Ali Rashid, Central Department of Statistics Kingdom of Saudi Arabia and

John Rumford, United States Bureau of the Census/U.S. Representation United States - Saudi Arabian Joint Commission on Economic Cooperation

In accordance with the current Five Year Plan of Saudi Arabia, the Central Department of Statistics (CDS) is committed to implement three major household sample surveys. Included are surveys of vital events and migrations, labor force activities and family consumption expenditures. To collect this information as soon as possible and at the same time work within the constraints of the critical shortage of statistical manpower that is prevalent in Saudi Arabia today, the three surveys have been compressed into a single unitized system. The design of any one component of this multipurpose survey is not particularly unique, however, the integration of three very different types of information into one survey vehicle, the multiplicity of data that can be generated, and several of the evaluation and control techniques introduced are considered unique and may prove useful to other countries or areas where similar data are required in a short period of time and under conditions where statistical manpower is extremely difficult to acquire.

The Survey Vehicle

One of the most important elements in designing the multipurpose survey was the configuration of the vehicle itself. This involved considerations of sample size, sample dispersion, and sample periodicity. Two factors were instrumental in determining the sample size finally selected. The first was the geographic scope of the survey and the second was the precision of the estimates that were considered to be of paramount importance.

With respect to the scope of the survey, the vast differences between the urban and rural areas of the Kingdom in cultural heritage, living conditions, life style and facilities, made it necessary that separate estimates be obtained for each area.

Concerning the precision requirements of the survey, the most nationally significant estimates that will be generated are the birth and death rates. Current estimates of vital rates derived from the latest United Nations information available for the Kingdom 17/18/ suggests that the birth rate is approximately 50 per 1,000 population and the death rate between 20 and 23 per 1,000. Based on results from similar surveys in other countries 6/7/8/9/15/16/, a sample of between 50,000 and 75,000 persons should yield relative sampling errors that will be within 1 to 3 percent for the birth rate and about 4 to 7 percent for the death rate.

With regard to sample dispersion, though a sample size of under 75,000 persons is not particularly large, if the sample units are scattered throughout the Kingdom, the logistical and control problems necessary to service them would be excessive. To avoid widespread dispersion, a multistage clustered sample was selected. The population within each last stage, sample unit in a cluster is approximately 500 persons. A unit of this size is compatible with the village settlement pattern in Saudi Arabia and, as has been demonstrated in other countries, relatively efficient as far as the casefinding of births and deaths is concerned 12/.

Regarding periodicity, the subject matter of the survey demands that the enumeration be conducted more than once each year. Labor force activities are seasonal and month-to-month variations must be monitored. Price levels, and family expenditures also vary throughout the year and estimates must realistically reflect how the current state of the economy affects the budget of Saudi citizens. Moreover, the measurement of births and deaths require a continuing enumeration schedule to promote accurate reporting.

The most critical periodicity component is the timely recording of births, deaths, and migrations. These events occur throughout the year and must be recorded continuously or they will be lost through memory decay or intentional misreporting. Moreover, vital rates are expressed as incidence measurements and are time specific. One of the more successful enumeration periods found to maximize vital event and migration reporting is by a regular monthly household visit 1/6/10/11/14/.

In the case of the family consumption component, it was necessary to take into consideration the seasonal patterns affecting production and consumption. Saudi Arabia has two distinct seasons, a mild winter and a very hot, dry summer. A semiannual enumeration, therefore, was scheduled in the midseason periods of January and July.

Labor force activities are also affected to some degree by the same climatic extremes and the main survey efforts are again conducted semiannually in the months of November and May. With labor force activities, however, it was also necessary to monitor changes in the employment status on a continuing basis, therefore, like vital events, a supplementary monthly cycle is used.

Implementation of the Vital Event Component

As indicated previously, the most critical component of the multipurpose survey is the casefinding of vital events and migrations, particularly the former. Because of this, the major implementation, enumeration and control decisions were oriented toward relieving the problems associated with the capture of these events. The occurrence of a birth or death is a very personal experience in any culture. To record these events successfully, a carefully trained and controlled network of enumerators atuned to the sensibilities of the respondents is required. Because of the paramount importance of enumerator—respondent rapport, the permanent resident enumerator concept was adopted. This method has proven successful in many countries where people are reluctant to confide in persons who do not come from their immediate cultural subgroup <u>5/10/11</u>/.

To implement the resident enumeration system, elementary school teachers are to be recruited as part-time enumerators. In most instances, these teachers teach school in or very close to the survey sample unit.

The initiation of the monthly system is relatively uncomplicated. For the first round, beginning October 8, 1976, a date chosen because it marks the beginning of the school year, the enumerator conducts a complete initial canvass of every household in his sample unit. He fills out in triplicate all the basic census information required for all household members. Nothing is asked at this time about vital events, migrations, labor force activities or consumption expenditures. One copy of the questionnaire is retained by the enumerator, one is transferred to the Regional Headquarters and one is filed in the Central Office in Riyadh. At the end of every month, the enumerator visits each houshold, taking along the initial questionnaire. He asks if any births, deaths, migrations, or labor force changes took place since his last visit. If any of these events or changes occurred, they are recorded on three new questionnaires and the household census information is adjusted to reflect the changes brought about by the event. Again, one copy is kept by the enumerator, one is transmitted to the regional office and one is filed at the Central Office. Each monthly report for a household is cumulative. The latest questionnaire not only contains the events and household composition of the current month, but also includes all the events that may have occurred since the survey began. Considering the low probability of the occurrence of a given event in a population of less than 100 households in any one month, most rounds are completed within a few hours.

On the surface it would seem that if the monthly enumerators made their rounds religiously and that household respondents dutifully reported all events that occurred, at the close of the year the computation of exact birth, death or migration rates would be a straightforward matter. Unfortunately, this is not the case. Even the most conscientious enumerators neglect monthly rounds. Respondents often do not bother to recall a migration or, through the heartbreak of tragedy, fail to mention the death of a loved one. Because of these problems, it has been demonstrated that one of the most successful methods of obtaining relatively complete reports of events is by using a dual estimation procedure 1/2/3/5/10/11/. The basis of the system is to record events using two independent data collection systems covering the same population and time period. The results of

the two systems are compared or "matched", differences are reconciled and the results are accumulated.

In linking records, each report is classified by the enumeration system that found the event. The three classifications are (a) the same event was recorded by both systems, (b) the event was recorded by the first system but missed by the second system, and (c) the event was recorded by the second system but missed by the first. The matching process used for record linking is the singular or "one-way" method. Singular matching is employed because of the relative simplicity and speed associated with the technique and because it is particularly appropriate where geographic out-of-scope problems related to indistinct enumeration area boundaries are common.

There are several methods used to implement this dual enumeration process. One of the better techniques is to link a monthly system to an independent enumeration conducted on an annual, semiannual or quarterly basis $\frac{4}{5}/10/11/12/13}$. Because of the shortage of trained cadre of full-time enumerators in Saudi Arabia, the annual enumeration system was selected to complement the continuing monthly report. This annual survey is implemented by a completely different team of enumerators at the end of the survey year and uses a recall period dating back to the beginning of the school year.

Although the dual system has many provisions for control through self-evaluation, it is effective only after the fact in most cases. To rectify this problem, a unique control procedure is implemented that not only serves a control function, but also provides a separate, independent, and complementary vital event coverage estimate.

To apply this system, the sample units in each region are divided into three sections. At the end of the first three months, a regional enumeration team visits one of these sections and records all births and deaths that occurred since the survey's beginning. These results are matched against the accumulative monthly reports and coverage estimates are generated for the three month period. This procedure is repeated every three months using a sliding recall period. This type of active control insures that every sample unit is reinterviewed twice in a survey year. Moreover, the additional coverage estimate provides a running account of enumeration quality.

Although these enumeration and control procedures are mainly oriented toward improving the coverage of vital events, they also improve the implementation, coverage and quality of the remaining two components of the multipurpose survey - - the semiannual labor force study and the family consumption expenditure report.

Implementation of the Labor Force Component

The major purpose of the labor force component is to provide an accurate and current estimate of the domestic and foreign working population in the country. This estimate includes both an inventory of occupational skills by business and industry and selected information about the characteristics of the workers themselves.

As indicated previously, the primary labor force survey enumerations are to be conducted in November and May with a short supplemental monthly canvass. These particular months were selected because they represent periods of relative stability in the work force. Due to the extremely hot weather extending from June through September, many businesses and industries curtail operations. This is the period of extended vacation and leave taking. In contrast to this exodus, a large influx of Saudi students temporarily enter the labor market during the summer recess and create a distorting picture. The November/May canvass measures the normal pattern; the monthly canvass, the seasonal cycles.

The semiannual enumerations are conducted by the same, part-time resident enumerators who do the vital event rounds. They are issued a separate questionnaire containing only nine questions. The enumeration is restricted to persons age 12 years and over. Because the first labor force round is conducted only one month after the initial census round, it is not necessary to ask such questions as name, age and sex. These and other items are linked automatically to the initial questionnaire. The second semiannual round conducted in May is designed to measure any changes in occupations and incomes that may have occurred during the six month period. The monthly inquiry consists of only one question, this pertains to changes in the employment status of the eligible labor force population. It requires a simple, self-coded answer and very little enumeration time is expended.

Implementation of the Family Consumption Expenditures Component

A general multipurpose survey system is not the vehicle to use for the execution of a traditional, intensive family consumption expenditure survey. Inquiries of this type require the techniques of multiple visits over short periods of time, long lists of expenditure items and full-time enumerators. No attempt was made to interject a consumption survey of this type into the multipurpose system. Instead two surveys are implemented. One, is a component of the multipurpose system, confined to the rural areas and designed only to provide consumption inputs into National Accounts. The other is a traditional expenditure survey executed exclusively and independently in the urban areas and designed to provide information for a Current Price Index.

Because data from both surveys will eventually be used to create Kingdomwide SNA statements, a standard classification scheme is used for both at the publication level.

As indicated previously, the rural expenditure survey is conducted semiannually in January and July. This again is necessitated by the seasonal extremes that dramatically affect the availability and quality of food stuffs and services. This is particularly true in the rural areas where "own product" commodities and services are used. Like the labor force survey, the same part-time enumerators conduct the enumeration. They use a separate questionnaire for each household. The expenditure recall period extends to the past week for frequently purchased items and, to the past month for such items as rent, fuel and most durables.

<u>Multiplicity of Information Through</u> <u>Data Integration</u>

The integrated multipurpose survey approach as implemented in Saudi Arabia presents a total of information that is much greater than the sum of the individual parts. It is possible for example to examine fertility, mortality and migration differentials by labor force activities and consumption patterns. These added dimensions are provided without any increase in enumeration and supervisory personnel or additions in logistical support.

The multipurpose survey design will probably not make specialized subject matter technicians completely happy. Obviously, the training of enumerators on any one component cannot be especially thorough. Part-time enumerators usually owe allegiance to their main source of income and not the after hours survey. The respondents themselves may be subject to confusion at times over exactly what the overall study is about. However, considering the economy of operation in personnel and time, and the multiplicity of information available, the multipurpose survey approach incorporating some of the enumeration and control procedures used in Saudi Arabia may offer nations with a scarcity of statistical manpower a method of collecting different types of information rapidly; incontrol and with the administrative and logistical advantages inherent in a unitized survey system.

References

- Ahmed, N., and Krotki, K.: Simultaneous Estimations of the Population Growth: The Pakistan Experiment. Pakistan Development Rev 3: 37-65 (1063).
- Cantrelle, P.: Repeated Demographic Observation in a Rural Area in Senegal: Method and First Results. Document No. B.6 6/V/ F/207. World Population Conference, Belgrade, 1965.
- 3) Chandrasekar, C., and Deming, W.E.: On a Method of Estimating Birth and Death Rates and the Extent of Registration. J. Am. Stat. Assoc. 44:101-115, March 1949.
- 4) Marks, E.S., Seltzer, W. and Krotki, K.: Population Growth Estimation: A Handbook of Vital Statistics Measurement. New York. The Population Council, 1972.

- National Statistical Office: Malawi Population Change Survey: February 1970 - January 1972. Zomba, Malawi: Government Printer 1973.
- Republic of Liberia: Patterns of Natality, 1970. Series, N-1, Ministry of Planning and Economic Affairs, 1971.
- Republic of Liberia: Patterns of Mortality, 1970. Series D-1, Ministry of Planning and Economic Affairs, 1971.
- Republic of Liberia: Natality Profiles, 1971. Series N-2, Ministry of Planning and Economic Affairs, 1972.
- Republic of Liberia: Mortality Profiles, 1971. Series D-2, Ministry of Planning and Economic Affairs, 1972.
- Rumford, J.C., Heperkan, Y., and Fincancioglu, N.: The Principles and Preliminary Results of the Turkish Demographic Survey.
- 11) Rumford, J.C.: Use of the Chandrasekar-Deming Technique in the Liberian Fertility Survey. Public Health Rep. 85:965-974, November 1970.
- 12) Rumford, J.C.: Factors that Affect Case-

finding in the Liberian Fertility Survey. Health Service Reports, 87:247-262, March 1972.

- 13) Rumford, J.C.: Factors Influencing the Casefinding of Migrations in the Liberian Fertility Survey. Demography 9:431-441 (1972).
- 14) Seltzer, W.: Some Results from Asian Population Growth Studies. Population Studies 23:395-406, November 1969.
- 15) Turkish Ministry of Health and Social Welfare: Vital Statistics from the Turkish Demographic Survey. School of Public Health, Ankara, 1967.
- 16) Turkish Ministry of Health and Social Welfare: Vital Statistics From the Turkish Demographic Survey. School of Public Health, Ankara, 1970.
- 17) United Nations Population and Vital Statistics Report. Series A, V. 26, No. 4 U/W. New York, New York, 1974.
- 18) United States Bureau of the Census: Recent Demographic Estimates for Countries and Regions of the World. In S.P.C. May 1974.