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Master Sample Design for the Household Surveys  
In Yemen Arab Republic

29 October - November 12, 1982

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## Introduction

This document reflects the findings and recommendations resulting from a technical assistance mission to Yemen Arab Republic by Mohamed Abdul-Wahab of ECWA. The mission was undertaken during the period 29 October - 12 November, 1982.

The Adviser wishes to express his appreciation to the Office of the UNDP for their assistance during this visit and also to the various government officials who have contributed to the success of this mission.

## Section I: Background and Summary Information:

### 1.0 Terms of Reference of the Mission

The Statistics Department (SD) of the Central Planning Organization (CPO) has started implementing the NHSCP in the Yemen Arab Republic (YAR). As a first step a Demographic Survey is planned in December, 1982. Other household surveys like the Household Income and Expenditure Survey, Manpower Survey etc. will be conducted in succeeding years. For implementing a programme of integrated household surveys, it is advisable to work out a Master Sample Design. The assistance of the Adviser was requested by DS, CPO in preparing the Master Sample Design.

### 2.0 Summary of the Report

2.1 The Statistics Department (SD) of the Central Planning Organization (CPO) had conducted a Pilot Demographic Survey in 1981. In addition, household income and expenditure data were also collected from a sub-sample of the households (hh) covered in the Demographic Survey. It is planned to conduct a full scale Demographic Survey during December, 1982. They had gained good experience during 1981 about planning and execution of surveys of this type. It was felt that to obtain good results the survey operations should be carefully planned, the selection of enumerators their training and supervision should be meticulous, as mistakes made in the field could not be retrieved and would have a far reaching effect. In carrying out surveys of this type there are constraints of time, finances and sometimes political exigencies and immediate planning priorities. The Survey Planner has to balance out between these pressures and efficient planning and execution of the surveys. As YAR has elected to participate in the NHSCP, a series of household surveys are to be carried

out during 1982-1986. In 1983 a Household Income and Expenditure Survey would be conducted and an Agricultural Household Survey is programmed to collect data in depth from the agricultural households to supplement the information collected through the recent Agricultural Census. The Labour Force Survey would come in 1984.

For the Pilot Demographic Survey the sampling frame used was the 1975 Census of Population. The Census data had many deficiencies. Some areas were partially covered and certain other areas were not enumerated. For these areas estimates were made.

The sample was designed to give separate estimates of rural and urban areas. It was a stratified unistage cluster sample design using clusters of about 100 households (hh). The stratification in rural areas was done on the basis of sex ratio and the urban areas were divided into three strata.

- i) Sana'a city
- ii) Four large cities and,
- iii) Other urban cities.

The urban centre was defined as the capital of the governorate or a centre with a population of 2,000 or more persons.

Even this definition gave only 1.1% urban population. The field enumeration was preceded by elaborate field work for the delineation of Enumeration areas (EA) consisting of about 100 occupied structures, in all the five large towns. This work was completed in early 1981. In the Master Sample it is proposed to utilize these EA, after up-dating, as primary sampling units (psu).

In 1982 the Confederation of Yemen Democratic Associations (CYDA) had conducted a cooperative census in the country and the government has accepted the results of this census for all official purposes. The sampling frame per force has to be the CYDA Census data. The urban stratification scheme would be as adopted in the Pilot Survey and the rural areas may be stratified according to sex ratio and average family size. The primary sampling units selected for the Demographic Survey would be used for further sampling for other surveys.

The SD has experienced staff for planning and execution of Demographic Surveys and they have also acquired the services of the UN Demographer to assist them. They would probably need the services of a Data Processing Adviser in this connection.

It is expected that during the planning of the Household Income and Expenditure Survey at the beginning of 1983, the services of the Advisers on sampling, Training and Data Processing would be required. At a later stage probably in the last quarter of 1983, they would need the services of the ILO Adviser. They have requested ECWA for a Consultant for the improvement of their Foreign Trade Statistics and an Adviser for improving their price statistics and indexes of wholesale and consumer prices. At a later stage they would request for the services of a Nutrition Expert probably by the end of 1984.

The CYDA figures need close scrutiny - before they are accepted as a basis for the sampling frame. A system has to be established for up-dating the psu, that is the EA in the urban areas and the selected clusters in the rural areas.

## Section II: Findings, Recommendations and Services of Adviser

### 4.0 Findings and definitions of problems

#### 4.1 Background

The Statistics Department (SD) of CPO plans to conduct a series of households surveys for providing data to the planners and administrators. The NBSOP forms part of the overall statistical development programme of the YAR. The SD conducted a Pilot Demographic Survey (PDS) along with a Household Income and Expenditure Survey during November 1981. The SD Population Centre published the preliminary results of this survey in July, 1982. The questionnaire asked for information directly related to population growth and population estimation. Later on it was expanded to contain questions on housing. A supplementary questionnaire on Household Income and Expenditure was filled in from every fourth household enumerated in the PDS. The integration of the two surveys did economise the field costs and achieved the maximum utilization of the field resources but it had side effects which adversely influenced the data collection process. The Household Income and Expenditure

Survey questionnaire was long and took on an average an hour to complete. This usually irritated and angered the respondents and in certain cases was responsible for the non-response in the PDS. The surveys in future should be planned in the light of this experience. The initial plan of the Demographic Survey includes two main rounds in December, 1982 and 1983. A stratified random sample of 20,000 households would be selected to represent rural and urban areas so as to study the changes in the social and demographic characteristics of the population during that period.

#### Sample Design:

Frame: The 1975 Population Census results were used as the frame. In the Census certain areas for various reasons were covered partially and certain areas like the sector of Al-Jawf in the eastern part of the country could not be covered.

Design: It was planned to have estimates for rural and urban areas separately. On the basis of available resources, field constraints and statistical precision it was considered adequate to have a sample of 20,000 hh for the main survey and of 5,000 hh for the Pilot Survey and every fourth household was chosen for completing the Household Income and Expenditure questionnaire.

An urban centre was defined as a governorate capital or any other settlement of 2000 persons or more. The urban area was defined in this manner because of the lack of other information and as small size is a characteristic of the regular settlements in the YAR. Accordingly 1.1% of the total population was urban and there were 45 urban centres and five main cities (Sana'a, Ta'iz, Al-Hodaydah, Ibb and Dhamar).

#### Urban Areas:

The urban areas were divided into three strata consisting of

- (1) The Sana'a city, the capital and the largest urban area in YAR.
- (2) Other four main cities of Ta'iz, Al-Hodaydah, Ibb and Dhamar and the
- (3) Other remaining urban centres.

Rural areas:

Rural areas were divided into two categories. (a) Completely covered and (b) Partially or completely un-covered.

(a) Completely covered

These areas were divided into four strata according to sex ratio

Strata 1: Areas where the sex ratio was less than or equal to 80

2: Areas where the sex ratio was between 81-90

3: Areas where the sex ratio was between 91-110

4: Areas where the sex ratio was 111 or above

(b) Areas partially or completely un-covered

These were divided into two strata and estimates of their population were made.

Strata I: Areas completely un-enumerated in 1975. These consisted of Al-Jawf sector.

II: Partially enumerated in 1975. These consist of areas in Kitaf district and other areas in the northern part of the country.

The country was thus divided into 9 strata, three urban and six rural.

It was decided to take a primary sampling unit (psu) as a cluster of 100 hh.

For the Demographic Survey 200 such clusters were to be selected and 50 for the Pilot Survey. When these clusters were allocated to different strata in proportion to population, a small number were assigned to strata for which complete information was not available. Therefore, arbitrary allocations had to be made on the following consideration:

- (1) More weight to be given to the Sana'a city because of its importance
- (2) The number of selected clusters in each stratum of the main sample should be a multiple of four since a quarter of the sample had to be selected for the Pilot Survey.
- (3) The number of selected clusters should be at least two in each stratum.
- (4) Due weight had to be given to the un-covered areas.

The sampling frame based on the 1975 Population Census had to be up-dated and many discrepancies that had crept into the final data, had to be cleared. The census provided a list of administrative units like the governorate, Nahiya, Uzi, Village and Mohalla with the number of structures, households and males and females in each of these units.

To rectify these discrepancies and formation of primary sampling units of 100 hh, intensive field work was undertaken in the five large towns in the two urban strata. The structures were numbered, the boundaries of the psu were identified in the field. This work was completed in early 1981. For non-enumerated or partially enumerated areas the technical Committee of CYDA was consulted to provide estimates of these areas.

CYDA carried out a co-operative population census in February, 1981. The purpose of this census was two fold, (i) To provide the planners data for the preparation of the second five year development plan on a regional base and (ii) To provide population figures for legislative as well as co-operative and municipal elections. The census reports for all the Mohafzas will be made available by the end of 1982. It is proposed to use the CYDA results for the selection of the Master Sample.

#### 4.2 Field study of the problems

The CYDA census results are very interesting. The Population has been classified as Population within the country (75.4%), the expatriate population (16.3%) and the number of persons not included in the census enumeration due to social or technical factors (8.3%). Accordingly the de-facto population within the country included in the census was 6,439, 363 persons. A field study was undertaken on November 6, 1982 in the Regam Uzlah of Bani Hashish Nahiya of the Sana'a governorate. This Uzlah is about 35 Km from Sana'a city and is situated in the Regam Valley. The roads leading to the villages and mohallas are tracks winding around the hills and driving along these roads is risky. According to the 1981 CYDA census the Regam Uzlah consisted of 7 Karyas out of which two of them have 3 and 4 mohallas each. The purpose of the field visit was:

- (1) To verify the accuracy of the CYDA population figures.
- (2) To see how the settlements were located from the point of view of formation of clusters for a Master Sample Design and
- (3) Identification of the boundaries of different population units in the field and the distances and time involved in travelling from one cluster to another.

The findings of the field visit, if representative of Uzlahs in the country, will suggest constraints on the selection of the sample and organization of field operation. The mohallas are sort of permanent settlements and are usually named after an important individual. In some cases mohallas are split because some households had built houses in another part of the valley. Since these migrated families are not accepted in the new area according to tribal customs, they are still counted in their original mohallas. Therefore, the distances between split mohallas may be quite large. The same applies to the villages. The A'aquil (the Head man of the village) is a quite well informed person and knows the details of these split households. The interviewers would do well to consult the A'aquil in case of any doubt. The A'aquil knows the boundaries of the villages and mohallas and the names of the members of the households and sometimes his opinions seem to be accepted officially.

In the settled areas the CYDA figures seemed to be quite accurate. It was noted that the households in rural areas are quite dispersed and it may take time to cover the households in a cluster. Similarly the presence of the respondent at the time of interview is an important factor. The term village and mohallas are not carefully defined. Mohallas are often compact units and if villages consist of mohallas, then they are defined clearly. If villages exist independently, then their population is not significant. From a sampling point of view the list of independant villages and villages with mohallas should be mutually exclusive.

#### 4.3 Other activities

A meeting was held on November 1, 1982 under the chairmanship of the Director General of the Statistics Department to discuss the technical and administrative matters concerning the 1982 Demographic Survey. The ECWA Adviser, the UN Experts and



consultant and the counterparts participated in the discussions.

The meeting was informed that the government of YAR was committed to start the survey in November, 1982. Some of the participants were of the opinion that a large scale undertaking like the Demographic Survey should be launched after thorough planning, because any mistakes made in the field can not be retrieved at a later stage.

It was proposed to use the Pilot Survey questionnaire with some modifications. This would be taken care of by the UN Demographer along with the Tabulation plan, Manuals for field work etc. It was argued that if the survey could be conducted in November, 1982, it would be possible to estimate the changes in the characteristics of the Population during the year as the Pilot Survey was conducted during November, 1981.

The Adviser also attended a meeting to discuss the Agricultural Household Survey Programme held on November 2, 1982. The meeting was informed by the representatives of the Ministry of Agriculture that the Ministry had completed an Agriculture Census recently and the results of nine Mohafazas have been published. It was proposed to get more detailed information about the agricultural sector through the Household Survey. A sub-sample of the Demographic Survey (DS) sample would be used for this purpose. This would necessitate the identification of the agricultural households during the field operations of the Demographic Survey and extracting this information from the DS schedule. It would be convenient if a separate sheet is filled up immediately the agricultural household (Ag hh) was encountered. For this purpose some additional questions had to be asked such as whether any member of the hh was engaged in ag. activity. This would also require a clear definition of the agricultural activity. The additional sheet may involve more work for the enumerator. There was a suggestion that the answers to questions on economic activity may identify the ag. hh. The problem of extracting this information at a later stage would present problems.

Alternately these questions may be included in the houselisting phase along with other information needed for stratification of the hh. The question may worded as agricultural hh (Yes or No); education of the head of the household (highest standard attained) and household size may be obtained directly from the houselisting.

Some areas in the Sana'a city were visited to identify in the field the boundaries of the Enumeration areas. In 1981 good work had been done by numbering the structures and listing the households. Unfortunately at the moment of the visit, there were more than one number on the structure and it was difficult to identify the original numbers. They are relying on old hands who had done this work to re-identify the block boundaries for the Demographic Survey. It was also observed that there have been changes within the blocks by the construction of new structures etc. These blocks have to be up-dated by getting information through other sources like the records of the Taxation Department etc.

The Household Income and Expenditure schedule was briefly discussed. The comments would be sent after discussions with the advisers in the NHSCP ECWA Unit. It is proposed to conduct the field work of the survey starting April, 1983. The services of the ECWA Sampling Adviser would be needed for selecting the sample probably in March 83.

In addition the future survey programme and the need of ECWA Advisers was also discussed. It was proposed that, the services of the Training Adviser would be needed in February, 1983. The Government had requested for the services of a consultant to reorganize the system of Foreign Trade Statistics. They could require the services of the ECWA Adviser for revising the Consumer Price Index and establishing and reviewing the system of collection of prices. The services of the ILO Adviser would be needed late in 1983. The government will send the formal request to ECWA for providing the services of these Advisers. In addition at a later stage a Consultant on Nutrition Surveys would be required through the good offices of the ECWA.

## 5.0 Recommendations:

### 5.1 Sampling Frame:

Basically the CYDA co-operative Census figures seem to be reliable upto the Uzla level. At the lower level there seems to be some confusion in the identification of the village names and the jurisdiction of villages and mohallas because of shifting of households to certain other areas, but the aggregates for administrative areas from the level of Uzlas and above may be used for sampling purposes. It will be advisable to use the Uzlas as the primary sampling units in the rural areas and enumeration areas in the urban areas. The work done in 1981 of demarcating Enumeration areas has to be up-dated and detailed records are to be maintained describing the boundaries of these areas along with the listings of the hh. Rough sketch maps of Enumeration areas and selected clusters properly maintained would be of immense help. The tendency to rely on old workers who had done this job before needs to be discouraged. As the systematic turn over of the experienced staff may make the identification, if not impossible, difficult.

A system should be devised to up-date the Enumeration areas through Taxation and other Municipal records and field visits. New houses that come into existence should be included and demolished or abandoned structures removed from EA lists. The same will apply to the Uzlas in the rural areas. If this procedure is followed carefully the psu may be used for different hh surveys for some years.

The scheme of stratification of urban areas could be the same as used in DS. Probably new EA will be selected and up-dated for the 1982 Demographic Surveys. The selected EA may be used for drawing a multi-purpose sample of hh in urban areas. In the rural areas the Uzlas may be stratified according to the sex ratio and hh size and other relevant factors. The scheme of distribution of the 200 psu through different strata may be the same as originally proposed. After selection, the Uzlas may be up-dated and used as psu in rural areas for drawing a multi-purpose sample in the Uzlas. As Uzlas vary in size, it is recommended that Uzlas/EA may be selected with probability proportional to size and the second stage units, the hh should be

selected to give an overall equal probability for the selection of households.

Probably a sample of 3000-4000 hh would give sufficiently reliable estimates for the desired variables in the Household Income and Expenditure Survey. A higher sample size may be aimed at for the Labour Force Surveys. Further stratification of psu and hh may be needed to get better estimates of variables in a particular survey. For instance for the selection of hh for Household Income and Expenditure Survey the hh may be classified according to the highest standard of education attained by the head of the hh, in the absence of other information.

#### 6.0 Services provided by the Adviser and others

The Adviser worked with a team of three UN Advisers and a UN Consultant on Sampling to help the Statistics Department primarily to plan and execute the 1982 Demographic Survey. The Adviser concentrated on the sampling aspect of the survey and worked closely with the UN Consultant. During the discussions it was brought out that some of the counterparts in the SD were not happy with certain Advisers. Probably the attitude of some of the Advisers left much to be desired. Such reactions could be at least minimized, if the Advisers are accepted by the Department on the basis of their technical ability and extraneous considerations should not have an over siding influence. It is also to be understood, that an Adviser is there to offer solutions to the problems after thorough discussions with the counterparts. He can not dictate terms because the final decision lies with the Department and it is for the Department to either accept or reject the advice offered.

The Adviser also participated along with other Advisers in the detailed discussions with the representatives of the Ministry of Agriculture and others for the planning and implementation of the Agricultural Household Survey.

There were also detailed discussions regarding the Household Income and Expenditure Survey and the appropriate timings for providing the services of the other ECWA Advisers.

The Adviser also undertook field trips to verify the CYDA census figures and identification of the boundaries of EA in the urban areas. It is expected that psu selected for the Demographic Survey would be used for further sub-sampling for other surveys. This work may be undertaken in February, 1983.

Annex "A"

List of Persons Seen in Connection With The Assignment

Statistics Department

1. Mr. Yahya Al-Qaisil Director General

United Nations

1. Dr. Karim K. Al-Adhadi CPA
2. Dr. M. El-Rouby UN Demographer
3. Dr. G.K. Mehrotra UN Consultant
4. Dr. Majid Bassil UN Adviser