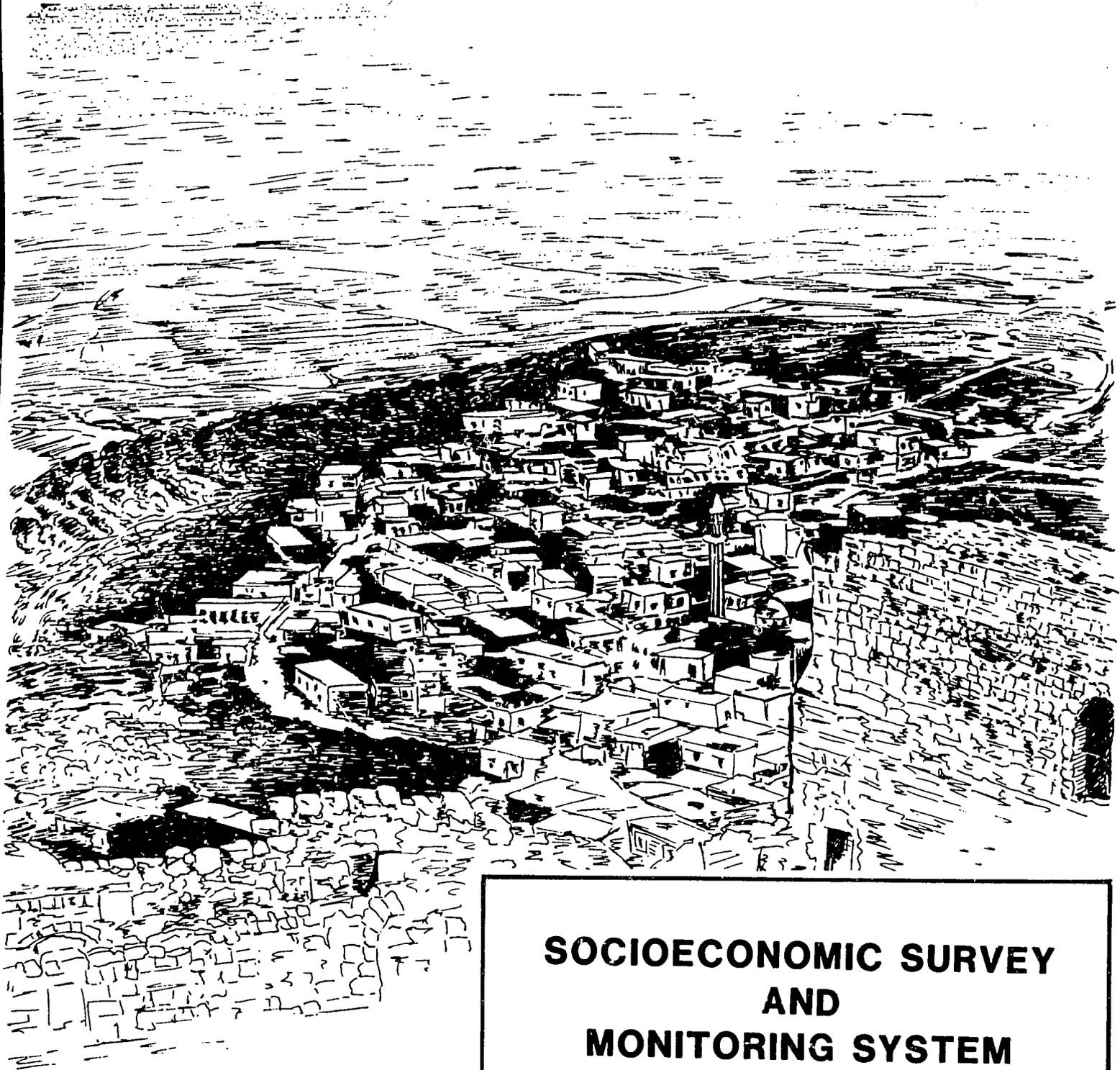


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NATIONAL RURAL ELECTRIFICATION PROJECT

Stage I



SOCIOECONOMIC SURVEY AND MONITORING SYSTEM



Gilbert/Commonwealth

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SYRIAN ARAB REPUBLIC

NATIONAL RURAL ELECTRIFICATION PROGRAM

SOCIOECONOMIC SURVEY

AND

MONITORING SYSTEM

PUBLIC ESTABLISHMENT OF ELECTRICITY

DAMASCUS, SYRIA

GILBERT ASSOCIATES INC.

READING, PENNSYLVANIA

U.S.A.

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I. SUMMARY

The socioeconomic studies of this report are part of the Consulting Engineering services being provided by Gilbert Associates Inc. of Reading, Pennsylvania for the Public Establishment of Electricity of the Syrian Arab Republic under Contract 2020, dated 31 March, 1979, signed on 13 September, 1979 and ratified in November, 1979. The Consulting services are being financed by the United States Agency for International Development under Loan No. 276-K016 dated 27 September, 1977.

This report provides a detailed description of the monitoring system developed for the National Rural Electrification Program (NREP). The main objective for establishing the monitoring system is to measure the contribution of NREP to the socioeconomic development of the areas included in the program and to assess the amount of benefit that was derived from the program.

Based on the basic premises that NREP is a social benefit oriented program--to provide reliable electric service to rural population at rates that reflect social rather than financial considerations, the program benefit is defined as social benefit instead of economic benefit.

The social benefit of NREP is measured principally in terms of the amount of electricity that was used by the rural households and businesses. By comparing the actual benefit realized and a conceptually defined maximum attainable benefit, analyses can be conducted to determine whether the difference between the two measures of program benefit is attributable to the service policy, rate structure, or other aspects of NREP implementation plan. If this is the case, some policy adjustments may be considered to improve the performance of the program.

As to the estimation of the contribution of NREP to the socioeconomic development of the program areas, the basic methodology is to define the pre-electrification socioeconomic characteristics of the villages through the use of information gathered from the village household survey; at a later date after electrification, a second survey with expanded scope will be conducted to develop the socioeconomic characteristics of the same regions. It is anticipated that the comparison of the village and regional profiles developed before and after electrification will shed some light on NREP's contribution to the socioeconomic development of the areas.

To achieve the objectives of the monitoring system, certain analytical tasks are necessary which, in turn, require additional inputs of data from various sources. The key tasks are to analyze the program benefits on the basis of rate structure, the availability of other sources of energy, and the level of socioeconomic development of the regions. To conduct these analyses, extensive effort is necessary in the future to compile the data concerning the number and characteristics of the electric customers and non-customers, the energy consumption patterns, and various socioeconomic data. The key component of the data remains to be computer processed. The report discusses all survey activities, work completed, and future work. Other activities have been defined but are yet to be carried out. It is anticipated that, when properly implemented, the information generated from the monitoring system will provide a useful management tool for planning future programs. Therefore, it is recommended that serious effort be made to continue the development, refinement, and implementation of the program with minimum interruption.

II. MAJOR OBJECTIVES AND THE STRUCTURE OF THE MONITORING SYSTEM

The main purpose of this report is to provide a detailed description of the monitoring system developed for the National

Rural Electrification Program (NREP), and of one of the major components of the monitoring system, i.e., the socioeconomic survey of rural households. The design of the monitoring system depends to a large extent on the purpose of the monitoring program which, in turn, depends on the objectives that the rural electrification program aims to achieve. It is, therefore, necessary to first outline the goals of NREP and the main objectives of the monitoring program so that the report will address all relevant issues in the proper perspective.

A. Objectives

1. Goals of National Rural Electrification Program:

The main objective of NREP is to make reliable electric power available to the rural population at reasonable rates that reflect social rather than financial considerations. It is anticipated that the availability of electricity will contribute positively to the improvement of rural living conditions through the provision of basic services, creation of new sources of employment, and enhancement of agricultural production. To make proper assessment of the program's performance, it is necessary to develop certain indicators to verify that the project goals have been achieved, or to measure the extent of project goal attainment in an objective manner.

2. Objectives of the Monitoring System:

The main objective for establishing the monitoring system is to measure the contribution of NREP to the socioeconomic development of the areas included in the program and to assess the benefit realized from the

implementation of the program. As such, the implementation of a monitoring program is a long term, continual effort. The program requires the collection and analysis of baseline data on the characteristics of the villages before the rural system is energized, and an appropriate record-keeping system after electrification to allow the compilation and analysis of statistics related to the connection rate and energy usage patterns of rural customers. Supplemented by socioeconomic data from other sources, e.g., national income statistics published by government agencies, the monitoring system will provide sufficient primary and secondary data to measure the achievement, or the lack of it, of the NREP. The result of the analysis can then be used to improve or modify the implementation plans for the second and subsequent stages of the program. In brief, it is expected that through the extensive gathering and analysis of data, the experience gained during the first stage of the program can be used to improve the planning and execution of the program in subsequent stages. More specifically, information generated from the monitoring system will provide a useful management tool for appraisal of on-going programs and for the planning of future programs. It is also expected that the information developed through the implementation of the monitoring system will help promote the understanding and support of rural electrification programs by the general public.

3. Purpose of the Report:

The main purpose of the present report is to provide a detailed description of the monitoring system, designed to evaluate the performance of the first stage of the

NREP. The system, as discussed in subsequent sections, consists of several major components. The first major component, i.e., data development system through a socioeconomic survey of villages, has been initiated.

Detailed discussions of various aspects of the socioeconomic survey is provided in the Chapter that follows; other components of the monitoring system such as the collection and analysis of PEE operating statistics will be performed by PEE or its designated representatives in the future. Detailed description, however, is provided to indicate the major types of information that would be useful for the program monitoring and evaluation processes. Overall, the present report aims to promote a general understanding of the proposed monitoring system, the tasks that have been performed to date, and the additional activities that are necessary to implement the monitoring system.

B. Structure of Monitoring System

NREP is the first major step in rural electrification in Syria. It has been agreed that a monitoring system be developed to gather extensive data during the implementation of the first stage of the program so that the experience gained can be used in the development of the implementation plans for the later stages of the program.

Based on this stated objective of the monitoring program, it is necessary to first identify the types of "experience" that are potentially useful. Operationally, the "experience" may be defined as the changes that took place after the implementation of the program. The most significant change that may be expected in the villages after electrification is

the change in the socioeconomic characteristics over time. Although major changes in socioeconomic characteristics are not normally expected until after a relatively long period of time, e.g., 10 to 15 years, it is important that the current conditions in the villages are adequately defined so that comparisons can be made to ascertain the socioeconomic impact of the Program. Since the existing data are not sufficient to develop a socioeconomic profile on a village-by-village or region-by-region basis, an extensive survey program was developed to collect socioeconomic data through sample household survey.

As noted previously, it was determined by the Government that PEE will provide electricity to all villages at users' rates which reflect social rather than financial considerations. Based on this premise, another important "experience" that may be gained in the first stage of the program is the magnitude of social benefit that has been realized as the result of electrification of the villages. It is, therefore, necessary to collect, assimilate, and analyze all available data which can be used to identify and estimate the social benefits of the program. If maximum benefits were not attained, additional analyses may be conducted to determine the factors that have affected the amount of benefit realized and to formulate policy decisions accordingly so that program benefits will be maximized in future stages of the program.

It should be noted that data analysis at any given point in time will only indicate the then current conditions in the program areas. To make comparisons over time, and to assess the impact of the program, it is necessary to make data collection and analysis activities a continual effort.

To achieve the objective outlined above, the monitoring system will have the following major components:

1. Data Collection System:
 - a. Data development through village socioeconomic survey
 - b. Compilation of PEE operating statistics
 - c. Collection of other socioeconomic data from published documents by government agencies and other organizations
2. Analysis of all relevant data.
3. Additional data collection and analysis at regular intervals in the future.

The first item above represents the data collection system of the monitoring system. Extensive effort has been made to conduct the villages survey in the regions included in the first stage of NREP. Detailed description of sampling methodology, survey design, and other major activities related to the survey are provided in the next chapter. Collection of data from PEE and other sources will be initiated in the future when village distribution systems are energized. To facilitate the effort to compile the necessary data, the major types of operating statistics and socioeconomic data that are potentially useful for program monitoring and evaluation purposes are detailed in Chapter IV.

Item 2 of the above list includes all necessary analysis to assimilate available information for evaluation and policy

decision-making purposes. The third item indicates the need to make a continual effort on data collection and analysis activities so that the performance of the program and the resultant progresses in the villages may be measured objectively over time. The recommended schedule for implementing the monitoring program and the key activities necessary for the implementation of the program are provided in Chapter V.

III. THE SOCIOECONOMIC HOUSEHOLD SURVEY

A. Statement of Purpose

The Socioeconomic Survey of the National Rural Electrification Program, Stage I, Syrian Arab Republic, is the first panel of two surveys of multipurpose design undertaken during the course of the NREP (1979-1989) to evaluate the rural electrification program. The study is exploratory and descriptive, designed to provide baseline information for future comparison and a data bank of quantifiable variables for monitoring the program of the project. Outputs of the study furnish essential data for the engineering design of Stage I of the program, intended to maximize its planning and execution. Outputs also focus on variables that may be used to assess household socioeconomic and demographic conditions and differences between regions, where ecological characteristics have created distinct human environments which may be differentially impacted by central service electricity and other development projects.

The survey was accomplished by means of household interviews with a structured questionnaire in a sampling of households in sample villages of the Project areas. The survey is an integral component in the work of establishing a monitoring

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system for NREP Stage I, because it is the means by which essential information that is not available from other sources has been collected.

Since the conduct and administration of a socioeconomic survey is a complex and time-consuming process, adequate justification for it needs to be given. It has been established through a search of extant sources that the essential information needed for the monitoring system is not available from secondary materials. Data collection through the panel surveys will yield information measuring cost demands, uses and economic and social benefits accruing from the use of electricity. The multipurpose objectives of the survey will permit evaluation of the impact and effects of rural electrification as a national program of equitable distribution of social benefits. Moreover, the collection of baseline information on rural conditions before electrification provides a unique opportunity for longitudinal monitoring of central service electricity throughout the duration of NREP.

There are few precedents, worldwide, for the scope of the study. Previous known studies of the impact of rural electrification, which have been carried out in various countries, were conducted on an ad hoc basis, usually after electrification. Collection of data before the installation of central service electricity permits the quantitative measurement of socioeconomic changes in the post-electrification stage. The longitudinal design of the survey in two panels of the same population provides a pace-setting model for long range study and analysis, and may serve to meet the goals, not only of PEE, but also of national planning agencies concerned with the study of developmental change.

1. Chapter Contents

- a. This chapter provides a detailed description of the work carried out on the household survey, the design and methodology of sampling, the staffing of the field survey team, field procedures, and constraints and limitations which have been met in the course of carrying out the work.

The collected data from the household interviews remain untabulated to date. The principal reasons for unaccomplished work on the survey are the lack of computer facilities for processing and secondly, limitations of time and personnel for the alternative arrangement of initial manual tabulation of the data. Therefore, this report offers no survey data analysis or tabulations.

The purpose of this descriptive account are twofold. One is to offer a record of work to date to provide continuity in the development of the monitoring system, and specifically in the next task of processing the data with a computer program. The program recommended is the Statistical Package for the Social Sciences (SPSS). The second is to offer the experience gained from the work so far for reference in planning the next steps and in overcoming some of the problematic aspects in the work. This may contribute to timelier and more efficient procedures in the execution of future survey work.

2. Review of Work

A full survey requires essentially eight steps in order. These are:

1. Defining the study objectives
2. Choosing the design of the study
3. Selecting the sample
4. Constructing the questionnaire
5. Interviewing the respondents
6. Coding the interviews
7. Tabulating and analyzing the results
8. Writing the study report

The work so far has covered the first six steps. Step six was carried out during the final preparation of the questionnaire form by precoding the responses, in order to save time after the field interviewing. Details of the precoding will be described in another section. Steps seven and eight remain to be carried out. Essential factors affecting the work schedule may be summed up at this point and discussed later in this chapter. The first was lack of timely provision of personnel to carry out the field work, and an insufficient number when they were provided. The second major factor was lack of computing facilities for processing the data. The combination of factors led to time constraints as well. The time allocated for the study has been expended as of the end of April, 1981. A summary of the Syrian schedule of the socioeconomic specialist follows. Details are available in sources outside this report and will not be dealt with.

a. Schedule of Gilbert Specialist in Syria

1. The first trip of the specialist for socioeconomic studies was from 10-12-79 to 20-12-79 at the inception of Project work. At this time the specialist requested a team of 25 survey personnel beginning in March and April, 1980 for implementation of the work. It was also recommended that PEE seek to secure the collaboration of an outside research/academic agency for staffing the survey team and for the appointment of a counterpart to the socioeconomic specialist.
2. The second trip was from 4-2-80 to 4-4-80. During this period efforts to involve an agency outside PEE for staffing the survey team proved unfruitful.
3. The third trip was from 17-4-80 to 23-5-80. Efforts of the PEE Action Committee for NREP Stage I to secure a counterpart to the specialist continued unabated.
4. The fourth trip, from 10-9-80 to 23-12-80, was originally scheduled to be the final trip, to be followed by subsequent work in the home office on the analysis of the processed data and the compilation of the final report. In actual terms the field survey was not begun until the proposed date for its completion had passed. Field work began on 23 November in the Governorate of Lattakia.

During the period of 27 September to 29 November, an assistant/interpreter was provided. After the last date his services were terminated. A counterpart to work with the specialist was never provided during the course of the work.

5. A fifth trip was necessary for completion of the field survey. The fifth and final trip began on 31-1-81 and was concluded on 7-5-81. The household interviews were completed on 2 April, 1981 in the Governorate of Homs.

Preparation of the questionnaire and the ancillary survey instruments - the two-page Village Profile Form and the one-page Rural Business Form - was carried out in the home office between Syrian trips. In January, 1980, at the inception of objectives and specifications development, a consultant, Dr. Hussain Shabka of Kent State University, was retained for ten days. The first version of the questionnaire was ready before the second trip in February, 1980.

6. The survey interviews

The household survey covered 40 villages in nine muhafazat (governorates). 921 sample households were selected; of these, 726 were completed interviews. The reasons for the number of 'no response' were other than the refusal of respondents. The actual refusal rate was minimal. The total was no more than

five for the entire survey. The number of 'no interviews' recorded was due to time and personnel constraints. The Interviewer Evaluation sheets attached to each questionnaire indicate excellent overall cooperation of respondents.

The completed interviews are being edited at present (latter part of April, 1981). The process of editing corrects unascertained replies due to interviewer errors with a Missing Value code.

The household interviews were administered from 22 November, 1980 to 18 December, 1980 and from 12 February, 1981, to 2 April, 1981. The same time periods subsumed the training of the interviewers and the collection of the primary and secondary stage sampling frames in eight governorates. Probability sampling was not used in the Governorate of Aleppo. Detailed procedures will be discussed in subsequent sections of the chapter.

B. Definition of Objectives and Study Design

1. Objectives

The general objectives of the study are covered in the scope of work and terms of reference. The objectives are to collect data in order to develop indicators that may be used to measure the socioeconomic, financial and technical performance of the program. The results of

the survey will create a data file to be used in the establishment of a monitoring system:

- to assess the socioeconomic impact of NREP in the post-electrification stage
- for the planning of the detailed engineering design of the system
- in order to develop policies for service extension in later phases

The objectives were broken down into specific objectives from which specifications of data were made. The specific objectives brought forth the need for data collection methods besides that of the household interview. General socioeconomic characteristics of the sample villages were best gathered by a short Village Profile Form and the energy requirements of rural industries and businesses were best collected by a Rural Business Form. Both involved a minimum investment of time and personnel.

2. Study design

The NREP socioeconomic survey is an ex post, panel design that permits the analysis of data from the same population over time. With the completion of the second panel, or cohort study, in the post-electrification phase, social and economic changes can be measured in the population of the study. The first survey stands also as a cross-sectional survey for descriptive purposes. Tabulation of the data will provide baseline profiles of the Project rural communities.

The population of the study comprises the households in the 1,200 villages to be electrified in Stage I of the NREP. The villages are situated in nine muhafazat, covering the area from the western coast to the eastern boundaries of Syria, north of the muhafazah of Damascus.

C. Sampling Design

1. Statement on sampling

The survey sample of households is a probability sample, with the exception of the sample from the Governorate of Aleppo, from the villages covered in Stage I of the National Rural Electrification Program. Therefore, it would be possible to make statistical inferences to the households of the 1,200 Project villages from the survey data after weighing each observation by the inverse of its probability of selection.

The sample was selected using a stratified two-stage design. The primary sampling units, or villages, were stratified into the appropriate number of strata in each governorate and were selected, with certain restraints due to the sample size specified by the Ministry of Electricity, with probability proportional to stratum size, where size is the number of villages in each stratum. The secondary stage sampling units were the households in the sample villages. The list of households in each sample village constituted the second stage sampling frame. The second stage sampling units, and elements, were selected by systematic sampling with a random start. The first stage sampling frames were the list of villages to be energized by the Project as those lists were finalized at the time of the survey.

The village sample, or primary sampling selection, in the governorate of Aleppo was by non-probability methods. A purposive or judgement sample was used.

2. Development of sampling methods

Choosing the design with the smallest error is the principal aim of sampling design. At the initial stage of work on the sampling design a multistage cluster sample was considered, based on the criteria of population size, production base, and location within the five climatic and rainfall zones of Syria (cf. Agricultural area and stability index, SAR, Statistical Abstract, Central Bureau of Statistics, 1978, pp 51 ff.). The assumptions taken were that lists for sampling frames and detailed maps would be immediately available to give consideration to the three strata within each Project muhafazah. Sampling could be completed before the field work. In addition, the scope of work specified that up to 20 percent of the 1200 villages would be sampled. The actual percentage was to be decided between Gilbert and PEE at the inception of the work. A stratified multistage cluster sample calls for a large sample and seemed appropriate. Village lists for NREP Stage I are given in the Sofrelec Report, but it became apparent that those lists would require revision before they could be used for sampling frames. Adequate maps were unavailable. Moreover, PEE decided that the village sample should comprise five villages per muhafazah, for a total of 45 villages. Considerations to sampling proportionately to size were not given. The village sample was to be 3.75 percent of the population of 1200 Project villages. A sample of this size excluded for practical reasons a stratified

multistage cluster design, because there were too many subsets for sampling. The design needed to be simpler. The Sofrelec Report listed very different sizes of village numbers for the muhafazat in Stage I of NREP. The list for the governorate of Hama included 301 villages. The list for the governorate of Dier ez Zor included 40 villages. A probability selection proportionate to size in each governorate seemed appropriate.

The Sofrelec Report listed a total of 1702 villages for NREP Stage I. The 45 village sample specified by PEE gave a sample of 2.6 percent. A proportionate sampling by muhafazah based on the list of Sofrelec would give 8 sample villages for Hama and 1 sample village for Deir ez Zor. A further specification made by PEE was that no more than five villages should be sampled in each muhafazah. This eliminated the possibility of village sampling proportionate to size. The design subsequently was constructed taking into account these constraints. Weighing for disproportionate samples would have to be considered.

Furthermore it became apparent that the village lists would have to be collected from the regional PEE offices in each muhafazah; no master list for all nine governorates was accessible by the date of the fieldwork.

3. Sampling procedures

The practical procedures for the first stage sampling was as follows:

- a. Securing the final list of Project villages in each muhafazah (sampling frame)
- b. Stratifying the villages by consultations with PEE regional officers into an appropriate number of strata on the variable of principal productive activity.
- c. Selecting sample villages in each stratum by rules of probability and as close to proportion to size as was possible within the maximum number of five villages per governorate.

The variable for stratification was the principal productive activity of the village. This was determined to a degree by ecological features and rainfall zones. The number of strata used for each governorate depended on its geographical position and ecological diversity which reflected rather well productive diversity. In some provinces the strata were defined by topography; in others, by administrative subdivisions (mantiqas and nahias). The variable of village production activities can be seen as coeval to the features which defined the strata in each case. The fit between topography, geographical position and production activities is a close one.

From each stratum a sample as close to the proportion of its population was drawn. In proportionate samples the sampling fraction in each stratum is made equal to the sampling fraction of the population as a whole. In most cases the sampling was disproportionate to size. A good example is the selection process in Lattakia governorate. Three strata were devised by topographical

features: High Mountain, Mid-Mountain, and Coastal villages. The proportion of high mountain villages, 34, was double that of coastal villages, 16; the number of mid-mountain villages was twice that of high mountain villages, 67. A non-weighted sample would have been one coastal village, two high mountain villages and four mid-mountain villages. Since the total sample would have been seven villages it was not feasible, according to the required terms. Therefore samples of one, one, three were selected; these need to be weighted for proportionality.

It should be noted that even though the samplings from the eight governorates (Aleppo is excepted) are disproportionate within each governorate, and between them, the total sample is a probability sample, in that each population element has a known nonzero probability of selection. This is to say different elements have different probabilities because of the sampling quota. Weighting procedures compensate for disproportionate sampling. All relevant information for weighting the samples is provided in the tables of samplings and stratification, on a muhafaza by muhafaza basis. There is considerable latitude to the degree of weighting precision required. The only guide is that the precision in weighting should be commensurate with the precision needed in the findings and in the range of error which is considered tolerable. The preferred method for purposes that require precise statistical inferences is a probability sample where all elements in the population have an equal chance of selection in that sample. This is often labeled an EPSEM sample - Equal Probability of Selection method. EPSEM requires probability proportionate to size sampling (PPS).

The second stage samplings of households were obtained by the following steps:

- a. The mukhtar of the sample village was asked to provide a total list of households in the village.
- b. The village list was numbered and up to 40% of the households were selected by systematic sampling with a random start.

Systematic sampling is appropriate for the second stage because "for computing the overall variance of the sample only the summary values of primary selections (PS) are used ordinarily; the computations do not depend on whether systematic or random choices are used in later stages" (L. Kish Survey Sampling, 1965: 117). In systematic sampling every K^{th} element in the total list is chosen for inclusion in the sample, where $K = \frac{N = \text{population}}{n = \text{sample}}$ and the first element is selected at random by selecting a random number between 1 and K . Systematic sampling has the advantage of avoiding the problem of periodicity, no matter what order was used to list the households. In practice, the mukhtar was asked to name the households by location, beginning with one side of the village and ending at the other side. This facilitated the distribution of interviews to the interviewers and decreased the time in locating the next household to be interviewed.

4. Non-probability sampling

In the governorate of Aleppo the sampling of villages was based on non-probability methods - a judgment or purposive sample of villages was offered by the regional

director. Judgmental sampling may be appropriate in surveys when precise representativeness is not necessary but it limits, in fact, prohibits making statistical inferences to the population of the study. The second stage sampling in Aleppo was carried out by interviewing every third household in the sample villages; no adequate sampling frames were devised. The procedures were followed independently of the explicit instructions of the Gilbert consultant, and without his knowledge, while he was supervising another interviewing team in another governorate. There is nothing to add on this except to offer a quote from a sampling statistician, who wrote some time ago:

"The sample design is no better than the weakest link in the entire procedure. Each sample design is an adaptation of sampling theory to the resources at hand. The resources include the distribution of the population, the facilities for communication, the nature and training of the field force, and the researchers engaged in the task. They also include the receptivity of the administration as well as of the users of research - their receptivity to, and understanding of, the methodological tools." (L. Kish, 1953: 216).

TABLE III-1: PRIMARY STAGE SAMPLING SELECTION

<u>Province</u>	<u>Primary Stage Selection, Sampling Frame: Project Village List (No.)</u>	<u>Strata (No.)</u>	<u>No. of Sample Villages</u>
Lattakia	117	3	5
Tartous	120	3	4
Deir ez-Zor	118	3	3
Hassakeh	246	4	5
Idleb	216	3	4
Raqqa	210	3	4
Hama	109	4	5
Homs	136	3	5
Aleppo	Not given (Purposive/ judgment sampling)	-	5

TABLE III-2: STRATIFICATION

<u>Province</u>	<u>Stratum (by Location/Productive Base)</u>	<u>No. of Villages in Stratum</u>	<u>No. of Sample Village(s) from Stratum</u>
Lattakia	1. Coastal region	16	1
	2. Mid-mountain region	67	3
	3. High mountain region	34	1
Tartous	1. Coastal region	17	1
	2. Mid-mountain region	40	1
	3. High mountain region	62	2
Deir ez-Zor	1. Nahia Kasrah	30	1
	2. Nahia Souwar	43	1
	3. Nahia Hajim	45	1
Hassakeh	1. Mantiqa Hassakeh	84	2
	2. Mantiqa Qamishly	93	1
	3. Mantiqa Ras al Ain	30	1
	4. Mantiqa Malikiah	39	1
Idleb	1. Wheat farming region	58	1
	2. Orchards region	68	1
	3. Mixed farming/pastoralism	90	2
Raqqa	1. Center and east of Raqqa	66	1
	2. Mantiqa Tell Abiad	47	1
	3. Nawahi of Mansoura, Thawra, and Journieh	97	2

TABLE III-2: STRATIFICATION
(Page 2)

<u>Province</u>	<u>Stratum (by Location/Productive Base)</u>	<u>No. of Villages in Stratum</u>	<u>No. of Sample Village(s) from Stratum</u>
Hama	1. Nawahi of Hamra, Aqribat, and Assaan	48	2
	2. Nawahi of Souran, Harnifa and external section	16	1
	3. Nawahi of Markaz and Wadi al Aioun	14	1
	4. Nawahi of Ziara and Shattha	31	1
Homs	1. S.E. of Homs and Mantiqa Quseir	18	2
	2. N.W. of Homs, Mantiqa Tell Kalakh	84	2
	3. N.E. of Homs, Mantiqa Muharram al Fouqani	34	1
Aleppo	Judgment, non-probability sampling used; not given whether stratification was applied.	?	?

TABLE III-3: SECONDARY STAGE SAMPLING SELECTION

<u>Province</u>	<u>No. of Stratum and no. of Sample Village</u>	<u>Name of Sample Village</u>	<u>Secondary Stage Sampling Frame: Village Household List (No.)</u>	<u>% for Sampl.</u>	<u>No. of Sample Households</u>
Lattakia	1.-1.	Zigrinn	86	40	34
	2.-1.	Meisia	45	40	18
	2.-2.	Shunbutin	70	40	28
	2.-3.	Al Fteh	52	40	21
	3.-1.	Talaziq	66	37	24
Tartous	1.-1.	Al Hasneh	107	40	42
	2.-1.	Al Tun al Markab	111	19	21
	3.-1.	Arqoub Qmsou	65	40	26
	3.-2.	Beit Youssf	63	40	25
Deir ez-Zor	1.-1.	Hawaij Jazirah	38	40	15
	2.-1.	Al Jasim	120	5	6
	3.-1.	Abou al Hasan	100	12	12
Hassakeh	1.-1.	Filiti	79	20	15
	1.-2.	Tell Rman Fouqani	66	25	16
	2.-1.	Bayazah Kabirah	41	38	15
	3.-1.	Oum al Asafir	64	27	17
	4.-1.	Tell al Asfar	21	68	14

TABLE III-3: SECONDARY STAGE SAMPLING SELECTION
(Page 2)

<u>Province</u>	<u>No. of Stratum and no. of Sample Village</u>	<u>Name of Sample Village</u>	<u>Secondary Stage Sampling Frame: Village Household List (No.)</u>	<u>% for Sampl.</u>	<u>No. of Sample Households</u>
Idleb	1.-1.	Kitian	76	40	30
	2.-1.	Bdita	95	40	38
	3.-1.	Khouein al Kabir	?*	?	30
	3.-2.	Shaikh Baraka	77	16	12
Raqqa	1.-1.	Al Ajeil	16	40	7
	2.-1.	Al Aseilim	29	40	12
	3.-1.	HadaJ	30	40	12
	3.-2.	Mujeibna al Muftaha	8	62	5
Hama	1.-1.	Jadw Aiat	98	30	29
	1.-2.	Rahjan	74	30	22
	2.-1.	Belahsin	63	25	16
	3.-1.	Zamlieh	100	25	25
	4.-1.	Qladeen	60	40	24
Homs	1.-1.	Arjoun	140	12	17
	1.-2.	Naamieh	61	20	12
	2.-1.	Hashmeh	61	40	24
	2.-2.	Beit Qirin	65	40	26
	3.-1.	Mantar al Abal	45	35	16

*List lost

TABLE III-3: SECONDARY STAGE SELECTION
(Page 3)

<u>Province</u>	<u>No. of Stratum and no. of Sample Village</u>	<u>Name of Sample Village</u>	<u>Secondary Stage Sampling Frame: Village Household List (No.)</u>	<u>% for Sampl.</u>	<u>No. of Sample House- holds</u>
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Aleppo

Second stage selection in the Governorate of Aleppo* was carried out by quota sampling, or some variation thereof; household lists were not obtained to determine the percentage of the quota. *The work was not supervised by the Gilbert specialist.

D. Construction of Questionnaire

1. Data specifications, Initial list

Preparation of the questionnaire took place in the home office with planning of the data specifications that would meet the objectives of the monitoring system. The first stage questionnaire development considered the following specifications:

- a. Annual household consumption budget, including food, clothing, home maintenance, health, education, ceremonies and energy.
- b. Types and monthly costs of fuels (a) for lighting (b) for cooking.
- c. Ownership of movable assets (e.g., radio, bicycle, sewing machine, and other specific items).
- d. Composition of household and socioeconomic characteristics of members.
- e. Non-resident family members of household (migration module).
- f. Ownership of dwelling.
- g. Level of living module (household function performance scale).
- h. Economically active individuals with demographic details.

- i. Land holdings and/or livestock and animal holdings.
- j. Forms of land tenure.
- k. Principal crops.
- l. Mechanization of farming (least, partially, most).
- m. Irrigation techniques.
- n. Changes in crops.
- o. Consumer intentions concerning electricity.
- p. Income from salaries and wages, agricultural production, livestock/poultry production, trade or business, and total household income.
- q. Cost of operations and other expenses.

The comprehensiveness of the list precluded total incorporation. Deliberation in the planning stage eliminated altogether questions on income or related to income. This included questions on land and animal holdings, operation expenses and others. While income data are of intrinsic interest to the objectives of the study, experience indicates that the results would be less than satisfactory. Responses would in most cases only palely reflect reality. Any questions that create wariness towards the survey on the part of respondents cancel their utility.

A trial income module would have been tested in the pretest or pilot study on an "every-other" basis before

the full survey, had the original schedule been followed. No pretesting was carried out because of delays in the schedule and the staffing of the interview team. This precluded any testing of the income module. The module was prepared and translated but not field tested.

A module on non-resident family members was also prepared for variables on migration. United Nations guidelines (Handbook of Household Surveys, Studies in Methods, Series F, No. 10, United Nations, New York, 1964) recommend inclusion of migration questions in all household surveys. The need to keep the outputs project-specific and to keep the interview to an optimal length eliminated this module.

Certain variables are often found in surveys related to rural electrification programs. These include questions on "Satisfaction with life," housing quality as a measure of income and economic status, ethnic origin, fertility. They were not considered for inclusion because their utility seemed questionable. They are mentioned here for the sake of completeness.

2. Data specifications, final list

After the survey objectives were identified the socioeconomic indicators were operationally defined. Dummy tables were constructed and output requirements were listed. Then appropriate questions were constructed. The final list of the specifications which were operationalized into questions is as follows:

- a. Household roster
- b. Housing profile

- c. Level of living scale
- d. Household fuel and power use
- e. Expenditures on fuels for lighting and cooking
- f. Expenditures on lamps
- g. Ownership of movable assets
- h. Weekly food budget
- i. Monthly and annual 'non-food' expenditures
- j. Consumer intentions concerning electricity

3. Other data collection instruments

The specifications required collection of data from village businesses and small industries. For this purpose a one-page Rural Business and Industries Form was constructed for use within the sample villages. In addition, a two-page Village Profile Form was devised for summary information on the socioeconomic profile of the sample villages.

4. Development of the questionnaire

The construction of the questionnaire required consideration of several factors aside from the choice of variables. These included the length of the interview, the organization of the questionnaire to facilitate analysis, incorporation of adequate identification, incorporation of checks for internal consistency and for consistency with outside data sources, the options of recording actual values or of constructing value classes, the choice of units of measurement and the provision of 'other' or 'no response' categories different to 'zero'.

The planning for computation called for selection of an appropriate program and organization of the document to

facilitate transfer of data to machine readable form. A sampling statistician's counsel would have aided in specifying the precision needed for the estimates, so that the sampling selection would not be larger than needed for obtaining estimates of adequate precisions for the purposes to which the survey results are intended.

a. Length of interview

The longest optimal period of time for an interview is an hour. The questionnaire was designed to be completed within an hour without hurrying. The actual time used for each interview is recorded by the interviewer on the control page. The information may be manually tabulated for future reference.

b. Questionnaire organization

Questions are grouped into modules for easy retrieval and for construction of the second panel survey in the post-electrification phase of the study, when the same modules will yield comparisons and measurements of change.

c. Incorporation of adequate identification

The control page identifies each interview; details are given in the Codebook (NREPSYRI).

d. Incorporation of checks for consistency

Checks for internal consistency have been built into the Household Roster module. The editing of

the questionnaires has brought out the utility of some redundancy as a check for internal consistency.

Checks have proved useful in correcting interviewer errors or omissions. No controls were devised for consistency with external data sources.

Verification of consistency with outside sources follows analysis.

e. Actual values and summary categories

The options of recording actual values and precoding specific responses into value class intervals are both adapted in the questionnaire. Expenditures are expressed in actual values in Syrian Pounds. Demographic and sociological data are precoded into summary categories. Some data are given in more detail than may be needed for analysis. Code combinations are easily achieved during analysis. Summary categories cannot be reconstructed for retrieval of essential details.

f. Tests for reliability and validity of data

No tests for reliability or validity of the survey instrument were conducted because of time and personnel constraints. All work time, when it became available, was given to the full survey. The fact that the personnel were made available at a late date (November, 1980) and on a limited time basis for each governorate led to the exclusion of any testing.

g. Pretesting the survey instrument

No pretest was carried out. The late start of the field work precluded the use of any time for pretesting. The lack of a counterpart throughout the course of the study and the absence of a full-time field team for the various tasks of the survey curtailed many preliminary activities. Even correction of the questionnaire, once some typographical and translation errors became evident, remained impracticable because of lack of personnel.

h. Translation of the survey instruments

The questionnaire was translated into Arabic by two translators and selections were made from the two versions. During the survey several mistranslations were discovered and correction was made by pointing out to the interviewers the intended meaning. The Village Profile Form and the Rural Business Form were translated in one version only.

E. The Modules of the Questionnaire

The modules of the questionnaire group the questions, for which the responses are the variables which indicate socioeconomic rural conditions, demographic characteristics and consumer intentions.

The household is the unit of analysis in the survey. It is also the unit of second stage sampling and the unit of observation. The head of household or his surrogate is, however, the principal observational unit for the household.

The household is defined, in the usage of census/surveys, as a group of two or more persons who combine to occupy the whole or part of a housing unit and to provide themselves with food and other essentials for living. The group may pool their incomes and have a common budget to a greater or lesser extent. The group may be composed of related persons only or of unrelated persons or a combination of both. The general criteria are common housekeeping arrangements, sharing the principal meals in the sense that the household food supply is obtained for common consumption or paid out of a common budget, and having communal arrangements for supplying basic living needs. Technically, this is known as a multi-person household (Handbook of Household Surveys, U.N. 1964, p. 10). A one-person is defined as a person who lives alone in the whole or part of a separate housing unit or who, as a lodger, occupies a separate room or rooms in a part of a housing unit but does not join with any of the other occupants of the housing unit to form a part of a multi-person household.

In training sessions emphasis was placed on dealing with the household as the unit of analysis, rather than the family. This was necessary for clarity. The survey/census definition of family is different from the common understanding of family and indeed different from the anthropological technical definition of family. The family, in survey/census terms, is a group of two or more persons, mutually related (by blood, marriage or adoption) who live together and share the same housing unit. Under this definition, a family may be either co-extensive with a private household or it may constitute only a part of a household. (Handbook of Population Census Methods, United Nations, No. 58, XVII, 6, Vol. III, P.76). The common understanding and the anthropological definition of family

transcend the limits of "household" and "household unit". The family, in the last two senses, are relatives of various degrees of kinship, irrespective of place of residence. Thus, it is difficult to study "the family" by the household survey technique. Members of a biological family need not, nor do they usually, live all together in one household, or even in the same geographical area. The "household" is preferable as the unit of analysis in a survey, even though it is in almost all cases the same as the "part" of the family that lives together. With few exceptions the unit may be termed "the family household".

The modules below are discussed in the order they appear in the questionnaire.

Household Roster

The household roster has 12 questions for nine variables on household demographic and sociological characteristics. The minimum period for co-residence is given as the past 12 months. The variables are: 1. relationship to head of household, 2. sex, 3. age, 4. marital status: ever married, 5. presently married, 6. educational attainment, 7. economically active or not, 8. kind of work (full-time), 9. kind of work (part time).

Housing Profile

There are three questions for three variables; ownership of house improvements in the last 12 months and a contingency question for amount of cost in Syrian Pounds for house improvement.

Level of Living

The level of living module is composed of 12 questions which inquire on the performance and means by which everyday household tasks are fulfilled. Five classes are given for each variable in a series which is graded in terms of the ease with which the task is performed. Level of living is measured not in terms of possessions but in terms of efficiency and ease with which daily tasks are carried out. The approach is based on John A. Belcher's work ("A Cross-Cultural Household Level of Living Scale," Rural Sociology, vol. 37, No. 2, 1972, pp 208-220), but has been modified extensively in a direction believed to yield a scale that is freer from culture-bound biases. The module has not been pretested in the field and it is likely that functional equivalents in different grades for any question may be found. This should be a task in the preparation of the second survey. The variables are meant to provide an aggregate score. Comparisons can be made between regions in a cross-sectional frame. But more significantly, with the second survey, changes can be measured by comparisons of the same households in two points in time.

Household Fuel or Power Use

This question examines six variables describing the fuel or power used for lighting, cooking, radio, ironing, water pumping and power-driven tools.

Weekly Expenditures for Fuels

The amounts expended in a week for cooking fuels and lighting fuels are recorded in exact value in Syrian Pounds.

Lighting Fixture Expenses

Three questions ask for annual expenses for lamps. This and the preceding module were devised for analysis by the economist on the study team.

Movable Assets

Three questions examine possession, use, and date of acquisition of ten selected consumer goods, as indicators of income levels. Although one of the measuring criteria of the socioeconomic profile of villages is the level of income of each household, it is generally agreed by specialists that due to the diversity of income sources and in the absence of adequate record-keeping practices, and also due to suspicion of question purposes, accurate reporting of household income by survey respondents is extremely difficult. Therefore, the measurement of the economic conditions of rural household is carried out by examination of consumption expenditures, in proxy of household income. A fourth question allows for the inclusion of additional goods which are not on the given list of ten items. The responses are not coded for processing, but may be manually tabulated.

Weekly Household Food Budget

The household weekly food budget module includes the value of foods produced by the household or received in kind and therefore not paid for in cash. The consumption reporting period comprises what is normally considered an "eating cycle", the period of one week. The variables of cash expenditures for food, and the sum value of produced or received-in-kind consumed foods, as well as the total of the two sums are given in exact values in Syrian Pounds. Value

class intervals can be constructed after tabulations are completed. The original intention was to construct value class intervals after pretesting the survey questionnaire.

Monthly and Annual Nonfood Expenditures

Two questions seek monthly and annual expenditures by item categories. The sum of categories in each time period is given in exact value. Retrieval of separate categories may be carried out, if needed for analysis. The reporting period of 12 months may be too extended to reflect accurate responses. For other purposes, namely, expenses for ceremonies such as weddings, the 12-month reporting period may be too short. The annual expenditure budget is not totally satisfactory in its present format. Pretesting, had it been feasible, would have permitted refinements.

Consumer Intentions

Three open-ended questions probe for intentions and perceptions of electricity. The first two questions are precoded. The third question which asks for ideas on income producing uses of electricity requires coding for processing.

1. Evaluation Page

The last, eleventh, page of the questionnaire is intended for the interviewer's evaluation of the interview. The interviewer marks the form to indicate the cooperation of the respondent and to assess the reliability of the respondent's answers. He also notes the presence of persons other than household members during the interview. A fourth section calls for the interviewer to give his own comments on any part of the

questionnaire in order to provide input to the refinement or improvement of format or content of the survey instrument in future work.

2. Village Profile Form

The Village Profile Form collects socioeconomic characteristics of the sample villages by a fifteen minute interview with the responsible village authority, namely, the mukhtar. The information includes population size, range of annual incomes, average household income, public buildings and public services, details of annual agricultural production and other general characteristics which together provide a socioeconomic profile of the villages from which households were sampled.

3. Rural Business Form

The form for rural industries and commercial establishments singles out sources of motive power and average monthly fuel costs for analysis. The form is one page and asks for type of business or industry, years in operation, seasons and hours of operation, numbers of employees, sources of power and lighting, average monthly cost of fuel and energy for operation of business and expansion plans with the provision of central service electricity.

The number of completed forms is minimal. Almost all sample villages had no commercial establishments or industries. It is possible that some may have been missed.

F. Field Operations and Procedures

1. Training of Personnel

Appointed personnel of PEE were intended to have been involved in all the stages of development of socioeconomic indicators, the data collection and the tabulation of survey results. A counterpart to the Gilbert specialist was to collaborate in full partnership in the planning and execution of all the steps of the survey so that he would have acquired the experience from work in the first survey to contribute to the organization and execution of subsequent work. The Gilbert specialist requested in December, 1979 a survey staff of 25 members for the tasks of interviewing, field supervising, editing, etc. This core team, along with the PEE counterpart to the specialist, were to be involved in all the tasks of the survey so that they would have, by the completion of the survey, acquired the necessary skills to continue the monitoring program in Stages II and III of the NREP with little external assistance.

After serious and continuing efforts on the part of PEE to find appropriate and available personnel for the survey work, it was decided to use PEE personnel from each muhafazah for the work in that muhafazah. This meant that in each governorate a new team had to be trained for the survey. There was no single permanent team throughout the survey. Moreover, each regional office provided a staff of different size and competence, so that the pace and quality of the field survey varied.

The initial proposal called for a two-week training period in Damascus for all members of the survey team, so that total familiarity with procedures and the content of the questionnaire preceded field work. Investment of time in proper training actually speeds the process of interviewing and cuts overall time expenditures with improved efficiency of effort. The provision of limited-time-basis personnel did solve the problem of staffing, but the arrangement limited the training period. Each new team was trained as it was recruited. Moreover each new team was made available according to the discretion of the regional director, not necessarily according to the requirements of the work. Midpoint in the survey a team of seven interviewers were added from the Damascus PEE. The Damascus team subsequently became the core team for the survey in the remaining provinces.

2. Schedule in the Provinces

LATTAKIA - Work began on 23 November 1980 with four interviewers who received two days of training. Interviews commenced on 26 November and were completed on 6 December. A request was made to the director for continuing work with the four Lattakia interviewers in the next province. Request was denied on 9 December.

TARTOUS - Work began on 11 December with GAI interviewers. Receptivity of directorate toward the work was minimal. A third interviewer was added for one day. Then he was removed from the survey. Survey continued until December, and resumed 12 February until 17 February.

Three new interviewers were assigned for the last five days.

DIER EZ ZOR - Work began on 23 February with six interviewers. The planned number of interviews in Dier ez Zor was cut short because some interviewers were unsuitable for the task. They are not to be personally faulted for their efforts. On 25 February, three interviewer trainees arrived from Damascus. After a two and one half hour training session they proceeded to Aleppo for carrying out survey interviews simultaneously with the survey in Deir ez Zor. Four additional interviewers joined them in Aleppo from Damascus. They received no first-hand training. Deir ez Zor interviews were cut short because of the quality of interviewing and terminated on 27 February.

HASSAKEH - The Qamishly PEE provided 12 interviewers who received training on 1 March. Gilbert furnished three vehicles for transportation of the survey team. The survey work was conducted most efficiently in Hassakeh even though the distances to the villages were long. Interviews completed on 5 March.

IDLEB - Five interviewers were trained on 16 March. The seven Damascus interviewers also worked in Idlib and the survey was completed on 19 March.

RAQQA - The Damascus team conducted the interviews from 21 March to 23 March.

HAMA - The Damascus team conducted the interviews from 26 March to 29 March.

HOMS - The Damascus team conducted the interviews from 30 March to 2 April.

ALEPPO - The Damascus team conducted the interviews from 1 March to 9 March, without the supervision of the Gilbert specialist. The village sample was selected with non-probability methods. The households were sampled on a every-third basis. No sampling frames were used for first-stage and second-stage sampling.

a. Transportation

The Damascus interviewer team traveled with three PEE vehicles and drivers. All other teams were provided with transportation by the Gilbert specialist. In the governorates of Deir ez Zor and Hassakeh Gilbert made available two additional vehicles.

b. Work hours

Throughout the survey the specialist sought to establish with the various PEE regional offices the hours of the work day for the local staff. A survey requires flexibility in hours and often long travels to and from the villages. In many cases the interviewers worked hours longer than their scheduled work day. Some teams worked on their day off. Their personal efforts were, overall, commendable and many worked tirelessly and with enthusiasm. The question of compensation for overtime work was never satisfactorily established in any area and it is not known whether the interviewers received recognition for the long days of work they often provided.

3. Interview Procedure

The interviewers received on arrival to a village numbered questionnaires, each form identified with the name of the head of household who was to be interviewed. If the interview was not secured with the initial visit, the procedure called for three call backs. In practice the time factor did not allow for several revisits. If the household could not be contacted on the same day, the interview was given up for loss. In many cases interviews were declared 'no interviews' because the time schedule did not allow for a second trip to the same village. The late starting date of the field interviewing required careful budgeting of the time available, so that the entire Project area could be covered for baseline data collection.

In some cases the percentage of households in the sample was less than 40 percent. This was an accommodation to time limitations rather than an effort towards proportionate sampling. The problem of time was acute because the number of interviewers who would be available was not known in advance to allow planning of the work day. This problem cropped up early in the fieldwork, in Tartous, where, of the three assigned interviewers, one or more would be withdrawn by the director for the day without prior notice.

4. Editing of the Completed Questionnaires

The editing of the completed questionnaires began in Damascus on 15 April and continues to date. Five PEE personnel have been assigned to the task under the supervision of the Gilbert specialist. The editors

check the forms for completeness, correct interviewer errors that are apparent because of internal inconsistencies, indicate missing values, compute totals, and prepare the forms for the next task of card punching.

G. The Codebook

The National Rural Electrification Program, Stage I, Village Household Survey data file contains survey responses from 921 households, of which 195 are 'no interviews'. Each household is a single data case. There are 80 variables measuring the households' socioeconomic and demographic characteristics and perceptions on electricity.

The file name created for these data is NREP1SYR. The file name is an SPSS-type name referring to the system file. The file label is National Rural Electrification Village Survey Stage I Syria 1981.

The codebook which follows is divided into three vertical sections. The leftmost section contains the column numbers in which each variable is to be punched on the data cards. The second section reports an SPSS-type variable name. The right hand section contains the detailed description of each variable, including an explanation of the coded values. For missing data the codebook includes the symbol MV (missing value) for those cases where no value is recorded. MV does not appear in any codes of the questionnaire. The edited questionnaires are marked MV in the applicable columns.

NREP1SYR CODEBOOK

<u>Column(s)</u>	<u>Variable Name</u>	<u>Variable Description and Codes</u>
1-4	COMMID	<p>Identification number of the governorate and village * in which the respondent lives.</p> <p>0001-0125 = LATTAKIA 0126-0239 = TARTOUS 0240-0271 = DEIR EZ ZOR 0272-0348 = AL HASSAKEH 0349-0458 = IDLEB 0459-0494 = RAQQA 0495-0610 = HAMA 0611-0705 = HOMS 0706-0921 = ALEPPO</p> <p>*VILLAGE IDENTIFICATION NUMBERS FOLLOW AT THE END OF THE CODEBOOK.</p>
5	CARDNO	Card Number
6	INTERNO	<p><u>Number of calls made for interview</u></p> <p>1 Original 2 First Call Back 3 Second Call Back 4 Third Call Back 5 Refusal/turned Hostile 6 Out for duration of survey 7 Transferred to non-sample area 8 Other reasons (specify _____)</p>
7-8	HOUSIZE	Size of Household (Exact Value)
9	CHILD	Children (under 15) in household (Exact Value)
10	ADULT	Adults (15 and over) in household (Exact Value)

NREP1SYR CODEBOOK

<u>Column(s)</u>	<u>Variable Name</u>	<u>Variable Description and Codes</u>
11	FAMREL	Relationship of person to head of household (Q2) 1 Head of Household 2 Husband 3 Wife 4 Son 5 Daughter 6 Other 0 Not ascertained (MV)
12	SEX	Sex (Q3) of household member 1 Male 2 Female 0 Not ascertained (MV)
13	AGE	Persons' age as of his/her last birthday (Q4) 1 Less than 1 year 2 1 to 4 years old 3 5 to 9 4 10 to 14 5 15 to 19 6 20 to 24 7 25 to 29 8 30 to 39 9 40 to 49 10 50 to 59 11 60 to 69 12 70 or more 0 MV
14	EDUC	Educational Attainment (95) (for persons 5 years old and over) Has the person ever been in school. Is the person presently in school. If no, what is the highest grade or year of school the person has completed.

NREP1SYR CODEBOOK

<u>Column(s)</u>	<u>Variable Name</u>	<u>Variable Description and Codes</u>
		0 No schooling 1 1 to 4 years 2 5 to 6 years 3 7 to 9 years 4 7 to 9 years of vocational school 5 10 to 12 years 6 10 to 12 years of vocational school 7 University training 8 Presently in school
15	MARIT	Marital Status (Q.6a) Was the person ever married (For adults: M, 18; F, 15) 0 No 1 Yes
16	PRESMARI	If Q6 is yes then Is the person now married (Q.6b) 1 Married 2 Widowed 3 Divorced 4 Not given
17	ECONACT	Employment. What did the person do most of the time during the past 12 months (Q.7) 1 Work that contributed to household income 2 Unemployed, looking for work, but unable to find 3 Doing housework and/or taking care of children 4 Retired; ill 5 In school 0 Not ascertained (MV)

NREP1SYR CODEBOOK

<u>Column(s)</u>	<u>Variable Name</u>	<u>Variable Description and Codes</u>
18	JOBTYPER	Type of work. Did the person work full-time (Q.8) or part-time (Q.9). What kind of work. 1 Farmer (Own farm) 2 Animal husbandman 3 Farm worker 4 Animal herdsman 5 Employer in business 6 Employee in government 7 Employee in industry 8 Employee in business 9 Craftsman or professional 10 Apprentice 0 Not ascertained (MV)
19	PARTIME	Part time work (Q.9) Same code as Col. 18
20	HOUSOWN	Ownerships of house (Q.10) 1 Own house and lot 2 Own house only 3 Own lot only 4 Rent 5 House furnished by government (co-op) 6 House furnished by employer (non-government) 7 Other (specify _____)
21	HOUSIMPR	Housing improvements in the last 12 months (Q.11) 1 Yes 2 No (Skip to Q.13)
22	COSTIMPR	Cost of improvements (Q.12) 1 1000 Syrian Pounds or more 2 500 S.P. 3 Less 4 Don't know 5 Not available

NREP1SYR CODEBOOK

<u>Column(s)</u>	<u>Variable Name</u>	<u>Variable Description and Codes</u>
23	LEVLIV1	<p>Level of Living</p> <p>Drinking water supply (Q.13)</p> <p>1 Water piped into dwelling from central service</p> <p>2 Water available in yard for family's exclusive use</p> <p>3 Water available in a common court for a group of housing units</p> <p>4 Municipal source of water accessible to all</p> <p>5 Other sources outside the village</p>
24	LEVLIV2	<p>Level of living</p> <p>Water other than drinking (Q.14)</p> <p>1 Water piped in home from central service</p> <p>2 Water available in yard for family's exclusive use</p> <p>3 Water available in a common court for a group of housing units</p> <p>4 Municipal source available to all</p> <p>5 Other source outside the village</p>
25	LEVLIV3	<p>Level of Living</p> <p>House lighting (Q.15)</p> <p>1 Electric Bulb(s)</p> <p>2 Lamps (butagaz etc.)</p> <p>3 Kerosene lamps</p> <p>4 Candles</p> <p>5 Oil and wick</p>
26	LEVLIV4	<p>Level of Living</p> <p>Rooms in home (Q.16)</p> <p>1 Separate spaces/rooms for living, sleeping, cooking, bathing, toilet, storage and livestock</p>

NREP1SYR CODEBOOK

<u>Column(s)</u>	<u>Variable Name</u>	<u>Variable Description and Codes</u>
		2 At least two living spaces, storage space and livestock space 3 Living space, storage space, livestock space 4 Living space and storage space 5 One all-purpose space
27	LEVLIV5	Level of Living Rooms per person (Q.17) 1 One or more per household member 2 Two persons per room 3 Three persons per room 4 Four persons per room 5 More than four persons per room
28	LEVLIV6	Level of Living Disposal of human wastes (Q.18) 1 Flush toilet (water closet) in home 2 Latrine (Modern pit toilet in home) 3 Latrine shared with others 4 Public Latrine 5 Other (specify _____) 6 No facilities
29	LEVLIV7	Level of Living Cooking facilities (Q.19) 1 Automatic range (Electric or gas) 2 Bottled gas stove 3 Kerosene stove 4 Charcoal stove 5 Open fire
30	LEVLIV8	Level of Living Cleaning floors of home (Q.20) 1 Hired help 2 Electric appliances

NREP1SYR CODEBOOK

<u>Column(s)</u>	<u>Variable Name</u>	<u>Variable Description and Codes</u>
31	LEVLIV9	3 Task-specific utensils 4 Broom with handle 4 Broom without handle Level of Living Washing dishes (Q.21) 1 In sink with drain and hot water 2 In sink with drain; no hot water 3 Dishpan; no sink 4 Multipurpose pan 5 Outside the house
32	LEVLIV10	Level of Living Laundry facilities (Q.22) 1 Laundry appliance(s) with hot water 2 Permanent laundry fixture with drain 3 Portable tub and laundry board 4 Multipurpose pan 5 No facilities in house
33	LEVLIV11	Level of Living Family bathing (Q.23) 1 Enclosed facility with hot water in house 2 Public community bath 3 Bathing tub; unenclosed 4 Multipurpose pan 5 Outside house
34	LEVLIV12	Level of Living Transportation to markets (Q.24) 1 In own vehicle 2 Lease or use car or truck 3 Public transportation (taxi or bus) 4 Animal transport 5 On foot

NREP1SYR CODEBOOK

<u>Column(s)</u>	<u>Variable Name</u>	<u>Variable Description and Codes</u>
35	LIGHT	Fuel/Power for lighting (Q.25) 1 To be determined; description entered 2 To be determined; description entered 3 To be determined; description entered 4 To be determined; description entered 5 To be determined; description entered 6 To be d termined; description entered
36	COOKING	Fuel/power for cooking (Q.25) (1-6) To be determined; description entered
37	RADIO	Power for radio (Q.25) (1-4) To be determined; description entered
38	IRON	Fuel/power for ironing (Q.25) (1-4) To be determined; description entered
39	WATPUMP	Fuel/power for water pumping (Q.25) (1-4) Description entered
40	TOOLS	Power driven tools (Q.25) (1-4) To be determined; description entered
41-42	COOKOST1	Last week's expenses (cost) for cooking fuel(s) (Q.26) First kind (Description entered) Exact value in S.P. 0 Not ascertained (MV)
43-44	COOKOST2	Second Kind (Q.26) Description entered Exact value 0 Not ascertained (MV)

NREP1SYR CODEBOOK

<u>Column(s)</u>	<u>Variable Name</u>	<u>Variable Description and Codes</u>
45-46-47	COOKOST3	Total cost of cooking fuel(s) (Q.26) Exact value 0 Not ascertained (MV)
48-49	LITECO1	Last week's expenses for lighting fuel(s) (Q.27) First kind (Description entered) Exact value 0 Not ascertained (MV)
50-51	LITECO2	Second kind (Q.27) (Description entered) Exact value 0 Not ascertained (MV)
52-53-54	LITECO3	Total cost of lighting fuel(s) (Q.27) Exact value 0 Not ascertained (MV)
55	LAMPOWN	Number of lighting lamps owned and used (Q.28) (Exact Value) 1 2 3 4 5 6 7 8 9 10 11 12 0 Not ascertained (MV)
56	LAMPBUY	Number of lamps bought in the last 12 months (Q.29) Exact value Codes 1-12
57-58-59	LAMPCOST	Cost of lamps in past 12 months (Q.30) exact value in S.P.
60	ITEMOWN1	Own radio/cassette deck (Q.31) 1 Own 2 None

NREP1SYR CODEBOOK

<u>Column(s)</u>	<u>Variable Name</u>	<u>Variable Description and Codes</u>
51	ITEMUSE1	If own, do you use radio/cassette deck (Q.32) 1 Use 2 Not
62	ITEMBUY1	If own, when did you acquire radio/cassette deck (Q.33) 1 In the last 12 months 2 In the last 24 months 3 Earlier
63	ITEMOWN2	Own bicycle (Q.31) 1 Own 2 None
64	ITEMUSE2	If own, do you use bicycle (Q.32) 1 Use 2 Not
65	ITEMBUY2	If own, when did you acquire bicycle 1 In the last 12 months 2 In the last 24 months 3 Earlier
66	ITEMOWN3	Own sewing machine (Q.31) (the ownership questions have the same coding categories for own, use and when acquired).
67	ITEMUSE3	Use sewing machine (Q.32)
68	ITEMBUY3	If own, sewing machine when acquired (Q.33)
69	ITEMOWN4	Own watch or clock (Q.31)
70	ITEMUSE4	Use watch or clock (Q.32)

NREP1SYR CODEBOOK

<u>Column(s)</u>	<u>Variable Name</u>	<u>Variable Description and Codes</u>
71	ITEMBUY4	If own, watch or clock, when acquired (Q.33)
72	ITEMOWN5	Own motorcycle (Q.31)
73	ITEMUSE5	Use motorcycle (Q.32)
74	ITEMBUY5	If own, motorcycle when acquired (Q.33)
75	ITEMOWN6	Own living room furniture (Q.31)
76	ITEMUSE6	Use living room furniture (Q.32)
77	ITEMBUY6	If own when acquired (Q.33)
78	ITEMOWN7	Own cupboard (Q.31)
79	ITEMUSE7	Use cupboard (Q.32)
6	ITEMBUY7	If own, cupboard when acquired (Q.33)
7	ITEMOWN8	Own waterpump (Q.31)
8	ITEMUSE8	user waterpump (Q.32)
9	ITEMBUY8	If own, waterpump when acquired (Q.33)
10	ITEMOWN9	Own television (Q.31)
11	ITEMUSE9	Use television (Q.32)
12	ITEMBUY9	If own, television when acquired (Q.33)
13	ITEMOWNO	Own fan (Q.31)
14	ITEMUSEO	Use fan (Q.32)
15	ITEMBUYO	If own, fan when acquired (Q.33)
16-18	FOODBUY	Food budget spent last week (Q.35) Exact value in S.P. 0 Not ascertained (MV)

NREP1SYR CODEBOOK

<u>Column(s)</u>	<u>Variable Name</u>	<u>Variable Description and Codes</u>
19-21	FOODGRO	Food consumed last week but not bought because produced (Q.38) Exact value in S.P.
22-25	FOODTOT	Total value of food bought and food consumed but not bought because produced, in last week Exact vlaue in S.P.
26-29	SPENDMO	Household expenditures for non-food items, for last month (Q.31) Exact value in S.P.
30-34	SPENDYR	Household expenditures for non-food items, for last 12 months (Q.42)
35	ELECPERC	Respondents' perception of central service electricity (Q.43) 1 Positive 2 Negative 3 Mixed 4 No response
36	ELECUSE	Plans for use of electricity (Q.44) 1 Lighting only 2 1 plus small appliance(s) 3 1 plus 2 plus one major appliance 4 1 plus 2 plus two major appliances 5 1 plus 2 plus three major appliances 6 All of the above plus water pump
37	ELECTHOT	Ways that electricity can produce new income in community (Q.45) Codes 1-6 not determined until description tabulated.

Village Identification Codes:

<u>Village Name</u>	<u>Interview Identification Numbers</u>
<u>Governorate of Lattakia</u>	
ZIGRINN	= 0001 - 0034
MEISA	= 0035 - 0052
SHUNBUTIN	= 0053 - 0080
AL FTEH	= 0081 - 0101
TALAZIQ	= 0102 - 0125
<u>Governorate of Tartous</u>	
AL HASNEH	= 0126 - 0167
ARQOUB QMSOU	= 0168 - 0193
BEIT YOUSSEF	= 0194 - 0218
ALTUN AL MARKAB	= 0219 - 0239
<u>Governorate of Deir Ez Zor</u>	
HAWAIJ AL JAZIRAH	= 0240 - 0252
AL JASIM	= 0253 - 0259
ABOU AL HASAN	= 0260 - 0271
<u>Governorate of Hassakeh</u>	
OUM AL ASAFIR	= 0272 - 0288
TELL RMAN FOUQANI	= 0289 - 0304
FILITI	= 0305 - 0319
BAYAZAH KABIRAH	= 0320 - 0334
TELL AL ASFAR	= 0335 - 0348
<u>Governorate of Idlib</u>	
KITIAN	= 0349 - 0378
BDITA	= 0379 - 0416
KHOUEIN AL KABIR	= 0417 - 0446
SHAIKH BARAKA	= 0447 - 0458
<u>Governorate of Raqqa</u>	
KHADAJ	= 0459 - 0470
MUJEIBNA AL MUFTAHA	= 0471 - 0475
AL AJEIL	= 0476 - 0482
ASEILIM	= 0483 - 0494

Village Identification Codes:Village NameInterview Identification NumbersGovernorate of Hama

BELAHSIN	= 0495 - 0510
ZAMLIEH	= 0511 - 0535
QLADEEN	= 0536 - 0559
RAHJAN	= 0560 - 0581
JADW AIAT	= 0582 - 0610

Governorate of Homs

ARJOUN	= 0611 - 0627
BEIT QIRIN	= 0628 - 0653
HASHMEH	= 0654 - 0677
MANTAR AL ABAL	= 0678 - 0693
NAAMIEH	= 0694 - 0705

Governorate of Aleppo

ISKAN	= 0706 - 0744
HARDATANEEN	= 0745 - 0770
KULT AL BOIDR	= 0771 - 0809
BOUMANEH	= 0810 - 0895
JAADAT AL MAGHARAH	= 0896 - 0921

IV. ADDITIONAL DATA ACCUMULATION AND DATA ANALYSIS

In addition to the socioeconomic profile data to be developed through the village household survey as noted above, PEE operating statistics, village energy consumption data, and other socioeconomic data may also be important for the implementation of the monitoring system.

Since the major objective of the rural electrification program in Syria is to provide reliable electric services to rural villages at rates that reflect social rather than financial considerations, one of the criteria that may be used to evaluate the performance of the electrification program is the amount of social benefits attained. Generally, the quantifiable part of the social benefits of the rural electrification program can be defined in terms of the benefits derived from the availability of electricity which, in turn, can be measured in terms of the amount of electricity used by the population in the program areas. To evaluate the performance of the electrification program, analyses should be conducted to determine whether or not the maximum attainable level of social benefits, measured by aggregate amount of electricity consumed, were achieved. The aggregate level of electricity consumption in a region is the product of two variables:

1. Number, or percentage, of households and businesses connected to the network
2. Average annual KWH consumption by each customer group. To evaluate the performance of NREP, these two factors should be identified and separately analyzed.

Conceptually, several factors may be of significant impact on the rate of connection and on the level of energy (KWH) consumption in the villages. These factors may include:

- Rate structure for electric services
- Service extension policy of PEE
- Socioeconomic characteristics of the region
- Availability and cost of other forms of energy

Some of these factors are directly affected by PEE policy decisions; others depend for the most part on the social and economic policies of the government and are largely outside the program framework and beyond PEE's control. To determine the extent that PEE policy have affected the amount of social benefits realized from the electrification program, it is necessary to first collect all relevant data to allow an adequate analysis of the factors identified above in terms of their respective impact on the aggregate amount of electricity consumed by rural village population. Provided below in the following sections are the major types of analysis that may be conducted to evaluate the performance of the electrification program. After the brief description of the analytical tasks, examples of various types of data that are potentially useful for analytical purposes are provided at the end of this chapter.

A. Analytical Tasks

1. Rate (Tariff) Structure for Rural Services:

The rate structure includes the initial connection charges and the unit price for the energy (KWH) consumed. If the rate of rural electrification program were to be based on the financial rather than social considerations, the charges for connection and for energy consumption would be set at a level that would allow the recovery of the cost for providing the electric service. In such case, electricity may be considered an unaffordable commodity by certain segments of the rural population.

In Syria, as the main objective of rural electrification is to provide reliable electricity to all rural population, it is essential that the connection charges are not set at a level that would prevent any rural household from connecting to the network. Therefore, if the connection rate in a given region is relatively low, analysis should be conducted to identify the underlying causes.

After a household or business is connected to the network, the unit price of electricity may have substantial impact on the amount of electricity consumed. To maximize the benefits of the program, the per KWH rate should be set at a level that would not unnecessarily restrict the use of electricity by rural customers.

It should be noted, however, that while high connection charges and unit price may have some significant impact on the adoption and utilization of electric energy, a relatively low energy consumption level may not be entirely attributable to the high cost of electric service. Other factors, as indicated below, may also affect the level of usage of electricity.

2. Regional Socioeconomic Characteristics:

Electricity consumption is a "derived demand" in the sense that the need to use electricity derives from the use of electric apparatus or appliances. Therefore, the average KWH consumed by the customers in a region depends, in part, on the economic well-being of the rural population. Conceptually, it is possible that even when the electric rate was set at relatively low

levels, the KWH consumption was relatively small. One possible explanation of this phenomenon is that the general level of income in the region has not reached the level to allow the typical household or business to acquire a number of electric appliances. In such case, rate structure may not have much impact on the use of electricity. Instead, the level of income is the major limiting factor on electricity consumption. As such, PEE service and rate policies may not have much impact on the level of consumption, or on the amount of benefits derived from the electrification program.

3. Sources and Cost of Competing Forms of Energy:

For many uses of electricity in the household and business, alternative forms of energy may be available. For example, as substitutes for electricity, kerosene and gas may be available for cooking; kerosene lamps may be used for lighting. Depending on the availability of the competing energy sources and their cost relative to the cost of electricity, the level of electricity consumption may or may not be significantly affected by the availability of other fuels. That is, whether or not electricity and other forms of energy are to be considered competitive or substitute commodities is an empirical question which can be answered only after appropriate data is obtained to identify the type, cost, and uses of other energy sources. The analysis of the substitutability of electricity and other forms of energy will not only help determine the load requirements in the future but will also allow the estimation of potential cost savings associated with the use of electricity versus other fuels, which may be considered part of the benefits of the electrification program.

To summarize the analyses outlined above, after the villages in a given geographic area are electrified, it is important that analyses be made to relate the connection rate and the electricity consumption patterns of the villages to such factors as the rate structure, the level of region income, and the availability of competing sources of energy. As noted previously, some of the factors affecting the utilization of electricity may be the direct result of PEE service policy or rate structure. In such cases, additional review and analyses may be conducted to determine whether policy changes are warranted so that the benefit of the program can be expanded. Other factors affecting electricity consumption may be the result of policy decisions that are outside the project framework. In these latter cases, the implementation of the program should be coordinated with other development programs. For example, if it is demonstrated through empirical analysis that the utilization of electric service is relatively high in areas with other infrastructure programs being implemented, priority consideration may be given to this type of areas in the future stages of the program so that program benefits may be maximized.

B. Data Accumulation

For purposes of conducting the analyses described above, various types of data are necessary. Provided below are the major types of data that are considered potentially useful for purposes of assessing the socioeconomic factors and policy parameters that may have significant impact on the social benefits of the rural electrification program.

1. PEE Operating Statistics:

Information concerning the number of customers and the electricity usage patterns of various customer groups is important for assessing the social benefits of the program. Therefore, as soon as a village (or villages in an appropriately defined geographic area) is electrified, a proper record-keeping system should be developed and maintained to collect customer and energy consumption related data. Examples of customer information and energy consumption data are provided below.

a. Customer Data:

- Number of customers in each class of service
- Rate of connection by class of customer
- For households and business that are not customers, the number in the following categories:
 - Non-adopters: Those who have access to electricity but are not customers
 - Non-accessibles: Those who have no access to electricity due to technical or other non-financial reasons
- Socioeconomic characteristics of customers and non-adopters

While the data directly related to the number of customers may be collected from PEE record files,

information concerning the socioeconomic characteristics of electric customers and non-adopters can be obtained only through village surveys. Therefore, in addition to the question modules provided in the current version of the survey questionnaire, additional questions should be included to allow the identification of users and non-users and to relate the socioeconomic characteristics to the energy consumption behavior of each group in the village population.

b. Energy Consumption Data:

As noted above, the primary consideration of the NREP is the social benefits rather than the economic benefits. The primary program benefits will be an improvement in the quality of life in the villages, both directly for those individuals living in dwelling units with electricity, and indirectly for the entire population through street lighting, improved storage facilities for perishables at local stores, community televisions and other public service facilities made possible with the availability of electricity. The electricity used probably is the only measure of social benefits that is objectively measurable in quantitative terms. It is important, therefore, to identify the level and pattern of electric energy consumption by various customer groups. Examples of energy consumption data that are crucial for analytical purposes are:

- Annual KWH consumption by class of customer
- Appliances ownership and major uses of electricity
- Other sources of energy and their major uses in households and businesses

While the KWH consumption data may be obtained from PEE records for each region, appliances ownership data may have to be developed through sample household survey of residential (domestic) customers. To provide additional data for analyzing current energy consumption pattern of various customer groups and to predict their future usage levels, the data concerning other sources of energy, e.g., kerosene, gas, in terms of their major uses and costs will also be useful and should be collected as part of the data development system.

2. Other Socioeconomic Data:

As noted above, electricity consumption by the customers in a region depends not only on the overall cost of electricity but also on the general economic well-being of the population. In addition, it has been hypothesized that electrification project and other infrastructure programs have complementary effects in their contribution to the socioeconomic changes of the villages.

For purposes of analyzing the correlation between the benefit of electrification program and the economic

development plans in general, and infrastructure programs in particular, extensive effort should be made to collect all relevant data on other on-going or completed development programs. Preferably, the data should identify the benefits of the program, the major beneficiary, and the impact on local employment and income levels. Information concerning these factors may allow the assessment of whether or not electrification and other programs are complementary in the economic and social development processes of the regions, and whether or not social benefits of the electrification program depend to a great extent on the level of economic development of the region. To define the level of economic development, it is important that macro-economic data of the regions such as aggregate income, consumption expenditures, employment, production, population growth, etc. are made available. In many cases, this type of data may be obtained from various published documents by government ministries such as the annual statistics of Syria.

C. Summary

In the above, the key analytical tasks for the monitoring and evaluation of the rural electrification program were outlined and the data necessary for the analyses were described in example form.

The main purpose of the analyses is to measure the benefits that have been derived from the program and to assess the possibility of expanding the program benefit by identifying the socioeconomic factors and policy parameters that may lead to such a result. While quantitative analysis is intended to be part of the monitoring process, it should be noted

that, in social sciences, causality between socioeconomic factors can rarely, if ever, be demonstrated beyond doubt. It is, nevertheless, not necessary to demonstrate a uni-directional causality between two variables to the exclusion of all others in order to obtain sound guidelines for policy decisions. Therefore, for example, if the analysis indicates that the region with certain type of infrastructure program tends to obtain relatively larger social benefits from electrification program, perhaps priority should be given to this type of area in the future stages of the program.

V. CONCLUSIONS AND RECOMMENDATIONS: Future data collection and evaluation activities and schedule for system implementation

The main purpose of the data collection, analysis, and evaluation effort is to identify the benefits of the electrification program. Conceptually, through the analyses of relevant factors the maximum attainable program benefit can also be defined. In the case where there is a gap between the actual benefit and the attainable benefit, analysis may be conducted to determine the underlying causes of the gap. With the identification of the underlying causes, program implementation plans for the future stages can be modified so that the benefit of the program can be expanded.

The analytical tasks and data requirements for the implementation of the monitoring program were identified in Chapter IV. As indicated previously, data collection at any given point in time will only indicate the then current condition in the area. To identify the changes that took place over time, it is necessary that additional data be collected and analyzed periodically. Therefore, the implementation of the monitoring system and the required data collection and analyses should be considered a continual long term effort rather than a one-time task. The

present project has developed the basic framework of the monitoring system and has initiated and completed the field work for the socioeconomic survey of rural households. Data tabulation and analysis, however, are yet to be carried out. It is recommended that serious effort be made at the earliest possible time to process the data provided in the survey questionnaires. The tasks that remain to complete the work of the socioeconomic survey are:

- Computer processing of the collected data
- Analyzing and reporting on the findings

Then, a permanent 'file' of the survey data in computer-use-form can be maintained for further analysis.

The first of the remaining tasks requires access to computer facilities, the use of a packaged program, such as SPSS, or instead, the services of a computer specialist to design a program, and the selection of the relevant statistical tests for the data. The data will be transferred by card punching to machine readable form, and then entered into the computer.

Once the results are received, the findings are reported and the study is complete. The maintenance of the data file will permit further analysis in view of the second, post-electrification survey. Depending on the exact type of information that was successfully obtained from the current version of the survey, adjustments may be made to modify the questions so that more precise and accurate data may be obtained in future surveys.

In comparison with the data collection activities that have been completed to date, the future activities will be much broader in scope. Simply stated, the need for the increased effort is largely due to the data requirements for program evaluation. The

activities to date have dealt principally with the tasks associated with household survey in the selected villages. Socioeconomic survey is the principal but not exclusive source of data for analytical purposes. Other types of data that are important to the monitoring system include customer data, energy usage patterns, and economic development plans and other infrastructure programs, as well as demographic and economic statistics. The scope of the household survey is also expected to be expanded in the future. Additional questions will be included in the survey to ascertain the socioeconomic characteristics of the customers and non-customers, to relate the energy consumption pattern of various customer groups to level of income, size of family and other demographic and economic factors, as well as to PEE service policy and rate structure. To the extent necessary, the survey may also include questions concerning the ownership of electric appliances. The appliance ownership questions will not only help to predict future load requirements but will also allow the assessment of the impact of level of income on electricity consumption.

While no specific schedule for the implementation of the monitoring system can be determined at the present time, it is recommended that an adequate record-keeping system be developed and maintained as soon as electric service becomes available in the villages so that accurate customer and consumption data can be made available for evaluation purposes. As to the household survey, since any major change as the result of electrification program is not expected to take place until after a relatively long period of time, a one year gap between the time when electricity becomes available and the survey may be considered appropriate. To facilitate the design of the questionnaires for the post-electrification survey, a list of socioeconomic changes that might be expected is provided below for reference purposes. Several of these components may be verifiable through comparison

of the findings from the survey questionnaires, Village Profile Forms and Rural Business Forms, with the findings from the post-electrification survey data.

Expected Socioeconomic Changes Associated with Rural Electrification

Improvement of agricultural productivity.

Increase in productivity through the use of labor-saving electrical equipment.

Increase in productivity through the use of water-pumping equipment and/or change in crop patterns.

Improvement of rural non-farming economic activities.

Improvement in productivity of existing industries through availability of more efficient and reliable sources of power; increase in productivity, quality and income. Different percentages for different industries.

Introduction of new industries in the area, utilizing and exploiting local resources through the use of electric power.

Development of rural small industries; especially those related to the processing of agricultural commodities produced locally.

Number and percentage of stores and markets utilizing refrigeration; increase from period without central service electricity.

Social and Community Benefits

Electrification of schools; development of evening classes in adult education, industrial and agricultural training programs; health and hygiene classes in school facilities.

Public recreation facilities for evening use.

Expansion of communications through television, radio, etc.

Reduction in rural-urban migration due to increased employment opportunities in the agricultural and industrial sector of the country-side and the improved rural living conditions.

Household Benefits

Increase in per capita income or in total household income due to improved agricultural productivity and/or development of industrial and service employment opportunities.

Improvements in household sanitary conditions and family health resulting from the use of electricity for water systems, refrigeration, ventilation, and lighting.

Increased levels of living resulting from the availability and use of electricity.

Possible reduction in household energy expenditures with the substitution of electricity for other power sources.

Increasing participation of women in income producing activities in and out of the home as a result of utilization of labor-saving devices. (This could include labor input in new agricultural crop production, handicrafts, cottage industries, and service opportunities).

Indirect Changes

Possible reduction in underemployment of rural labor force through intensification of labor in new patterns of land use.

Increase in degree of participation and integration in national level socio-political life.

Improvement of health and sanitary conditions due to pure drinking water, new dispensaries and hospitals and medical services in the countryside.

GLOSSARY

- Cohort study - A survey focusing on the same population each time data are collected, although the samples studied may be different.
- Household - A group of people who share the same dwelling and have common arrangement for the preparation and consumption of food. A person living alone is listed as a separate household (single-person household).
- Head of household - A person who is generally the main provider of the household and is responsible for the organization and care of the household.
- Household size - Number of household members
- Panel study - A survey involving the collection of data over time from the same population and the same sample of respondents. The sample for such a study is called the panel.
- Piped water - Refers to water laid on from a community-wide system or from individual installations (pressure tanks, pumps, etc.) for the distribution of water under pressure.
- Respondent - The head of household or other adult member of the household who answers the questions and furnishes data for the household.
- SPSS - Statistical Package for the Social Sciences: a computer program and language for statistical analyses; a packaged program designed to compute those statistics used by social scientists.
- Stratification - The organization of a population into homogeneous subsets with heterogeneity between subsets.
- Stratum (pl.: strata) - A subpopulation homogeneous on a given variable
- Work - An economically productive activity, that is, an activity which contributes to the national product. Work includes paid labor whether paid in cash, in kind, or by other benefits, such as food, housing, goods or services, and unpaid labor for own or family enterprise. (Note: Household activities that do not contribute to the Gross National Product are not subsumed under work. However, market activities carried out at home are considered work).

SPSS - Statistical Package for the Social Sciences: a computer program and language for statistical analyses; a packaged program designed to compute those statistics used by social scientists.

Stratification - The organization of a population into homogeneous subsets with heterogeneity between subsets.

Stratum (pl.: strata) - A subpopulation homogeneous on a given variable

Work - An economically productive activity, that is, an activity which contributes to the national product. Work includes paid labor whether paid in cash, in kind, or by other benefits, such as food, housing, goods or services, and unpaid labor for own or family enterprise. (Note: Household activities that do not contribute to the Gross National Product are not subsumed under work. However, market activities carried out at home are considered work).