collection begins.

12. QUALITY CONTROL AND PRETESTING

As far as topics and concepts are concerned, quality control is largely a matter of judgment. The professional staff will review the concepts to make sure that they express the agreed-upon meanings. The staff will also verify that the questions and answer categories are consistent
A CASE STUDY FOR THE 1980 CENSUSES OF POPULATION AND HOUSING

PART D.
Phase II: Census Sample for Popstan

Prepared under a Resources Support Services Agreement with the U.S. Agency for International Development

U.S. Department of Commerce
BUREAU OF THE CENSUS
persons employed by national and local governments from administrative records, it would not be able to relate these numbers to characteristics of the workers or to compare them with persons in private employment.

9.4 Secondary job

Because of severe underemployment in parts of Popstan, many people work at more than one job. Question 56 identifies persons who have a second job during the reference period. Questions on occupation, industry, and status in employment for the second job use the same concepts as those for the principal job.

9.5 Hours worked

As in Phase I, the usual number of hours worked per week at all jobs during the reference month is to be reported. Cross-tabulations of hours worked by occupation, industry, and other characteristics will give some evidence of underemployment.

Question 62 is intended to embody the same concept of usual hours worked per week, except that it covers a period of a year. It is more difficult to give an accurate answer, unless the respondent had a regular job all year with regular hours. If the person worked at several jobs with varying hours, the enumerator should ask for the hours normally worked for most of the year. Because the answers may not be very precise, tabulations will be limited to several broad categories.

9.6 Weeks worked in last 12 months

Popstan will include in Phase II questions on economic activity over a longer time period as well as the 1-month reference period. The longer period (1 year) will give an indication of the intensity of economic activity in the recent past (questions 61 and 62).

Each week the respondent worked (including paid vacations) is to be reported, whether the persons worked full time or part time. For example, if the person worked 1 day a week for 52 weeks, "52" is to be reported. The usual hours per week (question 62) would indicate that the job was part time.

9.7 Income

For Popstan, income to be reported is defined as the 1980 income in cash from all sources—wages, salaries, net income from a business, pensions, dividends, etc. Income in kind (for example, food and shelter in payment for services) is excluded. Figures for individuals will be added to get family income. As with some of the items on economic activity, the NSO is aware of the limitations of a question on income in the census. Special surveys with detailed questions are needed for good income data. The information to be collected in Phase II will be approximate at best.

10. COVERAGE EVALUATION QUESTIONS

Questions needed for the coverage evaluation portion of Phase II (questions 12 to 17 and 64 to 74) will be discussed more fully in chapter D-7. The questions will provide information on out-movers as well as in-movers and non-movers who currently live in the sample HU. Characteristics reported in Phase II will be matched with Phase I to determine the completeness of the Phase I enumeration.
A CASE STUDY FOR
THE 1980 CENSUSES
OF POPULATION
AND HOUSING

PARTE.
Intercensal Household
Survey Program
for Popstan

Prepared under a Resources Support Services
Agreement with the U.S. Agency for
International Development

U.S. Department of Commerce
BUREAU OF THE CENSUS
# Household Record Card

## CONFIDENTIAL — This information is secured confidentially and cannot be used for taxation, investigations, or regulations.

### Household Record Card

#### POPULATION HOUSING SURVEY

#### MINISTRY OF ECONOMY

#### NATIONAL STATISTICAL OFFICE

### HOUSEHOLD RECORD CARD

#### POPULATION HOUSING SURVEY

### 1. PREVIOUS

- **Residence:**
  - Street code:
  - Street name:
  - Residence quarter:
  - Control Code No.:

### 2. SEGMENT

- **Unit serial:**
- **NRC No.:**

### ASK IN SURVEY PERIOD INDICATE

#### (Circle Y = Yes or N = No)

- **Survey period number:**
  - Y N Y N Y N N

### 22. TYPE OF LIVING QUARTERS

- **Conventional HU:**
  - 1
- **Improvised HU:**
  - 2
- **Mobile HU (tent, boat, wagon, etc.):**
  - 3
- **Collective quarters — Specify in Ta.**
  - 4

### 23. NUMBER OF HOUSING UNITS IN THIS HOUSEHOLD

- **1 unit, detached:**
  - 1
- **2 units, attached:**
  - 2
- **3 to 9 units:**
  - 3
- **10 units or more:**
  - 4

### NAME (family name first)

- **What is the name of the head of this household?**
  - (Example: head, spouse, son, daughter-in-law, parent, brother, sister, etc.)

### RELATIONSHIP TO HOUSEHOLD HEAD

- **Male or female:**
  - (Circle Y = Yes or N = No)

### PERSONAL IDENTIFICATION

- **Sex:**
  - M
  - F

### FOR PERSONS WITH "YES" IN ITEM 13

- **Age last birthday:**
  - Day
  - Month
  - Year

### CHANGES IN HOUSEHOLD COMPOSITION

- **Fill out all last birthday:**
  - Day
  - Month
  - Year

### 25. ROOMS

- **Number of rooms in this unit:**
  - (Specify)

### 26. TENURE

- **Is this unit owned by someone living in it or is it rented?**

### OCCUPIED

- **Owned or being bought:**
  - 1
- **Rented or to be bought:**
  - 2
- **Rented for cash:**
  - 3
- **Rent free or other arrangement:**
  - 4

### 27. TELEPHONE

- **Does this unit have a telephone?**
  - Yes
  - No

### 28. UTILITIES

- **Does any member of this household have a telephone?**
  - Yes
  - No

### 29. LIVESTOCK AND BILLIARY

- **Does any member of this household keep any farm animals (livestock) or have any fish or waterfowl?**
  - Yes
  - No

### Appendix E-2: Detailed Analysis of Data
### Exhibit E-2-2. ECONOMIC ACTIVITY QUESTIONNAIRE

#### TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

<table>
<thead>
<tr>
<th>a. Survey period (Item 20)</th>
<th>b. Section code (Item 1)</th>
<th>c. District (Item 2)</th>
<th>d. Rotation, quarter, week (Item 3)</th>
<th>e. Control Card No. (Item 4)</th>
<th>f. HRC No. (Item 5)</th>
<th>g. Interview completion status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Interview completed -- Line No. of respondent</td>
</tr>
</tbody>
</table>

**TYPE A**
- [ ] No one home at time of call
- [ ] Temporarily absent for a period of time
- [ ] Refusal
- [ ] Other – occupied (Specify)

**TYPE C**
- [ ] Demolished
- [ ] House, tent, trailer, etc., moved from site
- [ ] Permanent business or storage

**TYPE B**
- [ ] Vacant – regular
- [ ] Vacant – unfit
- [ ] Vacant – under construction, not ready
- [ ] Vacant – temporarily used for business or storage

**OTHER (Specify)**

#### FOR OFFICE USE ONLY

**HOUSING DATA** (From HRC)
- i. Type of living quarters (Item 23)
- m. Number of units in structure (Item 24)
- n. Rooms (Item 25)
- o. Tenure (Item 26)

**HOUSEHOLD DATA** (Determine from HRC Items 10-18)
- p. Number of persons in household
  - (1) Total
  - (2) Related to head
  - q. Number of unmarried children under 18
    - (1) Related to head (including own children)
    - (2) Own children of head
  - r. Type of family nuclei

#### INDIVIDUAL PERSONAL CHARACTERISTICS** (From HRC for persons under 12 years of age)
- s. Line No. (Item 10)
- t. Relationship (Item 12)
- u. Sex (Item 14)
- v. Age last birthday (Item 16)
- w. Marital status (Item 17)
### Exhibit E-2-6. ANNUAL INCOME AND WORK EXPERIENCE QUESTIONNAIRE

**ANNUAL INCOME AND WORK EXPERIENCE**  
**POPSTAN HOUSEHOLD SURVEY**

**NOTE:** Complete for each person 12 years old or older

<table>
<thead>
<tr>
<th>a. Survey period</th>
<th>b. Stratum code</th>
<th>c. District</th>
<th>d. Rotation, quarter, week</th>
<th>e. Control Card No.</th>
<th>f. Unit serial No.</th>
<th>g. HRC No.</th>
</tr>
</thead>
</table>

1. **HRC line No.**

2. **Name of this person**

3. In the past 12 months, how many weeks did... work, either full time or part time (including paid vacations and sick leave)?

   - **Weeks**

   OR

   - **None (Skip to item 9)**

4. When... was working in the past 12 months, did he/she usually work full time (35 or more hours a week) or part time?

   1. **Full time**
   2. **Part time**

5. With respect to...'s principal job in the past 12 months:

   a. **What kind of work was it?**

   b. **What kind of business or industry was it?**

   c. **Was...**

      1. Employee of private company or business for pay or wages
      2. Government employee—National or local
      3. Employer with paid employees
      4. Self-employed or own-account worker
      5. Unpaid worker in family farm or business
      6. Armed Forces

6a. In the past 12 months, did... work for an EMPLOYER for wages or salaries, or for benefits of any kind?

   1. **Yes**
   2. **No (Skip to item 7a)**

   b. **How much did... receive in the past 12 months in cash wages, salaries, commissions or tips from all jobs?**

   - **Goldars**

   OR

   - **None**

   c. **In addition, did... receive any of the following in the past 12 months?**

      1. **Free housing**
         - **Yes (Specify type - house, apt., room, etc.)**
         - **No**
      2. **Free meals**
         - **Yes**
         - **No (Skip to 4)**
      3. **How many meals a week?**
         - **Number**
      4. **Other free benefits**
         - **Yes (Specify)**
         - **No**

70. In the past 12 months, did... work at all in his/her OWN BUSINESS OR PROFESSION for profit or fees?

   1. **Yes**
   2. **No (Skip to item 8a)**

   b. **How much were the total (gross) sales, receipts, or fees in the past 12 months from this enterprise?**

   - **Goldars**

   c. **How much was the net profit in the past 12 months from the enterprise (after business expenses)?**

   - **Goldars**

   d. In addition, did... use any goods or products from the enterprise for his/her own household in the past 12 months?

   1. **Yes**
   2. **No (Skip to item 8a)**

   e. **How much were they worth?**

   - **Goldars**

8a. In the past 12 months, did... operate his/her own FARM enterprise as an owner or tenant, or did he/she receive part of the farm production as a sharecropper?

   1. **Yes**
   2. **No (Skip to item 9)**

   b. **How much were the total (gross) sales of products from...'s farm in the past 12 months?**

   - **Goldars**

   c. **How much net cash income did... earn from his/her farm in the past 12 months after business expenses?**

   - **Goldars**

   d. In addition, did... raise any food products on the farm for use by his/her own household?

   1. **Yes**
   2. **No**

   e. **About what part of the total food used by...'s household was raised on his/her farm?**

   1. **All**
   2. **1/2 or more, but not all**
   3. **1/4 or more, but less than 1/2**
   4. **Less than 1/4**

9. In the past 12 months, did... receive any money income from...

   a. **Retirement pensions or disability payments from the Government or private companies?**

   - **Goldars**

   b. **Income from investments such as interest from savings or bonds or dividends from securities?**

   - **Goldars**

   c. **Net income from renting property to others or from roomers or boarders (not reported above)?**

   - **Goldars**

   d. **Any other money income such as government assistance, contributions from persons or agencies outside the household, etc.?**

   - **Goldars**

**GO TO NEXT PERSON 12 OR OVER**
### Housing Characteristics

**Housing Characteristics**

**Popestown Household Survey**

---

** Transect from Household Record Card (HRC) Form PHS-300 **

<table>
<thead>
<tr>
<th>a. Survey period</th>
<th>b. Street code</th>
<th>c. District</th>
<th>d. Rotation, quarter, week</th>
<th>e. Control Card No.</th>
<th>f. Unit serial No.</th>
<th>g. HRC No.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>1. Type of living quarters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Conventional HU</td>
</tr>
<tr>
<td>2. Improvised HU (shacks, shanties, shacks, etc.)</td>
</tr>
<tr>
<td>3. Mobile HU (campers, wagons, etc.)</td>
</tr>
<tr>
<td>4. Collective quarters (Find questions for this unit)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Number of housing units in this house (building)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1 unit, detached</td>
</tr>
<tr>
<td>2. 2 to 4 units</td>
</tr>
<tr>
<td>3. 5 to 9 units</td>
</tr>
<tr>
<td>4. 10 units or more</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. How many rooms are in this unit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>_______ rooms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Principal Material of Exterior Walls</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Stone, cement, stucco, brick</td>
</tr>
<tr>
<td>2. Metal</td>
</tr>
<tr>
<td>3. Wood</td>
</tr>
<tr>
<td>4. Bamboo, leaves, seed, mud</td>
</tr>
<tr>
<td>5. Other material</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Was this unit constructed in the last 12 months?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Yes</td>
</tr>
<tr>
<td>2. No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. Structural Condition (Check by observation):</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acceptable</td>
</tr>
<tr>
<td>2. Not acceptable</td>
</tr>
<tr>
<td>3. Inadequate original construction</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. Is there piped running water for this unit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Yes</td>
</tr>
<tr>
<td>2. No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8. What is the source of the drinking water for this unit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pipe or pump inside building</td>
</tr>
<tr>
<td>2. Pipe or pump outside building</td>
</tr>
<tr>
<td>3. Bottled or canned water</td>
</tr>
<tr>
<td>4. Closed well or closed spring</td>
</tr>
<tr>
<td>5. Open well or spring</td>
</tr>
<tr>
<td>6. River, lake, etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9. What type of toilet facilities are available for this unit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Flush toilet for exclusive use of the occupant of this HU</td>
</tr>
<tr>
<td>2. Flush toilet shared with occupants of another HU</td>
</tr>
<tr>
<td>3. Outhouse or outbuilding</td>
</tr>
<tr>
<td>4. Covered pit</td>
</tr>
<tr>
<td>5. Open pit, ditch, pail</td>
</tr>
<tr>
<td>6. Others</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10. What type of bathing facilities are available for this unit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bath or shower with piped water for exclusive use of the occupants of this HU</td>
</tr>
<tr>
<td>2. Bath or shower with piped water shared with occupants of another HU</td>
</tr>
<tr>
<td>3. Hand basin with piped water</td>
</tr>
<tr>
<td>4. Portable tub or basin</td>
</tr>
<tr>
<td>5. Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11. What type of sewage disposal does this house have?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Public sewage disposal system</td>
</tr>
<tr>
<td>2. Septic tank or cesspool</td>
</tr>
<tr>
<td>3. Other (Specify)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12. Occupancy/Vacancy Status (Check one):</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Occupied</td>
</tr>
<tr>
<td>2. Vacant — for rent or for sale</td>
</tr>
<tr>
<td>3. Vacant — other (Specify)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13. Is this unit owned or being bought by some member of the household, or is it rented? (HRC item 26)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Owned or being bought (Skip to 13)</td>
</tr>
<tr>
<td>2. Rented for cash</td>
</tr>
<tr>
<td>3. Rent free</td>
</tr>
<tr>
<td>4. Other (Specify)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14. What is the monthly rent?</th>
</tr>
</thead>
<tbody>
<tr>
<td>_______ Goldars</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15. Is there a telephone in this unit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Yes (Specify number)</td>
</tr>
<tr>
<td>2. No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>16. Is there a television in this unit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Yes</td>
</tr>
<tr>
<td>2. No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>17. What type of lighting does this unit have?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Electric</td>
</tr>
<tr>
<td>2. Gas</td>
</tr>
<tr>
<td>3. Kerosene or oil</td>
</tr>
<tr>
<td>4. Other or none</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>18. What kind of fuel is used most in this unit for cooking?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Electricity</td>
</tr>
<tr>
<td>2. Gas</td>
</tr>
<tr>
<td>3. Kerosene or oil</td>
</tr>
<tr>
<td>4. Coal or charcoal</td>
</tr>
<tr>
<td>5. Wood</td>
</tr>
<tr>
<td>6. Other or none</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>19. What type of refrigeration is used?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Electric, gas, kerosene refrigerator</td>
</tr>
<tr>
<td>2. Ice box</td>
</tr>
<tr>
<td>3. Spring, stream, none</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>20. Were any articles produced in this housing unit for sale or other during the past 12 months?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Yes</td>
</tr>
<tr>
<td>2. No (End questions for this unit)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>21. What was the principal type of product? (Specify)</th>
</tr>
</thead>
</table>

---

**Note:** Complete for each listing unit.
209. Time worked is the total time worked by persons reported as employed during the time-reference period used in the investigation of economic characteristics. If the reference period is the week preceding the census, time worked should be reported in hours. If the reference period is up to the 12 months preceding the census, time worked should be reported in days or months, as appropriate. Even where a one-week reference period is used in the investigation of economic characteristics, a supplementary question on time worked during the longer period can be useful.

210. If the reference period is one week, the amount of time worked should be related to each occupation reported for the person concerned. If, therefore, secondary occupation is investigated, time worked at the principal occupation and time worked at a secondary occupation should be indicated separately.

211. If a longer reference period is used, it may not be possible to relate time worked to a particular occupation for persons who have had several occupations over the period. The longer period is useful, however, for determining intensity of activity in general.

(f) Income

212. For census purposes, income should be defined as (a) monthly income in cash from the occupation of economically active persons and (b) the total annual cash income of households regardless of source.

213. As thus defined, the information collected can provide an input into statistics on the distribution of income, consumption and accumulation of households in addition to the immediate census purposes it serves.

214. The occupational income of employed persons should include wages and salaries of employees, income of members from producers' co-operatives, and entrepreneurial income of employers and own-account workers operating unincorporated enterprises.

215. In addition to the occupational income of its economically active members, the total cash income of the household should include, for example, interest, dividends, rent, social security benefits, pensions and life insurance annuity benefits of all its members. The concepts involved in determining cash income are not simple to grasp and respondents may be unable or unwilling to provide exact information. For example, occupational income should include social security, pension fund contributions and direct taxes withheld from employees' salaries but some persons will undoubtedly not include these amounts in reporting their salaries. Significant items of total household income may also be excluded or misstated. Despite any instructions given to enumerators, therefore, the data collected can be expected to

27/ See Provisional Guidelines on Statistics of the Distribution of Income Consumption and Accumulation of Households (United Nations publication, Sales No. E.77.XVII.11).
be approximate at best. As an aid to the interpretation of the results, tabulations of the data should be accompanied by a description of the items of income assumed to be included and, if possible, an estimate of the accuracy of the figures.

(g) Sector of employment

216. Sector of employment refers to the sector of the economy in which an economically active person works. For census purposes, the basic distinction to be made should be between the public sector and the private sector. Because there is not yet any interregional consensus on the subcategories of sectors to be identified, countries should consult the appropriate regional recommendations for further guidance.

217. In the absence of regional standards on the topic, countries may wish to take account of some of the sectors and subsectors defined in table 5.1 of A System of National Accounts. Depending upon the structure of the national economy, some countries may wish to subdivide the public sector into, for example, (a) general government and (b) publically owned and controlled enterprises. The private sector may, for example, be subdivided into (a) privately owned and/or controlled enterprises and (b) household and unincorporated enterprises. Co-operative enterprises may be separately identified.

218. If the distinction to be made is simply between employment in the public sector and employment in the private sector, the information need be collected only for persons classified as "employees" in the classification by "status in employment" (see para. 206), because the sector of employment for persons in any of the other status categories must of necessity be the private one. For the investigation of employment in the subcategories given as examples in paragraph 217, or for particular categories recommended by any region, it may be necessary to obtain the information for persons classified in one or more of the other categories of "status in employment".

219. The extent to which most persons in a country are likely to be able to supply accurate information, particularly when detailed subsectors are involved, should be taken into account in planning any investigation of the topic in the census. Suitable testing prior to the census would be appropriate to determine whether or not the topic should be investigated. If the topic is included in the census, further investigation in a post-enumeration evaluation study would be helpful in determining the reliability of the results.

20/ United Nations publication, Sales No. E.69.XVII.3.
55. **Economically active employed population by monthly income, occupation and sex**

Population included: economically active employed population

Classifications:

(a) **Geographical division**: (i) total country; (ii) each major civil division; (iii) each principal locality (distinguish between urban and rural for (i) and (ii)) (paras. 54-61)

(b) **Income** (paras. 212-215): income classification adopted by the country, preferably distinguishing approximately each 5 percentile or 10 percentile group

(c) **Occupation** (paras. 198-201): according to, or convertible to, the latest revision of the *International Standard Classification of Occupations* (ISCO), at least to the minor (two-digit) groups (The illustration uses the minor groups of the 1968 revision.)

(d) **Sex** (para. 87): male; female

Use of the tabulation

Tabulations 55 and 56 furnish basic information on income and occupation, useful as indicators of socio-economic status.

The present tabulation is also needed for appraising variations in the income level of persons both within and among groups of occupations. The tabulation can usefully be expanded to include a cross-classification by broad age groups (e.g., under 15 years, 15-64 years, 65 years and over).

Tabulation 56 is particularly needed for the planning of welfare schemes relevant to households. It can usefully be expanded to include a cross-classification by number of economically active members in the household.
Illustration 55. Economically active employed population by monthly income, occupation and sex

<table>
<thead>
<tr>
<th>Geographical division, a/ sex and occupation</th>
<th>Total economically active employed</th>
<th>Monthly income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both sexes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total economically active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major group 0/1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor group 0-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor group 0-2/0-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major group 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor group 2-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor group 2-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major group X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor group X-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor group X-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor group X-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Armed forces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (as for &quot;Both sexes&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female (as for &quot;Both sexes&quot;)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a/ This tabulation should be compiled for (i) total country; (ii) each major civil division; (iii) each principal locality (distinguish between urban and rural for (i) and (ii)).
56. **Households and population in households by annual income and size of household**

Population included: all members of households

Classifications:

(a) **Geographical division**: (i) total country; (ii) each major civil division; (iii) each principal locality (distinguish between urban and rural for (i) and (ii)) (paras. 54-61)

(b) **Size of household** (paras. 73-74): 1 person; 2 persons; 3 persons; 4 persons; 5 persons; 6 persons; 7 persons; 8 persons; 9 persons; 10 or more persons; not stated; and, separately, the number of households of each size and the aggregate population by size of household

(c) **Income** (paras. 212-215): income classification adopted by the country, preferably distinguishing approximately each 5-percentile or 10-percentile group

**Use of the tabulation**

The use of this tabulation is discussed in conjunction with that of tabulation 55.
Illustration 56. Households and population in households by annual income and size of household

<table>
<thead>
<tr>
<th>Geographical division, and size of households</th>
<th>Total</th>
<th>Annual income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Households</td>
<td>Populations</td>
</tr>
<tr>
<td>ALL HOUSEHOLDS</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>Households consisting of:</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>1 person</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>2 persons</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>3 persons</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>4 persons</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>5 persons</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>6 persons</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>7 persons</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>8 persons</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>9 persons</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>10 persons or more</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>Not stated</td>
<td>..</td>
<td>..</td>
</tr>
</tbody>
</table>

a/ This tabulation should be compiled for (i) total country; (ii) each major civil division; (iii) each principal locality (distinguish between urban and rural for (i) and (ii)).
ANNEX C

DEMONSTRATION OF NSLL'S METHODOLOGY
FOR INDIRECT ESTIMATION OF MEDIAN
FAMILY INCOME

On the following pages, the NSLL's methodology is applied to Peru, Kenya and Tunisia. The estimated median household incomes for urban areas are:

<table>
<thead>
<tr>
<th></th>
<th>Annual (1979 U.S. Dollars)</th>
<th>Monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>$5,392</td>
<td>$449</td>
</tr>
<tr>
<td>Peru</td>
<td>2,622</td>
<td>219</td>
</tr>
<tr>
<td>Tunisia</td>
<td>4,938</td>
<td>412</td>
</tr>
</tbody>
</table>

These estimates appear to be very high for Kenya and somewhat high for Peru and Tunisia, based on the 1979 estimate for Nairobi ($225), Lima ($147) and Tunis ($329). This is especially so considering that urban incomes outside the primary city are nearly always lower than in the primary city.

One explanation outside the methodology per se is the estimated medians for various years were updated to 1979 using consumer price data from the Shelter Sector Assessment and Project Paper reports. The annual increase were 12% from 1977 to 1979 for Kenya; the rates for Peru varied each year; 1975 was 24%, 1976 was 34%, 1977 was 38%, and 1978 was 58%; the Tunisia rate was 8% 1977-1979.

In this limited study, it is not possible to determine which estimated median is likely to be more accurate. However, the methodology for doing so would be to (1) exclude all the source data
and calculations; (2) replace consumer price data with rates of increases in salaries; (3) seek advice from knowledgeable persons regarding the quality of the data inputs; (4) reapply methodology with revised data.
FORMULA FOR INDIRECT ESTIMATION OF MEDIAN FAMILY INCOME

(1) \[ \text{UNI} = \left( \frac{\text{GNP} - \text{GNP}_{ag}}{\text{GNP}} \right) \text{NI} \]

(2) \[ \text{UHH} = \left( \frac{\text{P}}{\text{HH Size}} \right) \left( \frac{\text{EAP} - \text{EAP}_{ag}}{\text{EAP}} \right) \]

(3) \[ \text{Urban Median Household Income} = \left( \frac{\text{UI}}{\text{UHH}} \right) \left( \frac{\text{DI}}{\text{NI}} \right) \left( \frac{\text{Median}}{\text{Mean}} \right) \]

where

\( \text{UNI} \) = Urban Income
\( \text{GNP} \) = Gross National Product (or GDP, Gross Domestic Product)
\( \text{GNP}_{ag} \) = GNP derived from agriculture
\( \text{NI} \) = National Income
\( \text{UHH} \) = Number of urban households
\( \text{P} \) = Population
\( \text{HH} \) = Average Household
\( \text{EAP} \) = Economically Active Population
\( \text{EAP}_{ag} \) = Economically Active Population engaged in agriculture
\( \text{DI} \) = Disposable Income commonly is 80% of NI

Median = Median household income as measured by household survey of the most recent year available

Mean = Mean household income in the same year as the measured median

\( * \) = Designates a variable measured in the most recent year available, but not the year for which the estimate is being made

Methodology

a. **Estimate Urban National Income (UNI)**, which is the amount of National Income (NI) accruing to urban families. Since this is not usually available, it can be estimated in the following way:

i. Obtain the National Income, Gross National Product (or GDP) and the amount of GNP originating in Agriculture (\( \text{GNP}_{ag} \)).

ii. Calculate an estimate of Urban National Income by solving the following equation:

\[
\text{UNI} = \frac{\text{GNP} - \text{GNP}_{ag} \times \text{NI}}{\text{GNP}}
\]

Both GNP and GNP_{ag} must be expressed in the same year's prices, but these need not be current prices. National Income must be expressed in current prices.

b. **Estimate the Number of Urban Households (#UHH)**. Since the definition of urban is imprecise, an alternative calculation which removes from the population base the proportion of households that depend for their livelihood on the income generated by the agricultural sector can be estimated:

i. Obtain an estimate of the proportion of the Economically Active Population (EAP) employed in agriculture. This can be calculated by dividing Agricultural Employment (AE) in the given year (available at least in census years) by the total EAP for that same year.
ii. Obtain an estimate of the total number of households (#HH) in the country for the given year.

iii. Calculate the Number of Households by solving the following equation:

\[ \#\text{UHH} = \frac{\text{EAP} - \text{AE}}{\text{EAP}} \times \#\text{HH} \]

c. **Estimate National Income per Urban Household.**

Use the results of tasks (a) and (b) above:

\[ \text{NI/HH} = \frac{\text{UNI}}{\#\text{UHH}} \]

d. **Estimate National Income per Urban Household.**

This is a simple task if the data are available. If a Disposable Income estimate is not available a DI/NI ratio of .8 is suggested:

\[ \text{DI/HH} = \text{NI/HH} \times \text{DI/NI} \]

where NI/HH is obtained from task (c).

e. **Estimate Median Income per Urban Household.**

This is accomplished by multiplying the DI/UHH (obtained from task (d)) by the median/mean ratio for the country. The default value for the median/mean ratio of .66 should be used if no estimate is available for the country.
<table>
<thead>
<tr>
<th></th>
<th>KENYA (million Kenya pounds)</th>
<th>PERU (million Peruvian soles)</th>
<th>TUNISIA (million Tunisian dinars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNI = Urban National Income</td>
<td>1165.</td>
<td>451.64</td>
<td>1680.5294</td>
</tr>
<tr>
<td>GDP = Gross National Product by kind of economic activity in current prices</td>
<td>1832.67</td>
<td>605,759</td>
<td>2137.0</td>
</tr>
<tr>
<td>GDPag = GDP derived from agriculture</td>
<td>620.89</td>
<td>86,822</td>
<td>335.0</td>
</tr>
<tr>
<td>NI - National Income</td>
<td>1761.97</td>
<td>527,257</td>
<td>1978.6</td>
</tr>
<tr>
<td>UHH = Number of Urban Households</td>
<td>514,285.7/</td>
<td>1,845,244</td>
<td>682,411</td>
</tr>
<tr>
<td>P = Population</td>
<td>144.4mm</td>
<td>15</td>
<td>5.57</td>
</tr>
<tr>
<td>HH - Average household size</td>
<td>5.6</td>
<td>5</td>
<td>5.5</td>
</tr>
<tr>
<td>EAP = Economically Active Population</td>
<td>6.4mm</td>
<td>3,871,613</td>
<td>1,621,320</td>
</tr>
<tr>
<td>EAPag = Economically Active Population engaged in agriculture</td>
<td>5.12mm</td>
<td>1,581,846</td>
<td>526,030</td>
</tr>
<tr>
<td>DI = Gross National Disposable Income</td>
<td>1791.47</td>
<td>529,267</td>
<td>1978.2</td>
</tr>
<tr>
<td>MEDIAN = Median Income per Urban Household</td>
<td>1519 ksh (1977)</td>
<td>162,000 soles (1975)</td>
<td>1597.5 dinar (1977)</td>
</tr>
<tr>
<td>MEAN = Mean Urban Household Income</td>
<td>2,265.27 ksh</td>
<td>244,758.55 soles</td>
<td>2420.45 dinar</td>
</tr>
</tbody>
</table>
FOOTNOTES

Kenya

2. Ibid p. 691 Table 4a Figures for 1977.
3. Ibid p. 691 Table 2 Figures for 1977.
5. Average household size derived from United Nations, 1976 Demographic Yearbook Table 42.
7. Ibid

Peru

9. Ibid p. 998 Table 4a Figures are for 1975.
10. Ibid p. 998 Table 4a Figures are for 1975.
11. Ibid p. 997 Table 2 Figures are for 1975.
15. Ibid.

Tunisia

17. Ibid p. 1298 Table 4A for 1977.
18. Ibid p. 1297 Table 4A for 1977.
19. Ibid p. 1296 Table 2 for 1977.
FOOTNOTES


23. Ibid.

KENYA  MEDIAN URBAN HOUSEHOLD INCOME ESTIMATION

(1)  UNI  =  \frac{GDP - GDP_{ag}}{GDP} \times NI

= \frac{1832.67 - 620.89}{1832.67} \times 1761.97

= 1165mm

(2)  UHH  = \frac{P}{HH \text{ size}} \times \frac{EAD-EAP_{ag}}{EAP}

= \frac{14.4}{5.6} \times \frac{6.4mm - 5.12}{6.4}

= 514,285.7

(3)  Urban Median Household Income = \frac{UNI}{UHH} \times \frac{DI}{NI} \times \frac{Median}{Mean}

= \frac{1165mm}{514,285.7} \times \frac{1791.47}{1761.97} \times .66 (1\text{Ksh} = .145 \text{US})

= 1519 \text{Ksh}$  or 42,681.63 Ksh in 1977

in U.S. $ adjusted to 1979 with 12% inflation per annum = $5,392 Annual Income
PERU MEDIAN URBAN HOUSEHOLD INCOME ESTIMATION

(1) \[ \text{UNI} = \frac{\text{GDP} - \text{GDP}_{\text{ag}}}{\text{GDP}} \times \text{NI} \]

\[ = \frac{605,759 - 86,822 \times 527.275}{605,759} \]

\[ = 451.64 \text{ m soles} \]

(2) \[ \text{UHH} = \frac{P}{\text{HH size}} \times \frac{\text{EAP} - \text{EAP}_{\text{ag}}}{\text{EAP}} \]

\[ = \frac{15.6}{5} \times \frac{3,871,613 - 1581,846}{3,871,613} \]

\[ = 1,845,244.4 \]

(3) Urban Median Household Median Household Income = \[ \frac{\text{UNI}}{\text{UHM}} \times \frac{\text{DI}}{\text{NI}} \times \frac{\text{Median}}{\text{Mean}} \]

\[ = \frac{451.64 \text{mm}}{1845,244.4} \times \frac{529,267}{527,257} \times .66 \]

\[ = 162,000 \text{ soles in 1975} \]

\[ = 1,132,785.3 \text{ soles in December 1979} \]

\[ = \$5097.53 \text{ US in 1979 Annual Income} \]

\[ = \$2,622 \text{ (through December 1978) (1 sole = .0045 \$US)} \]
TUNISIA MEDIAN URBAN HOUSEHOLD INCOME ESTIMATION

(1) \[ \text{UNI} = \frac{\text{GDP} - \text{GDP}_{ag}}{\text{GDP}} \times \text{NI} \]

\[ = \frac{2137 - 335}{2137} \times 1978.6 \]

\[ = 1668.43 \]

(2) \[ \text{UHH} = \frac{\text{P}}{\text{HH size}} \times \frac{\text{EAD} - \text{EAD}_{ag}}{\text{EAD}} \]

\[ = \frac{5.57}{5.5} \times \frac{1,621,820 - 526,030}{1,621,820} \]

\[ = 682,411 \]

(3) Urban Median Household Income = \[ \frac{\text{UNI}}{\text{UHH}} \times \frac{\text{DI}}{\text{NI}} \times \frac{\text{Median}}{\text{Mean}} \]

\[ = \frac{1668.43}{682,411} \times \frac{1,978.2}{1,978.6} \times .66 \]

\[ = 1,557.5 \text{ 1977 dinar} \]

\[ = 1,863.28 \text{ 1979 dinar} \]

US$ = \[ 1,863.28 \text{ dinar} \times 2.65 \text{ (1 dinar = $2.65)} \]

\[ = \$4,937.61 \text{ Annual Income} \]
ANNEX D

DEMONSTRATION OF PROPOSED

METHODOLOGY FOR ESTIMATING

HOUSEHOLD INCOME DISTRIBUTIONS

The Employment and Wages/Salary approach to estimating household incomes first devised by Robert DeVoy in 1965 for Nairobi, Kenya is summarized on the following pages: extracted from the report prepared at that time.

Table I shows the resulting household income distribution. Table 4 indicates the sources of basic data including employment, wages, number of households and employment per household.

Table 5 displays the income distribution of full-time employment (step 1 of methodology). Table 6 shows the estimates of casual and self employment and their average incomes by economic sector (step 2).

The notes to Table 7 explain how the information on Tables 5 and 6 were combined (step 3). The adjustments for non-wage renumeration are included in Table 5 notes (step 4) as is the updating to the current year (step 5). Adjustments to estimate the number of workers at each income level are explained in the notes to Table 7 (step 6), as are the adjustments for the number of workers per household (step 7). Note that the same factors were used for all income levels. It is proposed now that income level-specific rates be estimated and used since there are likely to be substantial differences by income levels. The calculations to derive the number of households also are explained in the notes to Table 7 (step 8).
The household employment income distribution (step 9) and adjustments for rental income (step 10) are shown on Table 7 and explained in the notes. Tables 8 and 9 demonstrate how income distribution can be updated or projected by income levels. While the use of variable inflation rates (as in Nairobi) is better than using a constant rate for all income levels (the usual practice) it would be better yet to use wage/salary factors rather than expenditure factors.

The 1975 Nairobi study did not calculate total household incomes, but the procedure is very direct to complete steps 11 and 12:

<table>
<thead>
<tr>
<th>Household Decile</th>
<th>1975 Income (Ksh./mo.)</th>
<th>1/ Households In Each Range</th>
<th>Mean Income In Range</th>
<th>Total Income In Range (Ksh 000)</th>
<th>% Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>620</td>
<td>16,400</td>
<td>310</td>
<td>5,084</td>
<td>2%</td>
</tr>
<tr>
<td>20%</td>
<td>705</td>
<td>16,400</td>
<td>663</td>
<td>10,873</td>
<td>4%</td>
</tr>
<tr>
<td>30%</td>
<td>861</td>
<td>16,400</td>
<td>783</td>
<td>12,841</td>
<td>4%</td>
</tr>
<tr>
<td>40%</td>
<td>1,070</td>
<td>16,400</td>
<td>966</td>
<td>15,842</td>
<td>5%</td>
</tr>
<tr>
<td>50%</td>
<td>1,352</td>
<td>16,400</td>
<td>1,211</td>
<td>19,860</td>
<td>7%</td>
</tr>
<tr>
<td>60%</td>
<td>1,640</td>
<td>16,400</td>
<td>1,496</td>
<td>24,534</td>
<td>9%</td>
</tr>
<tr>
<td>80%</td>
<td>2,936</td>
<td>32,800</td>
<td>2,288</td>
<td>75,046</td>
<td>25%</td>
</tr>
<tr>
<td>100%</td>
<td>5,000 2/</td>
<td>32,800</td>
<td>3,968</td>
<td>130,150</td>
<td>44%</td>
</tr>
</tbody>
</table>

TOTAL 164,000

1/ Table 7
2/ Dummy number since maximum household income is not known.
3/ Households multiplied by mean income in range.

According to this distribution, the poorest 50% of Nairobi households have 22% of total personal income while the upper 10% have 44% of income. The estimated median income of Ksh 1,352 needs to be updated before a comparison can be made with the estimate using the
NSLL methodology (from Annex C). Using a factor of 12% per year (the same as used in the NSLL methodology) yields a 1979 estimate of Ksh 2,127 or $301 per month. This compares with the NSLL methodology median of $449.

This difference of nearly 50% is unacceptable. The Nairobi Project Paper has a 1979 estimate of $225, or 85% of the $301 estimate using the wage/salary approach. This difference is closer to being acceptable. Moreover, it indicates that the $449 estimate probably is substantially high. In this demonstration it is not possible to complete step 13 which entails verifying the data and calculations for each methodology and making appropriate revisions. However, in actual use this step is very important to the accuracy of the results.

Adjusting the income distribution to the level of the NSLL methodology (step 14) is not undertaken here because step 13 needs to be completed first.
TABLE 1.

NAIROBI HOUSEHOLD INCOME DISTRIBUTIONS AND HOUSING CONSUMPTION EXPENDITURES, 1975

<table>
<thead>
<tr>
<th>Household Decile</th>
<th>Household Income (KSh./mo.)</th>
<th>Housing Consumption Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>620</td>
<td>153 (24.7%)</td>
</tr>
<tr>
<td>20%</td>
<td>705</td>
<td>174 (24.7%)</td>
</tr>
<tr>
<td>30%</td>
<td>861</td>
<td>186 (21.6%)</td>
</tr>
<tr>
<td>40%</td>
<td>1,070</td>
<td>231 (21.6%)</td>
</tr>
<tr>
<td>50%</td>
<td>1,352</td>
<td>288 (21.3%)</td>
</tr>
<tr>
<td>60%</td>
<td>1,640</td>
<td>349 (21.3%)</td>
</tr>
<tr>
<td>80%</td>
<td>2,936</td>
<td>493 (16.8%)</td>
</tr>
</tbody>
</table>

Source: Real Estate Research Corporation.
<table>
<thead>
<tr>
<th>Employment Decile</th>
<th>Cumulative Number of Employees (KSh. /month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>20,613</td>
</tr>
<tr>
<td>20%</td>
<td>41,226</td>
</tr>
<tr>
<td>30%</td>
<td>61,840</td>
</tr>
<tr>
<td>40%</td>
<td>82,453</td>
</tr>
<tr>
<td>50%</td>
<td>103,066</td>
</tr>
<tr>
<td>60%</td>
<td>123,679</td>
</tr>
<tr>
<td>80%</td>
<td>169,906</td>
</tr>
<tr>
<td>100%</td>
<td>506,132</td>
</tr>
</tbody>
</table>

Source: Real Estate Research Corporation.

Notes:
1. Full-time wage earnings were adjusted upward by 55 percent to reflect non-wage remuneration (medical benefits, leave passages, uniforms, rations, bonus, housing allowances and subsidies). The adjustment for non-wage remuneration was derived from the relationship among aggregate income and earning data supplied by the Central Bureau of Statistics. Although the units were not supplied, it is believed the earnings are for the wage-earnings in the modern sector for Kenya as a whole, with the units in Kenyan pounds (in thousands) per year. It is assumed that the relationship among the items of remuneration holds for all full-time wage-earning employment. The non-wage factor was derived as follows:
   a. The components of wage-earning remuneration result from aggregation of income data:
      
```
      Percent of Total
      Direct Wages and Salaries 183,070 64.2%
      (monthly cash plus rations)
      Other Remuneration 62,046 21.8
      (medical benefits, leave passages, uniforms, bonus)
      Housing Allowances and Subsidies 39,915 14.0
      Total 285,031 100.0%
      ```
      Source: Central Bureau of Statistics.
   b. Since the amount of monthly wages and salaries is available, then to extrapolate from such direct compensation to total remuneration, approximately 55% must be added to earnings, with 33% for other remuneration and 22% for housing allowances and subsidies. (Example: 183,070 + (55% of 183,070) equals approximately 285,031.)
2. Wage-earnings were adjusted for inflation from 1974 to 1975 according to the following factors:

<table>
<thead>
<tr>
<th>Employment Income Level (KSh. / month)</th>
<th>Inflation Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 400</td>
<td>+30%</td>
</tr>
<tr>
<td>400-1500</td>
<td>+15%</td>
</tr>
<tr>
<td>Over 1500</td>
<td>+10%</td>
</tr>
</tbody>
</table>

The adjustment for inflation from 1974 to 1975 reflects several factors. Because of very large increases in the minimum wages, the lower income employees benefited more than others from shifts in earnings. All employee wages rose according to inflation, which was estimated at about 15 percent for 1975, following a period from 1971 to 1974 where earnings were increasing at about 10 to 12 percent per year. Earnings of higher-income employees showed less increase, although the rate remained considerable at an estimated 10 percent.

Source: Real Estate Research Corporation, with the inflation and wage increase factors derived from data from the Central Bureau of Statistics, as published in the following reports: Economic Survey, 1975; Kenya Statistical Digest; Statistical Abstract, 1974; Employment and Earnings in the Modern Sector, 1974 (unpublished data from draft).
<table>
<thead>
<tr>
<th>SIC-Code</th>
<th>Employment Sector</th>
<th>Casual Wage-Earning</th>
<th>Self-Employed Formal</th>
<th>Self-Employed Informal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Average Income</td>
<td>Number</td>
<td>Average Income</td>
</tr>
<tr>
<td>1. Agriculture/Forestry</td>
<td>1,850</td>
<td>147</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Mining/Quarrying</td>
<td>531</td>
<td>220</td>
<td>55</td>
<td>600</td>
</tr>
<tr>
<td>3. Manufacturing</td>
<td>4,833</td>
<td>255</td>
<td>1,078</td>
<td>750</td>
</tr>
<tr>
<td>4. Electricity/Water</td>
<td>268</td>
<td>200</td>
<td>23</td>
<td>700</td>
</tr>
<tr>
<td>5. Construction</td>
<td>6,123</td>
<td>272</td>
<td>557</td>
<td>700</td>
</tr>
<tr>
<td>6. Wholesale/Retail/Trade</td>
<td>1,678</td>
<td>254</td>
<td>3,125</td>
<td>700</td>
</tr>
<tr>
<td>7. Transport/Communication</td>
<td>691</td>
<td>878</td>
<td>1,090</td>
<td>3,000</td>
</tr>
<tr>
<td>8. Finance, Insurance, Real Estate</td>
<td>633</td>
<td>265</td>
<td>1,860</td>
<td>6,000</td>
</tr>
<tr>
<td>9. Community, Social, Personal Services</td>
<td>4,220</td>
<td>206</td>
<td>1,527</td>
<td>5,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>20,827</td>
<td>9,315</td>
<td>31,820</td>
<td></td>
</tr>
</tbody>
</table>

Incomes in Kenyan Shillings per month.

Source: Real Estate Research Corporation. Derived from Central Bureau of Statistics data or estimates.
### Table 7.

**NAIROBI HOUSEHOLD INCOME DISTRIBUTION**

**ALL INCOME SOURCES, 1975**

<table>
<thead>
<tr>
<th>Household Income Levels (KSh./mo.)</th>
<th>Total Employment-Related Income, Adjusted for Rental Income</th>
<th>Adjusted for Rental and Unreported Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decile</td>
<td>Cumulative Total Number of Households</td>
<td>Employment-Related Income, Adjusted for Rental Income</td>
</tr>
<tr>
<td>10%</td>
<td>16,400</td>
<td>467</td>
</tr>
<tr>
<td>20%</td>
<td>32,800</td>
<td>529</td>
</tr>
<tr>
<td>30%</td>
<td>49,200</td>
<td>655</td>
</tr>
<tr>
<td>40%</td>
<td>65,600</td>
<td>859</td>
</tr>
<tr>
<td>50%</td>
<td>82,000</td>
<td>1,114</td>
</tr>
<tr>
<td>60%</td>
<td>98,400</td>
<td>1,410</td>
</tr>
<tr>
<td>80%</td>
<td>131,200</td>
<td>2,608</td>
</tr>
<tr>
<td>100%</td>
<td>164,000</td>
<td></td>
</tr>
</tbody>
</table>

Source: Real Estate Research Corporation.

Notes:

1. The employment-related income distribution was derived as follows:
   a. Numbers of employees and incomes from all employment sectors were combined into total employment and total earnings, distributed by income level.
      
      The distribution for the full-time, wage-earning sector was taken from Table 5, and includes the adjustment for non-wage remuneration.
      
      The distributions for casual, wage-earning, and self-employed (formal and informal) sectors were taken from Table 6.
   b. Total earnings were increased by ten percent and numbers of employment decreased by ten percent to account for those employed that held more than one job.
   c. Total earnings were then further increased by 48 percent and numbers employed decreased by 48 percent to account for the number of households that contained more than one person employed.
   d. Steps b. and c. were required to translate numbers of jobs into numbers of households, and to translate earnings per job into earnings per household.
      
      The adjustment factor for multiple-jobs per employee (ten percent) was assumed by Real Estate Research Corporation.
      
      The adjustment factor for multiple-employees per household (48 percent) was derived from the 1974 Household Expenditure Survey, Central Bureau of Statistics.
      
      If the two factors are used in combination (ten percent times 45 percent), the result is 63 percent. That relationship is the same as the ratio of employment to household noted in Table 4.
   e. The household income distributions were then adjusted for inflation and other changes in income for one year from 1974 to 1975, according to the rates used in Table 5.

2. The rental income adjustment was calculated as follows:
   a. Number of households where rental income supplements other income was assumed as follows:
      
      | Household Income Level (KSh./mo.) | Percent Receiving Rental Income |
      |-----------------------------------|--------------------------------|
      | 300 - 400                         | 75%                            |
      | 400 - 800                         | 70%                            |
      | 800 - 1,000                       | 60%                            |
      | 1,000 - 1,500                     | 40%                            |
      | Over 1,500                        | 20%                            |
      
      Source: Real Estate Research Corporation. Derived from German Development Assistance Association for Social Housing; The Kibera Experimental Self-Help Program, p. 51. Verified by interviews with officials of Nairobi City Council and the Central Bureau of Statistics.
   b. Average rental income per household receiving rental income is assumed to be 120 KSh. per month. This factor accounts for households renting one or more rooms per household.
      
      Source: Real Estate Research Corporation. Based on general discussion in The Kibera Experimental Self-Help Program (op. cit.) and Metropolitan Growth Strategy Technical Paper E-13: Nairobi Income Distribution, as well as a number of interviews.
   c. The unreported income adjustment was calculated by adding ten percent to the income distribution, after adjustment for rental income.
      
      Source: Real Estate Research Corporation. Based on interviews with various officials, in conjunction with the fifteen percent estimate of unreported income from the NUSG report, as stated in Chapter 3.
TABLE 8.

NAIROBI PROJECTIONS OF HOUSEHOLD INCOMES, CONSTANT ALTERNATIVE

<table>
<thead>
<tr>
<th>Household Decile</th>
<th>Income Level (KSh./mo.)</th>
<th>1975</th>
<th>Mid-1976</th>
<th>1976</th>
<th>1977</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td></td>
<td>620</td>
<td>667</td>
<td>713</td>
<td>870</td>
</tr>
<tr>
<td>20%</td>
<td></td>
<td>705</td>
<td>758</td>
<td>811</td>
<td>933</td>
</tr>
<tr>
<td>30%</td>
<td></td>
<td>861</td>
<td>926</td>
<td>990</td>
<td>1,139</td>
</tr>
<tr>
<td>40%</td>
<td></td>
<td>1,070</td>
<td>1,150</td>
<td>1,231</td>
<td>1,416</td>
</tr>
<tr>
<td>50%</td>
<td></td>
<td>1,352</td>
<td>1,453</td>
<td>1,555</td>
<td>1,788</td>
</tr>
<tr>
<td>60%</td>
<td></td>
<td>1,610</td>
<td>1,722</td>
<td>1,886</td>
<td>2,169</td>
</tr>
<tr>
<td>80%</td>
<td></td>
<td>2,936</td>
<td>3,083</td>
<td>3,230</td>
<td>3,553</td>
</tr>
</tbody>
</table>

Source: Real Estate Research Corporation.

Notes:

1. 1975 household income distribution from Table 7, and includes adjustments for rental and unreported income.

2. Projections based on the following inflation factors: (in KSh./mo.)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Income 0-460</td>
<td>Income 0-520</td>
<td>Income 0-675</td>
</tr>
<tr>
<td>Rate = 15%</td>
<td>Rate = 30%</td>
<td>Rate = 30%</td>
</tr>
<tr>
<td>(30% Annual)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income 460-1,612</td>
<td>Income 520-1,725</td>
<td>Income 675-1,985</td>
</tr>
<tr>
<td>Rate = 7.5%</td>
<td>Rate = 15%</td>
<td>Rate = 15%</td>
</tr>
<tr>
<td>(15% annual)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income over 1,612</td>
<td>Income over 1,725</td>
<td>Income over 1,985</td>
</tr>
<tr>
<td>Rate = 5%</td>
<td>Rate = 10%</td>
<td>Rate = 10%</td>
</tr>
<tr>
<td>(10% annual)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Income levels where inflation rates shift are adjusted for each time period, according to inflation rates.
TABLE 9.
NAIROBI PROJECTIONS OF HOUSEHOLD INCOME, LOW-INCOME ALTERNATIVE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>620</td>
<td>652</td>
<td>706</td>
<td>807</td>
</tr>
<tr>
<td>20%</td>
<td>705</td>
<td>749</td>
<td>794</td>
<td>897</td>
</tr>
<tr>
<td>30%</td>
<td>861</td>
<td>906</td>
<td>949</td>
<td>1,042</td>
</tr>
<tr>
<td>40%</td>
<td>1,070</td>
<td>1,123</td>
<td>1,177</td>
<td>1,308</td>
</tr>
<tr>
<td>50%</td>
<td>1,352</td>
<td>1,393</td>
<td>1,431</td>
<td>1,590</td>
</tr>
<tr>
<td>60%</td>
<td>1,640</td>
<td>1,710</td>
<td>1,819</td>
<td>1,982</td>
</tr>
<tr>
<td>80%</td>
<td>2,936</td>
<td>3,046</td>
<td>3,031</td>
<td>3,269</td>
</tr>
</tbody>
</table>

Source: Real Estate Research Corporation.

Notes:
1. 1975 household income distribution from Table 7, and includes adjustments for rental and unreported income.
2. Projections based on same inflation factors as in Table 8.
3. Incremental households assumed to be added at approximate rate of 6 percent per year.
4. Incremental households from 1975 assumed to be distributed as follows:

<table>
<thead>
<tr>
<th>Household Income Level</th>
<th>Incremental Number of Households (From 1975)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mid-1976</td>
</tr>
<tr>
<td>0- 20%</td>
<td>2,650</td>
</tr>
<tr>
<td>20- 40%</td>
<td>1,400</td>
</tr>
<tr>
<td>40- 60%</td>
<td>950</td>
</tr>
<tr>
<td>Total Increment</td>
<td>5,000</td>
</tr>
</tbody>
</table>

5. Revised households per income levels, including increment distributed as above, are as follows:

<table>
<thead>
<tr>
<th>Household Income Level</th>
<th>Cumulative Number of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>0- 20%</td>
<td>32,800</td>
</tr>
<tr>
<td>30- 40%</td>
<td>65,600</td>
</tr>
<tr>
<td>40- 60%</td>
<td>98,400</td>
</tr>
<tr>
<td>60- 80%</td>
<td>131,200</td>
</tr>
<tr>
<td>80-100%</td>
<td>164,000</td>
</tr>
</tbody>
</table>