



Living Standards
Measurement Study
Working Paper No. 26

The Côte d'Ivoire Living Standards Survey

Design and Implementation

Martha Ainsworth and Juan Muñoz

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LSMS Working Papers
Number 26

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The World Bank
Washington, D.C., U.S.A.

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Washington, D.C. 20433, U.S.A.

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First printing August 1986

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Martha Ainsworth and Juan Muñoz are consultants to the Development Research Department of the World Bank.

Library of Congress Cataloging-in-Publication Data

Ainsworth, Martha, 1955-

The Côte d'Ivoire living standards survey.

(LSMS working papers, ISSN 0253-4517 ; no. 26)

1. Cost and standard of living--Ivory Coast--
Statistical methods. 2. Household surveys--Ivory
Coast. I. Muñoz, Juan E., 1947- . II. Title.

III. Title: Living standards survey. IV. Series.

HD7067.A37 1986 339.4'7'096668 86-15901

ISBN 0-8213-0816-5

ABSTRACT

The Côte d'Ivoire Living Standards Survey (CILSS) is the first survey to field test the methodology and questionnaires developed by the Living Standards Measurement Study.

The primary objectives of the survey are:

1. To provide timely cross-sectional and panel data on a permanent basis on living conditions of African households in Côte d'Ivoire.
2. To study the interrelationships between different components of living standards within the same households.
3. To develop and test methodologies for measuring living standards in developing countries.

The survey is being undertaken by the Côte d'Ivoire Department of Statistics in 1600 African households per year throughout the country in communities randomly selected to be nationally representative. Every year half of the sample is replaced, thereby yielding two observations one year apart for half of the previous year's households. Data on community characteristics, including local prices, are collected on separate village and price questionnaires. Although the World Bank will collaborate on this survey for only two years, the survey is expected to be continued on a permanent basis by the Department of Statistics.

This paper documents the development of the Côte d'Ivoire Living Standards Survey up to December 1985, ten months after field operations began. The chapters that follow describe:

- * The sample design
- * Survey instruments
- * The organization of the survey
- * Data management
- * The first ten months of field operations

In the last chapter some tentative conclusions are presented about the logistical and design aspects of living standards surveys, based on experience to date in Côte d'Ivoire.

PREFACE

The Living Standards Measurement Study (LSMS) was established by the World Bank in 1980 to explore ways of improving the type and quality of household data collected by Third World statistical offices. Its goal is to foster increased use of household data as a basis for policy decision making. Specifically, the LSMS is working to develop new methods to monitor progress in raising levels of living, to identify the consequences for households of past and proposed government policies, and to improve communications between survey statisticians, analysts, and policy makers.

The LSMS Working Paper series was started to disseminate intermediate products from the LSMS. Publications in the series include critical surveys covering different aspects of the LSMS data collection program and reports on improved methodologies for using Living Standards Survey (LSS) data.

This is the first of a series of papers on the methodology and results of the Côte d'Ivoire Living Standards Survey. The Survey is being conducted by the Department of Statistics of Côte d'Ivoire with the technical and analytic support of the Living Standards Unit, Development Research Department, the World Bank.

Staff and consultants of the Living Standards Unit and the Department of Statistics worked jointly on the development and implementation of the survey. The project's principal collaborators in Côte d'Ivoire are Méité Nediembo, Director of Statistics; Bakary Daho, Project Director; Idrissa Ouattara, Deputy Project Director; Roch Sopri, Assistant Deputy Project Director; and Kouakou Chia Blé, Computer Programming Specialist.

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I. INTRODUCTION

The World Bank's Living Standards Measurement Study (LSMS) was established in 1980 to develop improved methods for collecting and analyzing household and community data on living standards. Its ultimate goal is to contribute to the design of development policies by providing a richer empirical foundation for policy dialogue. This goal will be met by providing government statistical offices in developing countries with recommendations on ways in which they can improve the quality, timeliness, and information value of their household and community surveys.

The Côte d'Ivoire Living Standards Survey (CILSS) is the first survey to field test the methodology and questionnaires developed by the Living Standards Measurement Study. It is also the first permanent, year-round household survey undertaken by the Department of Statistics.

The primary objectives of the survey are:

1. To provide timely cross-sectional and panel data on a permanent basis on living conditions of African households in Côte d'Ivoire.
2. To study the interrelationships between different components of living standards within the same households.
3. To develop and test methodologies for measuring living standards in developing countries.

The survey is being undertaken in 1600 African households per year throughout Côte d'Ivoire in communities randomly selected to be nationally representative. Every year half of the sample is replaced, thereby yielding two observations one year apart for half of the previous year's households. Data on community characteristics, including local prices, are collected on

separate village and price questionnaires. Although the World Bank will collaborate on this survey for only two years, the survey is expected to be continued on a permanent basis by the Department of Statistics.

Many innovative aspects were considered in the design of the survey, to ensure that the data are of good quality and quickly available. Households are interviewed twice, two weeks apart. This determines a fixed time frame for the collection of expenditure data and allows for the correction of errors found in the first interview during the second one. The household questionnaire is almost completely precoded so that data can be recorded directly on personal computer diskettes in the field immediately after each interview. The data entry program performs automatic range and consistency checks on the entered data. Inconsistent and erroneous data are signalled by the program so that certain questions can be corrected during the second interview. The diskettes are eventually sent to survey headquarters, where the data are put on a mainframe computer. This system produces relatively good quality results in a short period; an abstract of preliminary results for the 900 households interviewed between February and September 1985 was published in November 1985.

This paper documents the development of the Côte d'Ivoire Living Standards Survey up to December 1985, ten months after field operations began. The chapters that follow describe:

- * The sample design
- * Survey instruments
- * The organization of the survey
- * Data management
- * The first ten months of field operations

In the last chapter we present some tentative conclusions about the logistical and design aspects of living standards surveys, based on experience to date in Côte d'Ivoire.

II. SAMPLE DESIGN

The objectives of the Côte d'Ivoire Living Standards Survey called for a nationally representative cross-section of African households, some of which could be interviewed in successive years. The multi-purpose character of the survey, as well as the need to simplify as much as possible the later analytic stages, made it advisable to design a self-weighted sample instead of a stratified sample with unequal weights. Finally, for logistical reasons it was decided to survey clusters of households within randomly selected primary sampling units.

These considerations led to a self-weighted sample of 1600 households a year, in 100 clusters of 16 households each. To provide continuous panel data, half of the households will be replaced each year and the other half will be interviewed a second time. Under the steady-state conditions of the survey, this means that the selection of fresh clusters will be an ongoing process, requiring a permanent updating of the sample.

Sample selection

A two-stage sampling procedure was used: (1) 100 primary sampling units (PSUs) were selected across the country; and (2) a cluster of households within each PSU was selected by means of a presurvey in the field.

Although no geographic stratification was explicitly needed, the 100 PSUs were selected, with probabilities proportional to their population, from a list of cities, villages and rural areas sorted by region ^{1/} and by site

^{1/} These are the main geographical Regions defined by the the Direction du Développement Rural: East Forest, West Forest, East Savanna and West Savanna.

type^{2/} within each region. This guaranteed a balanced distribution of the sample in these respects. The list of places was constructed on the basis of the 1975 census, updated to 1983 by the demographers of the Department of Statistics and based on a total population estimated to be 9.4 million.

Of the 100 primary sampling units selected, 21 were located in Abidjan (the capital), 5 in Bouaké (the second largest city), 17 in other urban areas, and 57 in rural areas. The geographical distribution of the sample is shown on the map which appears at the end of the paper. Table 1 provides a list of the 100 primary sampling units.

A presurvey was conducted in June-July, 1984, to select the households to be surveyed in each primary sampling unit. Sixty-four households were randomly selected in each PSU during the presurvey. Although only 16 households per cluster were needed for the first year of the survey, additional households were selected to avoid having to conduct another costly presurvey in the second year. Thus the first presurvey had to provide enough households to select two clusters in each PSU and to allow for replacement households in the event that some in the sample could not be contacted or refused to participate.

^{2/} Urban areas, large villages, small villages attached to urban areas, and small villages attached to large villages.

TABLE 1: Primary Sampling Units

001	Adjamé Fraternité	041	Gagnoa	081	Moronou
002	Other Adjamé	042	Korhogo	082	Babrasso
003	Treichville Ecole Reg	043	Boundiali	083	Molonou
004	Other Treichville	044	New Osrou	084	Sebolo
005	Attiecoubé Center	045	Boussoué	085	Sori Bouafla
006	Marcory Champro	046	Ouegninkro	086	Gadouan
007	Residential Marcory	047	Eboué	087	Tapeguhé
008	Bietry	048	Assouba	088	Nime Belleville
009	Marcory Anoumabo	049	Beniankré	089	Siegouekou
010	Other Marcory	050	Bebou	090	Saioua Guebia
011	Koumassi Center	051	Dame	091	Kouamefla
012	Koumassi Bidonville	052	N'Dakro Ayibekro	092	Dienedian
013	Cocody Center	053	Ouroutara	093	Lokolo
014	Corniche Lycée Technique	054	Abokouma	094	Somana
015	Port Bouet Hospital	055	Agbaou	095	Tchonkaha
016	Yopougon SICOGL	056	Aboude Kouassikro	096	Sakpele
017	Yopougon Selmer	057	Nebo	097	Nan Gounkaha
018	Yopougon Station and Center	058	N'Bazo	098	Douasso
019	Yopougon Andokoua	059	Kakouéoua Kipreou	099	Kanakoro
020	Abobo Tracks	060	Belleville (Kozoan)	100	Neguepié
021	Other Abobo	061	Dago Boua		
022	Bingerville	062	Bogouine I		
023	N'Douci	063	Dakouépleu		
024	Abengourou	064	Guinglo-Zagna		
025	Agnibilekrou	065	Sokourala		
026	Tanda	066	Ferentella		
027	Adzopé	067	Matongouine		
028	Akoupé	068	Zealé		
029	Divo	069	Bahe-blaon		
030	Man	070	Blody		
031	Arrah	071	Kouassikro		
032	Bouaflé	072	Ahouanou		
033	Bocanda	073	Pakouabo		
034	Bouaké Air France 3	074	Cohouo		
035	Bouaké N'Gatakro Nimbo	075	Prosi Blanfla		
036	Bouaké Air France 1/2	076	Aoussoukro		
037	Bouaké Sokoura	077	Agbanikro		
038	M'Bahiakro	078	N'Brako N'Drano		
039	Katiola	079	Akanzakroz		
040	Dalca	080	Pangbabo		

The presurvey was conducted by five teams, each consisting of a supervisor, three enumerators and a driver. A short form was completed for each household, containing questions on household size, demographic characteristics and economic activity.

The presurvey produced a computer file of 6,400 households, on the basis of which:

- * one cluster of sixteen households was selected in each PSU, to be interviewed during the first year of the survey, and
- * every selected household was assigned a "replacement household", similar in terms of size and socio-economic status, in the event of refusals or other problems in the field work.

The selection of the 16 households within each primary sampling unit was done by computer, attributing to each of the households an equal probability of selection. At the same time, a multivariate factor analysis, considering all the available socioeconomic information collected in the presurvey, allowed assignment of replacement households for every household in the cluster.

The one hundred clusters were divided geographically into five groups of twenty clusters to be assigned to each of five survey teams. The twenty clusters assigned to each team were randomly ordered to be interviewed over the twelve months.

The sample for the second and subsequent years

During the second year of the survey, half of the first year's households will be revisited, and the other half replaced by new households. This will be accomplished by revisiting all of the households in fifty clusters, and selecting 16 new households in each of the other fifty

clusters. The clusters will be interviewed in the same order the second year as in the first year so that panel households will be interviewed approximately 12 months apart.

This design was selected instead of the alternative of replacing half of the households in all of the clusters because it was: (1) easier to administer, field procedures being the same for all the households in each cluster, and (2) easier to pursue in the third and subsequent years when new primary sampling units will be selected.

The 800 new households to be included in 1986 will come from primary sampling units, in which other households had been visited in 1985. Thereafter, fifty new PSUs will be selected each year, and a pre-survey will be carried on in each PSU shortly before the actual survey, to designate the 16 households to be interviewed.

Great care has been taken to ensure that the information collected from panel households in the two interviews one year apart can be properly linked at the analytical phase. This is easy enough at the household level (provided, of course, that the household can be found again in the field) by simply retaining the same household number from one year to the other. At the individual level, however, the task is complicated because important changes can be expected in household composition. A special section of the questionnaire is specifically devoted to linking the ID codes of the household members from the second year interview to those of the first, and to record summary information about the members who were no longer residing in the household.

III. QUESTIONNAIRES

The CILSS uses three questionnaires: a household questionnaire; a community questionnaire; and a price questionnaire.

- * The household questionnaire includes modules on a broad range of measures of living standards: income and expenditure, schooling, health, housing, labor force participation, fertility, anthropometrics, and others.
- * The village questionnaire, completed in all rural clusters, collects data on community characteristics common to all households in a cluster. The data will assist in the analysis of links between government policies and household behavior.
- * The price questionnaire, completed in all clusters, collects price information on basic food items and a few nonfood items. This information can be used to improve comparisons in living standards between urban and rural areas (by taking into account differences in purchasing power) and to translate estimates of the value of home production consumed into quantities produced and consumed.

A. HOUSEHOLD QUESTIONNAIRE

Definition of the household

The household in the CILSS is defined as a group of persons who ate meals together and slept in the same dwelling for at least three (3) of the past twelve (12) months. Exceptions include: domestics and lodgers living

with the household (considered households in their own right and therefore not members of the household being interviewed)^{3/}; the household head (always considered a member); and children less than 3 months old of members of the household (always members). Information about household members who have died during the last 12 months is not recorded for households interviewed for the first time, but will be collected as each household is interviewed for the second time one year later.

Limited demographic information is also collected for persons who are present the day before the survey but who do not satisfy the 3 month definition for household membership.

Development of the questionnaire

The household questionnaire is based on a question list developed by the Living Standards Measurement Study. The question list reflected the analytical needs of a multipurpose living standards survey, as recommended by numerous studies of individual components of levels of living sponsored by LSMS.^{4/} The CILSS is the first survey to translate these analytic needs into a functional questionnaire and to test the questions and methodology developed by LSMS.

Transformation of the extensive LSMS question list into a formatted questionnaire in French normally would have taken many months, involving draftsmen and graphic artists. In fact, the entire process took only 7 weeks

^{3/} Technical difficulties in identifying the proper households of domestics and lodgers may have resulted in undersampling of these groups.

^{4/} For further detail of these studies, see the Living Standards Measurement Study Working Paper series.

of intensive work, as the physical design and layout of the questionnaire was done entirely in a personal computer using GRIDS, a software program developed by LSMS staff specifically for this purpose. Every page of the questionnaire was stored on a diskette so that it could be continuously modified as the questionnaire was adapted to local conditions. Photocopied reductions of printouts of each page were used directly as masters for printing the questionnaire. The use of GRIDS made it easy to incorporate both small and large changes in the questionnaire after the field test without loss of time.

To reduce as much as possible the tedious and error-prone step of coding, all but 15 items on the household questionnaire are precoded. Coding for other items is done by team supervisors prior to data entry.

The questionnaire is printed in French only. The profusion of local languages (about 80), most of them not written, and the fact that there are only ten interviewers to cover the entire country makes production of the questionnaire in local languages impractical.^{5/}

Field test

A field test of the household questionnaire was conducted over two weeks (September 23-October 9, 1984) in six villages, a small town, and two cities. The sites were chosen to represent the major economic and climatic zones in the country: the coast (fishing, oil palm and rubber plantations); the eastern cocoa and coffee growing area; the center and north, both with

^{5/} In the field, when the respondent does not speak French and the interviewer does not speak the local language, local volunteers are recruited to help in translating the questions. Roughly 45% of the interviews are conducted in local languages, either directly by the interviewers or with the assistance of a local volunteer.

subsistence agriculture and (in the north) cattle raising; and the major urban centers (Abidjan and Bouaké).

About 80 households were contacted in total. All sections of the questionnaire were tested, including several alternative versions for the employment, farm, and savings and credit modules. In addition, households in two villages and two districts of Abidjan were asked both rounds of the questionnaire two weeks apart to approximate procedures during the survey. The GRIDS software used in questionnaire design enabled us to make substantial improvements in the questionnaire after the field test.

Final version

The final version of the questionnaire consisted of fifteen sections, each section covering a different component of living standards. The first eight sections are asked during the first "round" interview and the last seven during the second "round" interview, two weeks later. Each round takes 2-3 hours to complete, depending on the size of the household. The respondents vary from section to section of the questionnaire so that each round is actually a series of shorter interviews with individual household members. In urban areas, it is often necessary to return several times per round to the households to obtain responses from all designated household members in person. In rural areas, however, one visit is generally sufficient to complete the interview.

Two sections were subsequently added to incorporate anthropometric measurements (see the discussion below) and to account for changes in household composition in households reinterviewed the second year of the survey.

Table 2 summarizes the contents of the questionnaire and the respondents for each section.

TABLE 2: Household Questionnaire: Summary of sections and respondents

SECTION	TITLE	RESPONDENT	SUBJECT
1	Household Composition	Head of household/ principal respondent	Household roster, demographic data, information on parents of all HH members.
2	Housing	Head of household/ principal respondent	Type of dwelling, housing and utilities expenditures.
3	Education	Head of household/ principal respondent	Completed schooling and schooling expenditures for all HH members 5 or older; schooling of all non-member children under 30.
4	Health	All household members (parents respond for young children)	Utilization of health services and medical expenditures for an illness in the last four weeks; utilization of and expenditures for preventive services in the last 12 months.
5	Economic activities	All household members 7 years and older (all adults must respond for themselves)	Employment, income, and time use data for the main and secondary jobs in the last 7 days and the last 12 months; employment history; unemployment spells in the last 12 months; time use in the home.
6	Migration	All household members 15 years and older	Location and reasons for first and last moves.
7	Respondents for round 2	Head of household/ principal respondent	Best informed persons to respond to sections in round 2; selection of female respondent to respond to fertility section.
8	Characteristics of housing	-	Observations and measurement of housing by the interviewer.

Table 2 (continued)

SECTION	TITLE	RESPONDENT	SUBJECT
9	Agro-pastoral activities	Best-informed household member	Land, crops, income and expenditure from raising crops and animals, livestock, farm equipment.
10	Non-farm self-employment	Best-informed household member for each of three businesses.	Income, expenditure, assets for three most important household businesses.
11	Expenditures and inventory of durable goods	Best-informed household member	Expenditures in the past 14 days and past 12 months; inventory of durable goods; remittances to others.
12	Food expenditures	Best-informed household member	Food expenditures in the past 14 days and past 12 months; consumption of home production in past 12 months.
13	Fertility	Randomly selected woman 15 years or older	Birth history; use of maternity services and duration of breastfeeding for last live birth.
14	Other income	Best-informed household member	Income from other sources, including remittances from others.
15	Savings and credit	Best-informed household member	Savings and net debt the day of the interview; characteristics of outstanding loans to household members.
16	Anthropometrics	-	Height and weight measurements of all household members performed by anthropometrist.
17	Household composition last year	Head of household/ principal respondent (only in households as they are revisited one year later).	Links ID codes of household members present in the two interviews. Summary information on household members who have disappeared since last year's interview.

Selection of respondent for the fertility section

The survey collects fertility information for only one woman age 15 or older in each household, so we were faced with finding a procedure for randomly selecting the woman to be interviewed from each household. The procedure had to be: (1) simple, so that interviewers can apply it in the field; (2) random, in the sense that each of the eligible women in each household has the same probability of selection; and (3) verifiable, so that the work of the interviewer can be repeated and tested for accuracy (this last condition precludes the use of dice or other "truly random" methods).

Many surveys use the Kish^{6/} tables to select individuals randomly. These are two-way tables, usually pre-printed in the questionnaire, in which one entry is the total number of eligible individuals in the household (women 15 and older in our case) and the other is some "reasonably random" number, like the last digit of the household number. The table gives the number of the individual to be interviewed.

Kish tables are widely used, but they have some defects. One of them is that in some cases selection probabilities are not exactly the same for all women. Also, we feared that some confusion could arise from the fact that we were using individual identification codes for everybody in the household, not only for women 15 and older. If we had used Kish tables we would have had to use an independent numbering for the eligible women.

We opted for an original, alternative method that is easier to use by the interviewers and more correct than the Kish tables. Each household member is assigned an identification code, generally from 1 to 20, in the first

^{6/} Kish, Leslie. Survey Sampling. New York: John Wiley & Sons, 1965.

section of the questionnaire. We programmed the personal computer to generate random permutations of these identification codes on adhesive labels. A label is affixed to each questionnaire. To select the woman, the interviewer scans the list of identification codes on the label until he comes to the code of a female household member age 15 or older. The figure below shows one of these labels. The process is verifiable by the supervisor, who can repeat the procedure with the label stuck to each questionnaire. It can also be checked by the data entry program, which can use the number in the box under the list as a "random number seed" to reproduce the permutation.

03	06	07	08	11	12	10	17	04	02	
16	15	05	18	19	01	13	20	09	14	
<table border="1"><tr><td>3614</td></tr></table>										3614
3614										

The anthropometric module

Prior to the field test of the household questionnaire, it had been planned to have the interviewers perform height and weight measurements on all household members, in addition to completing the questionnaire. Concerns about the length and complexity of the interview and about "overloading" the interviews led us to exclude the anthropometric module from the first months of the survey.

An anthropometric module (Section 16) was eventually added, however, in September 1985. Five persons were added to the data collection effort with

the sole job of performing these measurements during both rounds of the survey.

B. VILLAGE QUESTIONNAIRE

The objective of the village questionnaire is to measure community characteristics common to all households in a cluster. Most of the questions measure the access of the community to economic infrastructure and basic social services. The five sections of the village questionnaire cover the following subjects:

SECTION	TITLE	CONTENTS
1	Demographic information	Population, religion, ethnic groups, migration patterns
2	Economy and infrastructure	Main economic activities, economic trends, transport and communication, utilities, markets, seasonal labor market
3	Education	Characteristics and location of the nearest primary and secondary schools, adult literacy programs
4	Health	Access to health personnel and facilities
5	Agriculture	Marketing services for major crops, agricultural extension services, cooperatives, equipment and inputs, agricultural wages, sharecropping

One village questionnaire is completed by the team supervisor in every rural cluster. It is asked of a group of knowledgeable respondents who must have lived some time in the village. Typically, this group includes the village chief and his elders and other prominent members of the community.

C. PRICE QUESTIONNAIRE

The price questionnaire serves two analytic needs:

1. Construction of a crude price comparator for items in urban and rural areas, to improve analysis of urban-rural differences in living standards.
2. Conversion of the value of home production consumed by the household (reported in the household questionnaire) into quantities.

The price questionnaire collects price data for twenty-two food and non-food items. One questionnaire is completed by the team supervisor in the market of every primary sampling unit, except in PSUs where the data are already routinely collected by the Department of Statistics.

The items on the price questionnaire were chosen so as to include:

1. frequently purchased items, according to the results of the 1979 Ivorian Budget-Consumption survey; ^{7/}
2. items for which data was already being collected by the Price Index Division of the Department of Statistics;
3. food items included in the section of the household questionnaire on consumption of home-grown produce; and
4. items likely to be found in markets in rural areas.

^{7/} République de Côte d'Ivoire. Ministère de l'économie et des finances. "Enquête Budget Consommation 1979: Résultats généraux sur la consommation alimentaire des ménages africains de Côte d'Ivoire" EBC N^o 1, Decembre 1984.

The price questionnaire was tested by survey supervisors in Abidjan and in a rural area during the training program. The supervisors have been issued 5 kg. scales to weigh and price food items. None of the items weighed are purchased by the survey. If the vendor refuses to allow the supervisor to weigh the product, the supervisor must await a client and obtain information based on a sale. Three prices are recorded for each item, preferably from different parts of the market.

IV. ORGANIZATION OF THE SURVEY

Organization of field work

Data for the CILSS are collected by five teams stationed in regional offices of the Department of Statistics. Two data collection teams are based in Abidjan--one of which interviews in the city of Abidjan, and the other in nearby villages and towns. The other three teams operate out of regional statistics offices in Abengourou, Bouaké, and Man.

Each data collection team includes one supervisor, two interviewers, an anthropometrist to take height and weight measurements, a data entry operator, and a driver. The data entry operator works in the regional office, where a personal computer is installed for data entry, (see section 5) while the rest of the team travels back and forth between the office and the clusters to be interviewed.

In a four-week period, each data collection team completes two clusters of sixteen households each. The organization of fieldwork for one team for a typical four-week period of two clusters is summarized in Figure 1. The team asks round one in Cluster A during the first week, round one in Cluster B during the second week, return to Cluster A for round two during the third week, and returns to Cluster B for round two during the fourth week. During each round of interviews the data collection team resides in the cluster being interviewed.

FIGURE 1: CILSS FIELD OPERATIONS
(Typical four week period of two clusters)

WEEK	CLUSTER	INTERVIEWERS	ANTHROPOMETRIST	SUPERVISOR	DATA ENTRY OPERATOR
1	A	Ask round one in 16 households (8 households per interviewer)	Weighs and Measures all household members in 16 households	<p><u>In the field:</u></p> <ul style="list-style-type: none"> -Observes one interview per interviewer -Verifies that all questionnaires are complete -Reinterviews 25% of households -Codes fifteen items -Asks community and/or price questionnaire <p><u>In the office:</u></p> <ul style="list-style-type: none"> -Reviews printouts of round 2 from previous cluster -Prepares questionnaires for cluster B, round 1 	Enters round 2 data for 16 households from previous cluster
2	B	Ask round one in 16 households (8 households per interviewer)	Weighs and measures all household members in 16 households	<p><u>In the field:</u></p> <p>(Same as week 1)</p> <p><u>In the office:</u></p> <ul style="list-style-type: none"> -Reviews printouts of round 1, cluster A -Prepares cluster A questionnaires for round 2 	Enters round 1 data for 16 households of cluster A.
3	A	Ask round two in 16 households (8 households per interviewer)	Weighs and measures selected individuals	<p><u>In the field:</u></p> <p>(Same as week 1)</p> <p><u>In the office:</u></p> <ul style="list-style-type: none"> -Reviews printouts of round 1, cluster B -Prepares cluster B questionnaires for round 2 	Enters round 1 data for 16 households of cluster B.
4	B	Ask round 2 in 16 households (8 households per interviewer)	Weighs and measures selected individuals	<p><u>In the field:</u></p> <p>(Same as week 1)</p> <p><u>In the office:</u></p> <ul style="list-style-type: none"> -Reviews printouts of round 2, cluster A -Prepares questionnaires for round one, next cluster 	Enters round 2 data for 16 households of cluster A.

The field procedures for each cluster are as follows:

- * Having completed round one interviews in a cluster (Sections 1-8, 16, and 17, where appropriate) the team returns with the partially completed questionnaires to the regional office. The data entry operator registers the data on personal computer diskettes using a data entry program designed for this purpose. The program then produces a printout of all of the data entered for each household and a list of inconsistencies within and between sections.
- * In the regional office, the supervisor reviews the questionnaires and printouts to detect interviewer and data entry errors. Interviewer errors are marked directly on the questionnaires, and data entry errors on the printouts.
- * The questionnaires travel back to the cluster with the data collection team, where the interviewers re-ask the inconsistent or erroneous questions from round one before asking round two of the questionnaire (Sections 9-15).
- * The team returns to the regional office with the completed questionnaires from round two. Corrections of round one and the new round two data are entered on diskettes by the data entry operator. The operator makes a printout of all of the data from both rounds.
- * The supervisor reviews the printout to verify that all sections have been correctly entered by the data entry operator. Errors in data entry are marked on the printouts and subsequently corrected by the operators.

- * Diskettes, questionnaires and printouts are stored at the regional statistics office until a supervisory mission by Abidjan staff collects them.

Field staff

Each interviewer is responsible for asking eight half-questionnaires (corresponding to round one or round two) per week, completing both rounds for sixteen households over a four-week period. In Abidjan, interviewers are also required to contact all households one week in advance of the survey to introduce themselves and schedule interviews.

Each anthropometrist must record the height and weight of all household members during round one. During the second round, he must repeat measurements for certain individuals as signaled by the data entry program. These individuals include those for whom height and weight measurements were outliers. In addition, the data entry program randomly selects 20% of all individuals to be remeasured during the second round.

The data entry operators are responsible for entering sixteen half-questionnaires on personal computer diskettes per week, and for producing printouts of the entered data. They also must organize the diskettes, questionnaires and printouts in the regional office and maintain the personal computer.

The supervisors are responsible for: overseeing the work of the interviewers, anthropometrists, and data entry operators; managing the vehicle, equipment, and funds of the team; and asking the community and price questionnaires. The most important the supervisory tasks are:

- * Contacting authorities in villages before the survey to advise them of the dates of the interviews.
- * Preparing the household questionnaires from a list of selected households.
- * Helping interviewers to locate households, reviewing all non-contacts and refusals, and replacing households when necessary.
- * Verifying that all parts of the questionnaire are properly completed before returning to the regional office.
- * Coding items that are not precoded on the questionnaire.
- * Conducting reinterviews of 25 percent of the households in the cluster.
- * Reviewing the printouts of both rounds of the questionnaire to detect interviewer and data entry errors, and supervising correction of all errors in the field and in the office.

Advisory staff

The five data collection teams are backed up by an advisory staff in Abidjan: the Project Director, the Deputy Project Director and Assistant, and a Computer Programming Specialist and Assistant. All of these persons work full time on the survey with the exception of the Project Director, who as Deputy Director of General Statistics also has responsibilities for other activities in the Department of Statistics.

The Deputy Project Director and his Assistant conduct unannounced monthly supervision visits to each team in the field. In Abidjan, supervision is more frequent. They are also responsible for conducting interviewer training programs.

The Computer Programming Specialist, who prepared parts of the data entry program with a Bank consultant, is responsible for continually correcting and improving the data entry program, supervising data entry and personal computer problems, and managing the transfer of data from diskettes to tapes for use in the mainframe computer. He is also responsible for training the data entry operators and writing data entry manuals.

Recruitment and training of field staff

The field staff for the CILSS were all recruited from among personnel of the Department of Statistics.

- * The interviewers have generally completed the tenth or eleventh year of secondary school and received one year of training (corresponding to the Diplôme d'Agent Technique) at the Ecole Nationale de Statistique in Abidjan.
- * The data entry operators were selected from among keypunchers at the Department of Statistics. None of the operators had previously worked on a personal computer.
- * The supervisors have generally completed the twelfth or thirteenth year of secondary school (some have passed the baccalaureat) and have received two years of training at the Ecole Nationale de Statistique (Diplôme d'Adjoint Technique).

Field staff were trained in a six-week program that simulated field operations. Supervisors and interviewers were trained by a Bank consultant, with assistance from the Deputy Project Director. The household questionnaire and instruction manuals for interviewers and supervisors include the core

information covered during the training program. Data entry operators were trained by the Computer Programming Specialist.

Supervisor candidates were identified and received two weeks of training prior to the interviewer training program. The key topics covered were: the organization of the survey; the supervisory checks to be performed on the work of the interviewers and data entry operators; and basic information about personal computers. The supervisors also recruited households for the practical part of interviewer training.

Interviewer training consisted of four weeks of theoretical and practical training on completing the household questionnaire. It was attended by both supervisor and interviewer candidates. The practical part of the course was arranged to simulate field operations in one cluster, with practice interviews for round two performed in the same households two weeks after practice interviews for round one. Thus, the first week of the course comprised theoretical training for round one, the second week practice of round one in the field, the third week theoretical training for round two, and the fourth week practice of round two in the field.

Interviewers and supervisors were each able to practice both rounds of the questionnaire in two urban and two rural households. Half of the practice interviews for each round were observed and critiqued by the training staff. Supervisors were also able to practice supervisory checks during the practical training: preparation of the questionnaires from a list of selected households; verifying that the questionnaires were complete after each round; conducting reinterviews; and reviewing the printouts of round one, marking items to be re-asked during round two.

The data entry operators received a four week training program that ran simultaneously with interviewer training. The program included instruction on assembly and maintenance of personal computers and printers, basic operations (formatting and copying diskettes, printing, etc.), and the structure and functioning of the data entry program. The practical part of data entry training consisted of recording data from the 104 questionnaires completed in the field during interviewer training.

Selection of the interviewers and supervisors was based on observations during the practice sessions and the results of a final written examination. Five supervisors and ten interviewers were selected. The five data entry operators had been selected from among the best keypunch operators in the Department of Statistics prior to the training program.

V. DATA MANAGEMENT

In most household surveys, there is a considerable delay--as much as two years or more--between the collection of data and its availability for analysis. This delay has significantly reduced the value of surveys as decisionmaking tools. Several factors contribute to this problem:

- (1) Computers have to be used to process the data from any major survey. The reputation of computers for accuracy and speed notwithstanding, a long chain of clerical tasks, like questionnaire coding, key punching, verification, etc., is usually required, just to put the data in a computer-readable form. Each of these tasks is time consuming, needs considerable manpower and is a source of errors.
- (2) More often than not, the data in the computer files contain inaccuracies and inconsistencies, including: (1) respondent inaccuracies, voluntary or not; (2) interviewer errors; and (3) coding and data entry errors.

A major stage in the survey data processing has to be, therefore, the detection and correction of as many of these errors as possible. This task is known as "editing", and is usually performed by a program, or a set of programs, that submit the raw files to a series of quality controls. The programs produce printouts of errors and inconsistencies, that are revised by hand and replaced in the file. This cycle is repeated as many times as are necessary to produce a file that is qualified as "satisfactory" according to some criterion.

One of the problems of editing complex surveys in this way is that, except for the simplest cases, the correction of an inconsistency somewhere in a questionnaire often creates others in some far and seemingly unrelated part of the questionnaire. Thus, editing does not converge quickly to a satisfactory file. The process can take many years, diminishing the value of the survey and, in the worst possible cases, it can even make the survey useless because of the many undocumented decisions made throughout the time to clean the data.

The CILSS was designed to reduce this problem by using personal computers in the field, in order to integrate the stages of data collection, data entry and editing.

All data from the precoded household questionnaires are entered on personal computer diskettes by the data entry operator one week after each round. The data are recorded using a special data entry program designed for the personal computer, that checks for inconsistencies and invalid codes as data are being entered. As a result of this program, the data are not only of better quality than most surveys at a similar stage, but available within two weeks after the second round of interviews in every cluster.

The data entry program

The data entry program was especially designed for CILSS, but can be easily adapted to other surveys. It works with a set of files--the Dictionary of Variables--that stores the characteristics of the questionnaire, the allowable values of the variables, the skip patterns, and the shape and functions of the data entry screens.

By keeping the Dictionary of Variables separate from the data entry program, it was possible to prepare most of the program well in advance of the final

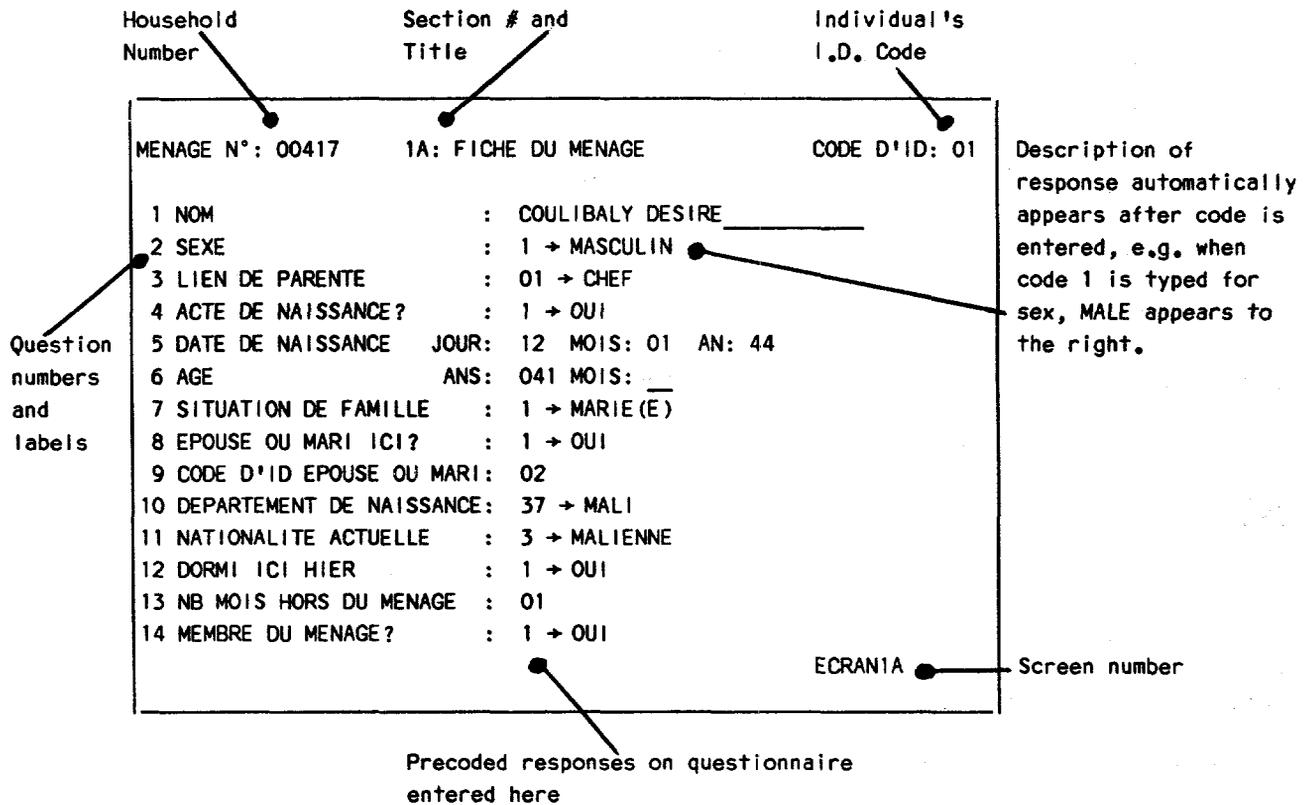
questionnaire design. Once the questionnaire was finalized, constructing the Dictionary was time consuming (due to the length of the questionnaire), but not very difficult. In principle, it can be entrusted to relatively unskilled personnel.

The data entry program stores data for each section of the questionnaire on a "screen" that appears on the computer monitor, and that closely resembles the different sections, parts and pages of the questionnaire. Each screen of the program constitutes a record on the diskette. The data entry program deliberately stores data for each household in a large number of small files, to speed retrieval and make the storage reliable in environments where power failures are frequent.

Editing stages

As data are keyed in, they are first submitted to a set of standard checks contained in the Dictionary of Variables. Numeric variables are constrained to lie between minimum and maximum values, qualitative variables can only have certain valid codes, and chronological variables are supposed to contain valid dates. When errors are detected, the operator is warned by audible and visual signals, and asked to correct them immediately. When valid values are entered for qualitative variables, the meaning of the code (for instance, MALE for code 1 in variable SEX), is displayed beside the code on the screen.

FIGURE 2: Data Entry Screen



After all the data on a screen are keyed in, the operator can visually appraise their correctness by comparing them with the contents of the questionnaire. If necessary, the operator can replace any value on the screen.

When satisfied, the operator attempts to record the data on the screen. The program then performs a certain number of consistency checks between the values of variables on the screen--for example, checks on the skip pattern of the questions and consistency checks between the ages and the dates of birth of individuals. The former type of check is built into the

Dictionary of Variables; the latter type has to be programmed specifically. If errors are detected in this phase, the operator is warned with an audible signal, and the inconsistent data flashes on the screen. If the error is due to data entry, the operator can then correct the entry and attempt to record the data again. If there are no more inconsistencies or errors, the data are recorded and another screen corresponding to the next page of the questionnaire appears. If, however, some errors remain--for example, those written in the questionnaire by the interviewer--the operator can forcibly record the data. These data are stored in a special format that registers their questionable status.

When all the sections of a household questionnaire have been entered, the program produces a complete printout of all the data for that household in a format that mimicks the original questionnaire. On this printout, data that flashed as erroneous on the data entry screen are enclosed in dark squares to make them conspicuous. At the same time, the program performs a set of consistency checks between data on different pages of the questionnaire or for different household members and produces printed statistics of the data entered for the household. Inconsistencies between records are signalled by messages on the printouts (see Figure 3).

A special set of consistency checks were devised for the anthropometric module. As data are entered, the program automatically compares individuals' age, height and weight with standard reference tables. Individuals with weight/age, height/age, or weight/height ratios farther than three standard deviations from the reference table median are signaled by the program. The data entry program then produces a printout of these individuals (with seemingly erroneous measures) plus a random sample of 20% of the rest of

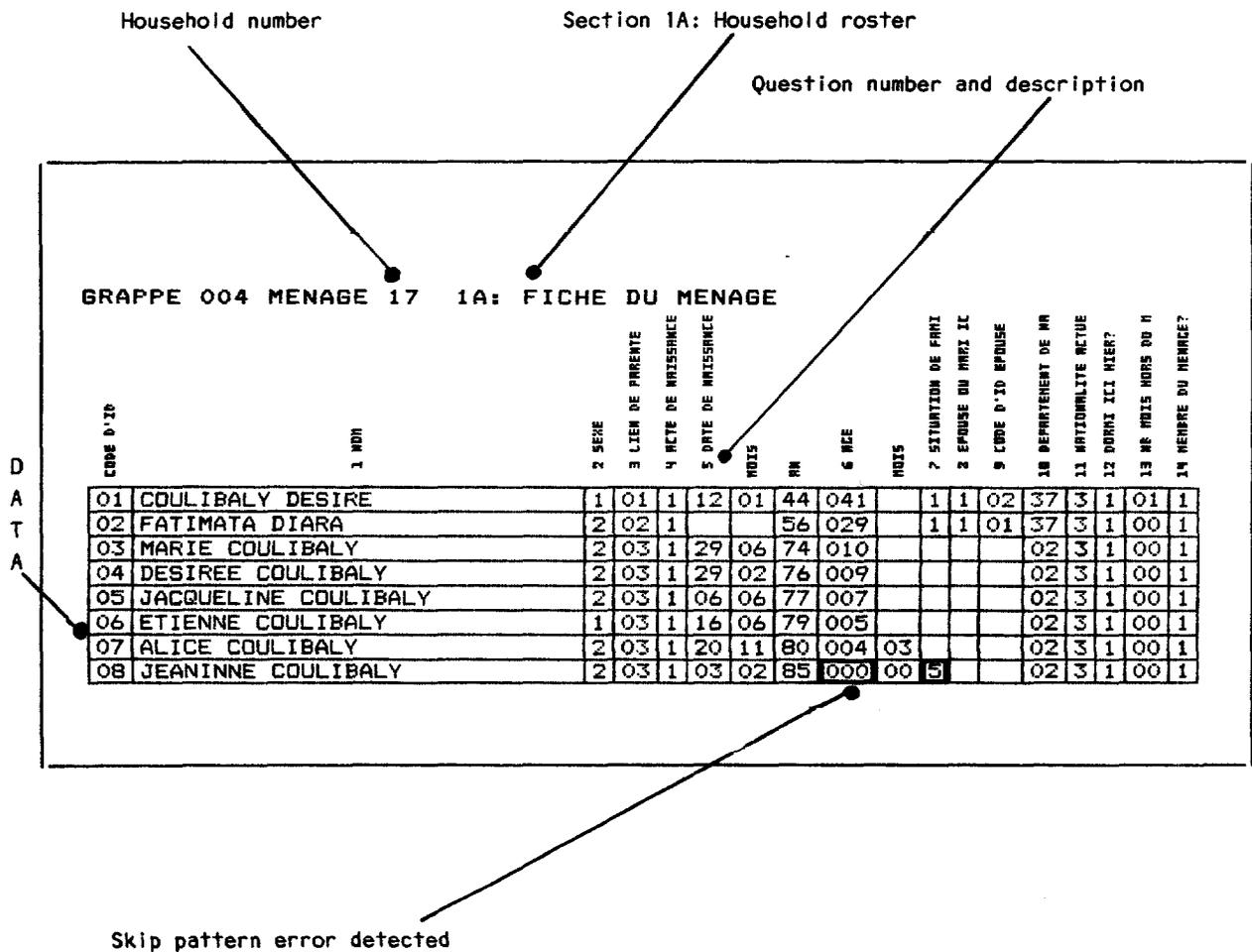
the household members, to be remeasured during the second round. This printout--one per household--is used directly by the anthropometrists as the questionnaire for round two. In this way, the anthropometrists are unable to refer to round one measurements during the second round. In the CILSS, the data entry program is essentially the "supervisor" for the anthropometric module.

FIGURE 3: Data Entry Printout

The data entry program prints a list of all the data entered for each household. Skip pattern, invalid code and range errors appear as darkened squares. Inconsistencies between individuals and sections of the questionnaire produce pre-programmed messages at the end of the printout, such as:

THE MOTHER OF KOFFI ASETA (NO. 10), ZONO ALIZATA (NO. 2), IS TOO YOUNG.

SECTION 4 HAS NOT BEEN ENTERED FOR ZOROUM SOULEYMANE (NO. 5)



Transferring the data to the mainframe computer

Two kinds of operations must be performed to make the data entered on personal computer diskettes suitable for analysis:

- * The data, stored in many separate files with different layouts within the diskette, must be transformed into a unique file with fixed length records and a standard format, to make them readable by the available statistical programs.
- * The data must be transferred from 5.25 inch diskettes to another, more universal storage medium.

These tasks are performed by a special reformatter program, used in the Abidjan headquarters to produce standard files on 8 inch diskettes from the smaller 5.25 inch personal computer diskettes by means of a drive attached to one of the personal computers. The 8 inch diskettes are, in turn, read in a mainframe computer to store the data on magnetic tapes for analysis.

VI. TIMING OF PREPARATORY ACTIVITIES

Figure 4 summarizes the timing of preparatory activities for the CILSS from March 1984, when the letter of agreement was signed with the Côte d'Ivoire government until the end of the first month of field work one year later. The duration of each activity in weeks is noted in parentheses. It is important to note that conceptual groundwork for the LSMS had been underway for several years prior to the Côte d'Ivoire project.

Since the CILSS is the first survey to incorporate LSMS methodology, many of the activities on the chart will not have to be replicated in future LSMS surveys. The fundamental elements of the survey--the household questionnaire and the data entry program--will require only superficial adaptation.

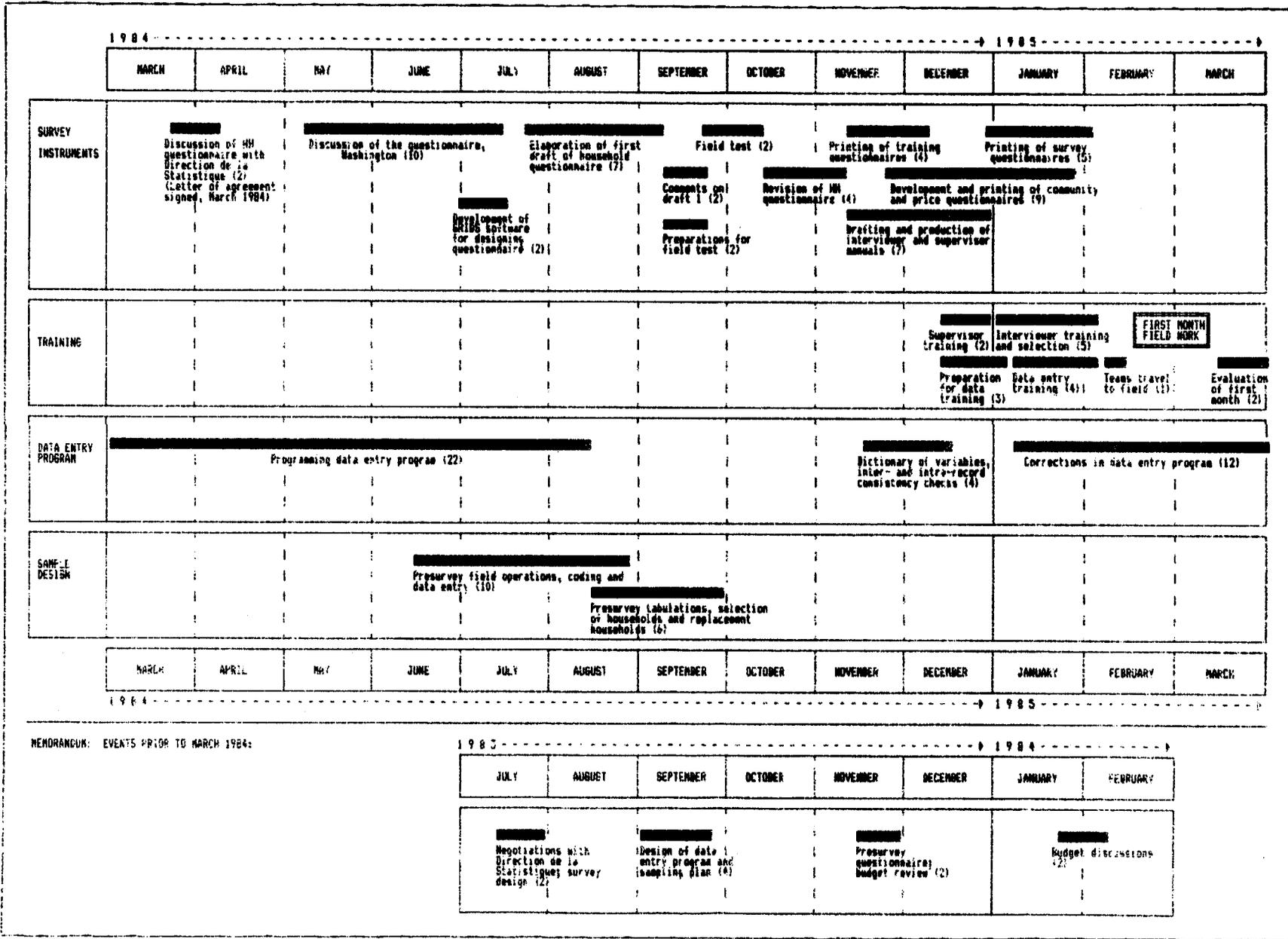
On the other hand, the CILSS benefitted from inputs that may not be available for future living standards surveys: a great deal of consultant time; printing of questionnaires and manuals by the World Bank; and logistical support from the West Africa regional office of the World Bank in Abidjan.

Depending on available resources and local conditions (for example, the degree of local expertise in conducting surveys and the existence of a suitable sampling frame), we estimate a start-up time for future LSMS surveys of 6-12 months.

The timing of some activities was determined by logistics and availability of staff. However, many of the most important activities had to be followed in sequence. Final work on the data entry program and writing the interviewer manuals could not begin until all modifications in the questionnaire had been made--about a month after the field test in this

case. The timing of the training programs was contingent on completion of the data entry program. Finally, the survey could not begin until the data entry program had been corrected. This necessitated a 1-2 week delay between the conclusion of training and the beginning of field work.

FIGURE 4: Timeline of Events - Côte d'Ivoire Living Standards Survey



VII. THE FIRST TEN MONTHS OF FIELD OPERATIONS

The survey began on February 16, 1985. The first month of field operations went remarkably smoothly. Despite the length of the interview and the complexity of the questions, respondents seemed willing to participate and able to provide reasonable answers. A meeting of field staff was held in Abidjan after the first four weeks of field operations to evaluate any problems. Several review sessions were held during the week of evaluation in Abidjan to clarify instructions to field staff and resolve any problems with the household questionnaire. An addendum to the interviewer manual was prepared.

The personal computers performed satisfactorily during the first month, but the current in the regional offices was extremely unstable and possibly damaging to the microcomputers. Stabilizers that protect against dips and surges were subsequently purchased for the three microcomputers located outside of Abidjan. Remarkably, since the first month of the survey, in February 1985, there have been virtually no hardware problems with the personal computers up to the final drafting of this document, in April 1986.

We were extremely pleased with the performance of the data entry program, despite some remaining bugs that were subsequently fixed but required reentry of the first month's questionnaires. The program detected many interviewer and data entry errors, omissions and inconsistencies which were later corrected. Data entry operators were easily able to enter sixteen questionnaires per week. Five weeks after the survey started, data for the first four weeks had arrived in Abidjan on diskettes, proving that rapid data retrieval was possible.

Supervisors and national staff found the supervisory controls -- verification of completed questionnaires, observation of interviews and particularly random reinterviews -- highly effective in detecting interviewer omissions. Because of strict supervision of the sample, few households were replaced. Among the first 907 households, 55, or 6% were replaced (14% in Abidjan, 8% in other cities, and only 3% in rural areas.) The primary reason for replacements is the inability to locate the housing units indicated by the presurvey.

Preliminary cross-tabulations for the first seven months of interviews were published in November 1985, only two months after data were collected. Such rapid results for a national survey are unprecedented in Africa, and so far as we know, in any part of the world.

VIII. CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE LIVING STANDARDS SURVEY

As of this writing, the data from 900 households have been analyzed. Two conclusions stand out:

- (1) The quality of the data is excellent; it is as good as or better than other surveys.
- (2) The information was available for analysis with an unprecedented time lag of only two months.

These results were due in large part to several innovative aspects of the survey, that are recommended for future Living Standards Surveys:

Use of personal computers in the field

The most notable success has been the use of personal computers for data entry and automatic editing in the field. This arrangement allowed for rapid, decentralized data entry. The data entry program has been easily used by keypunch operators who had never before used computers. It has clearly improved the quality of the data and the speed of retrieval, greatly increasing the usefulness of the data to planners.

The use of personal computers implies more than the addition of a new technology to existing survey procedures. In the case of CILSS, it required a fundamental change in the planning and organization of the survey, including design of the questionnaire, supervisory controls, and the content and timing of training.

- * The efficient use of personal computers for data entry depends a great deal on the design of the questionnaire. The CILSS questionnaire is almost entirely precoded, permitting immediate data entry.
- * Preparation of the Dictionary of Variables for the data entry program cannot proceed until the questionnaire is finalized. The entire program must be carefully developed, tested, and corrected prior to the start of field operations. The four weeks allowed for finalizing the data entry program in the Côte d'Ivoire were insufficient; future surveys should allow 6-8 weeks.
- * The major testing of the data entry program is during interviewer and data entry operator training. Whereas in many surveys, field work commences the day after training is completed, in this case time must be allocated before field work begins to correct problems in the data entry program. This requires 1-2 weeks after the end of training, depending on the nature of the problems and on the number of staff available to deal with them. If an uncorrected data entry program is sent to the field, the credibility of the program can be permanently damaged and so can its usefulness as a supervisory tool.

It is also advisable to have several backup computers available and a budget for repairs. In the CILSS two computers served as backups for the five computers used in the field. Dust covers, voltage regulators and air conditioning were also necessary -- the air conditioning primarily to prevent data entry operators from opening office windows and letting in dust that would damage the computers.

Other Recommendations

* Because of the complexity of the questionnaire, the field test is extremely important and should not be shortchanged. Testing must be pragmatic; in Côte d'Ivoire, for example, as many as three different versions of a section were tested, some of them spontaneously reorganized in the field. To adequately test all sections of such a large questionnaire -- many of which are not applicable to all households -- a fairly large sample size for the field test is necessary. Depending on the country, as many as 80-100 households may have to be contacted.

* The organization and timing of training programs followed in the CILSS is highly recommended for future surveys. By identifying and training supervisor candidates prior to interviewer and data entry training, supervisors were able to practice and test all procedures before the survey and to help in the evaluation of the interviewers.

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(List continues on the inside of the back cover)

The World Bank

Headquarters

1818 H Street, N.W.
Washington, D.C. 20433, U.S.A.

Telephone: (202) 477-1234

Telex: WUI 64145 WORLDBANK
RCA 248423 WORLDBK

Cable Address: INTBAFRAD
WASHINGTONDC

European Office

66, avenue d'Iéna
75116 Paris, France

Telephone: (1) 47.23.54.21

Telex: 842-620628

Tokyo Office

Kokusai Building
1-1 Marunouchi 3-chome
Chiyoda-ku, Tokyo 100, Japan

Telephone: (03) 214-5001

Telex: 781-26838

