

as source of information.

## 2.2 Sample Surveys

Sample surveys are other important sources of population or demographic statistics. At federal level Federal Bureau of Statistics and at provincial level Provincial Bureaus of Statistics are responsible for conducting sample surveys. Some other agencies like NIPS, PIDE etc also conduct some special type of surveys from time to time.

### 2.2.1 Historical background

The World Fertility Survey (WFS) program deserves a special mention that was started in 1972. WFS has been described as the largest single social science research project ever attempted (People 1978:30): Its purpose was to assist a large number of interested countries, particularly the developing countries, in carrying out nationally representative, internationally comparable, and scientifically designed and conducted surveys of human fertility behavior. The WFS did not provide the means to evaluate national family planning programs so a new series of surveys, the Contraceptive Prevalence Survey (CPS), was begun in the late 1970s (Morris et al. 1981).

The Demographic and Health Surveys (DHS) program, initiated in 1984, was designed to update and expand the data from the WFS and CPS. The objectives of the DHS included the provision of adequate data for policy makers, planners, and researchers (Fisher and Way 1988:15). The DHS has led to substantial expansion of the international health and population database. During the first phase, DHS-1, 34 surveys were carried out in 29 developing countries. The second and third phases, DHS-II and DHS-III, will include over 40 surveys (Moore and Croft 19990: 216; Haub 1993:2)

### 2.2.2 Types of Sample

A sample could be a probability sample or it could be a non-probability sample. Probability sample allows its self evaluation in term of standard error as an in built mechanism. The magnitude of standard error will go on decreasing with increase in sample size. For non-probability sample it is not possible to estimate the magnitude of standard error irrespective of choice and size of sample. The magnitude of sampling error depends upon the type of sample and its size. The size in turn is directly proportional to the number of administrative levels for which data are to be released. If data are to be released at national level only, then relatively a small sample is sufficed. However if data are desirable at district level then perhaps quite a large sample is required for attaining the same degree of precision. On the other hand the magnitude of non-sampling error is inversely proportional to the size of the sample.

Probability samples include simple random sample (with or without replacement), cluster sample, stratified sample, multi-stage sample, multi-phase sample, interpenetrating sample and sequential sample. Sample selection could be random or it could be systematic. Sample results can be blown up by applying simply the raising factors, or by using ratio method or regression method. Allocation of sample to various levels could be based on equal probability or it could be based on probability proportionate to size.

Simple random sample is a sample for which each item is selected randomly. It is simple to select and simple to blow up the estimates but not as efficient as other samples are. Selection of sample after dividing the population into groups having heterogeneity between various items within the groups is known as clusters sample and these groups are known as clusters. This sample is a bit difficult in selection but more efficient than simple random sample. Selection of sample after dividing the population into groups having homogeneity between various items within the groups is known as stratified sample and these groups are called as strata. This sample is a bit difficult in selection but more efficient than simple random sample. It could be even more efficient than cluster sampling if items within groups are homogeneous and between groups heterogeneous other-wise less efficient. If any sample is selected in stages then it is known as multi-stage sample. It is a complicated and very difficult sampling technique but very efficient, efficient than cluster sampling and efficient than stratified sampling. . If any sample is selected in phases then it is known as multi-phases sample. It is also complicated and very difficult sampling technique but very efficient. When two or more sub-sample are drawn from the same universe by the same sampling plan so that each sub-sample covers the universe and provides estimators of the parameters on application of the same estimating procedures, the sample is known as interpenetrating. This method permits to examine the factors causing variation, e.g. interviewers, field work, data collection methods and data processing procedures; compute the sampling error from the first stage units if these consist of one level of interpenetration; provide control in data collection and processing; supply advanced estimates on the basis of one or more sub-samples and to provide estimates based on one or more sub-samples when the total sample can not be

covered due to some emergency. Sequential sampling is a process of selecting a sample in sequence for bringing a balance between two types of errors that is type I error and type II error. This method is usually applied in quality control methods.

Systematic selection procedure allows more spreading of sample over the universe as compared to simple random selection therefore it is more representative and hence more efficient selection technique and its field coverage is also easy. Among the three estimation methods simple estimation method is very easy to apply but less efficient and biased. Ratio estimation method is a bit difficult and biased but more efficient than simple method. Regression estimation method is more complicated in computation but unbiased and far efficient than simple method and ratio method of estimation.

Non probability samples include purposive sampling, quota sampling, snow ball sampling methods etc. Purposive sample are drawn with certain purpose in mind. Quota sample is based on pre fixed quota of items to be included in the sample. Snow ball technique depends upon selection of first item possessing some desired characteristics and second item is selected on the basis of information received from first item. Similarly selection of third item depends upon information received from the second item and so on. Thus all selected items have almost similar characteristics. Such samples are very easy to select but it not possible to measure magnitude of sampling error and hence nothing can said about their reliability.

### 2.2.3 Reliability of Sampling

The reliability of sampling technique depends upon the size of the sample, the choice of sampling method, inputs, degree of desired precision and levels of release of data. It is reiterated that with increase in sample size the reliability as measured in term of standard error will go on increasing but magnitude of non sampling errors is likely to increase. The more sophisticated designs are more efficient than simple samples. Well qualified, experienced and trained staff can delivered better results than untrained and less qualified staff that is little exposed to sampling methods. Better facilities and field use equipments are the additional advantages which can also enhance the reliability. The reliability, as already said, depends upon the size of the sample and size of the sample in turn is determined on the basis of degree of precision one wants through the sample. For capturing information with same reliability relative size of sample at national level would be very small as compare to any sub-national level simply because of law of large number which says that with increasing number of items in a universe relatively a small sample is needed with same level of precision. Thus, if one has to release sample estimates at grass-roots level a relatively large sample is required.

### 2.2.4 Advantages and Disadvantages

Since sample is a small part of the whole universe, therefore, it reduces the over all cost of collection and release of data.

Again being a fraction of whole lot it requires far less time in completing the entire work. It carries sampling errors besides non-sampling errors.

Sampling enquiry always demand well qualified, experienced and trained field staff and latter on competent data processing people for raising the sample information.

### 2.2.5 Suggestions

For sensitive and difficult questions or queries demanding detailed probing or for cost and time consideration sampling methods should always be preferred over census or complete count.

## 2.2.6 Sample Surveys in Pakistan

Many sample surveys have been conducted and are being conducted in Pakistan by the mutual collaboration of national and international health agencies. Each sample survey had its own objectives, scope, spectrum and utility of information. The following surveys are worth mentioning in this regard:

### National Health Survey of Pakistan

The National Health Survey of Pakistan (NHSP) was a collaborative project of Pakistan Medical Research Council (PMRC), the Federal Bureau of Statistics (FBS) of Pakistan and the National Center for Health Statistics (NCHS), Public Health Services of USA. The objectives of the NHSP were to:

- Provide a general health profile of the people of Pakistan with national, provincial, and urban/rural estimates of morbidity *بیماری*
- Provide a health profile on high-risk priority groups (children under five, married women of reproductive ages and person's aged 60 and above)
- Assess utilization of public and private sector health services, medicines and traditional healers
- Present information collected in a form readily usable for health planning of the country.

The NHSP had two components; the Health Interview Survey (HIS) and the Health Examination Survey (HES). The study sample was randomly selected with statistically acceptable provincial and urban / rural representation. Persons of all ages were included in the study. The survey was conducted at 80 primary sampling units (PSUs) comprising of 30 families each. Of 80 PSUs, 40 were located in the Punjab, 12 in NWFP, 18 in Sindh and 10 in Balochistan.

The data was collected by mobile teams, which traveled to the sites of the PSUs to conduct interviews, physical examinations, anthropometrics measurements and laboratory investigations. The teams consisted of medical doctors, interviewers, laboratory technicians, lady health visitors and supporting staff.

The household interview (health interview component) was administered in the homes of the selected families, after which the family was scheduled for a visit to mobile examination center, which was organized in the area. The team remained in the field for approximately three weeks and completed the interviews and examinations of each member of the 30 selected families of PSU. A service component of the NHSP was developed to provide needed medical care to the subjects and to serve the communities where the survey was being conducted. The data collected provides information on general health profile of the people of Pakistan.

The survey provided information on the following:

- Disease pattern, health conditions, risk factors and health behaviors
- Nutritional status: weight, height, mid-arm circumferences, dietary patterns and prevalence of anemia.
- Prevalence of chronic conditions: hypertension, diabetes, arthritis and physical disabilities.
- Vision and ophthalmic conditions
- Respiratory status; peak flow and smoking habits
- Serological conditions; examination of urine, urea and creatinine

- Social, economic and occupational conditions
- Personal hygiene and health promoting behaviors

Note: (For detailed findings consult NHSP Report).

### Pakistan Demographic Survey-2001

In the absence of efficient civil registration system and inability of decennial censuses to provide birth and death statistics, during the inter-censal periods, several demographic surveys have been undertaken by the FBS in the country since early sixties either independently or in collaboration with other organizations. The latest series of demographic surveys, known as Pakistan Demographic Survey (PDS) was launched in 1984. The present description pertains to the data collected through PDS during 2001. The main objectives of the PDS survey were:

- To collect statistics of births and deaths in order to arrive at the various measures of fertility and mortality for Pakistan and its four provinces separately for rural and urban areas
- To estimate current rate of natural increase of population at national and provincial level
- To collect information on other selected characteristics of population, to assess the impact of family planning and other socio-economic development programs/-

The universe of this survey consisted of all urban and rural areas of the four provinces of Pakistan defined as such by the 1998 Census, excluding Federally Administered Tribal Areas (FATA), Military Restricted Areas and protected areas of N.W.F.P. population of excluded areas constituted about 2% of the total population. Each city /town had been divided in to a number of enumeration blocks. Each enumeration block consisted of 200 to 250 households on the average with well-defined boundaries and maps. The list of enumeration blocks was updated during 1995 and list of mouzas / dehs/villages prepared by the Population Census Organization for Population Census 1998 had been used as a sampling frame. Enumerating blocks and villages have been considered as primary sampling units (PSUs) for urban and rural domain respectively.

A stratified two-stage sample design was adopted for the survey. Considering the variability of the characteristics for which estimates are to be prepared, population distribution and field resources available, sample of about 31,491 households (secondary sampling units SSUs) was considered sufficient to provide reliable estimates of key variables at national and provincial levels with expected reliability within 95% degree of confidence. The sample households (SSUs) had been drawn from 704 primary sampling units (PSUs). Of which 308 were urban and 396 rural. As urban population was more heterogeneous, therefore, a higher proportion of sample size had been assigned to urban domain. Similarly N.W.F.P and Balochistan being the smaller provinces and to get reliable estimates a higher proportion of sample size had also been fixed for these provinces. After fixing the sample size at provincial level, further distribution of the sample PSUs and SSUs to different strata in rural and urban domain of each province has been made proportionately, keeping in view the minimum requirement of each stratum.

In the PDS 2001, the coverage of the population was on de-jure basis i.e. all persons who usually live in the sample areas, whether present or temporarily absent at the time of enumeration, were included in the survey. On the other hand, any person who was present in the sample area but whose usual residence was out of the sample areas was excluded from the survey. Students who were studying in any other village/ town but living in the hostels or boarding houses were enumerated with their parent's household. However, if any such student was living with his relatives, friends or in a private house, then he was enumerated at the place where he was being studied. Population of institutions, such as patients admitted in the hospitals, inmates of prison houses were not covered. Instead they were enumerated with their usual households, provided their period of absence was not more than six months.

PDS provided information on population by age, sex, marital status, number of households by size, live births by sex, age of mother, duration of marriage of the mother, birth order, age of the mother at first marriage and birth interval; infant death by sex, age and month of occurrence; deaths by age and sex; percentage distribution of respondents by relationship to head of household and percentage distribution of population by sex, relationship to head of household, live births by place of occurrence and age of mother, live births by type of attendant at birth and age of mother and deaths by cause and sex. All these information are available by urban-rural residence.

### **Pakistan Integrated Household Survey 1991, 1996-97 and 1998-99**

The first round of Pakistan Integrated Household Survey (PIHS) was undertaken in 1991, second in 1996/1997 and third round, 1998-99, was jointly conducted with Household Interrelated Economic Survey (HIES). The PIHS was mainly targeting the socio-demographic information about the household's e.g. family size, fertility rates, utilization of health services, contraceptive prevalence rates and other social issues. In the third round of the PIHS 16305 households were interviewed across 1150 urban and rural communities. Information was collected from households and from rural communities on a range of social sector issues. These are primarily focused on the sectors covered by the Social Action Programme: basic education, primary health, population welfare and rural water and sanitation.

Since the HIES was merged with the PIHS in this round, information on income, employment and expenditure was also collected from the sampled households. The PIHS report details the information on social indicators collected in the section of the questionnaire relating to the survey. The survey data is presented disaggregated by province, rural urban residence, gender

and income level of the household. Since the third round information correspond to the end of Eighth Five Year Programme so its results are comparable to SAP targets outlined in the plan.

### **Household Integrated Economic Survey 1990 to 1997**

The Household Integrated Economic Survey (HIES) has seen some major developments during the 1990s, and it is important to mention that the Household Integrated Economic Surveys has been conducted with some breaks since 1963. In 1990-HIES questionnaires were revised in order to address the requirements of a new system of national accounts. The four surveys of 1990-91, 1993-94, and 1996-97 followed the design of these questionnaires. In 1998 the HIES data collection methods and questionnaire were changed to reflect the joint venture of HIES with the Pakistan Integrated Household Survey (PIHS).

### **HIES and PIHS Collaboration-1998**

The operational activities of Household Integrated Economic Survey were carried on jointly with Pakistan Integrated Household Survey in order to study both social as well economic indicators related to the households. Prior to third round PIHS 1998-99, HIES surveys were collected by single male enumerators using public transport. Only male household members could be interviewed. Under PIHS and HIES-1998 the data was collected by mobile teams of both male and female enumerators under the day-to-day management of a team supervisor. Female enumerators on each enumerator team allow for female household members to be interviewed as well as male household members. In particular, female household members were asked questions about household size and structure, birth histories, health, family planning and food and non-food consumption.



The third round of PIHS contained two parts. The first part comprises the old PIHS questionnaire but excludes the brief income and consumption module found in the first and second rounds of the PIHS (1995-96 and 1996-1997). The second part comprises the old HIES questionnaire. In both parts there were some improvements in the sections on education, population welfare, and water and sanitation. In the case of the HIES, the questionnaire was split into modules for males and females. Some small changes were made to the list of consumption expenditure items about which questions were asked. In addition, there were some small changes made to the questions themselves. Finally, where women were more informed and better able to answer questions on consumptions expenditures of food and non-food items they became the main respondents for the household. A community questionnaire was also completed by the enumeration teams.

The universe consists of all urban and rural areas of the four provinces of Pakistan. Military restricted areas and protected areas of NWFP have been excluded from the scope of the survey. The population of the excluded areas constituted about 3% of the total population.

Different sample frame was used for urban and rural areas. This frame has been constructed adoption quick count record survey techniques. According to this method all urban areas, known as cities/towns of the urban domain of the sampling frame, have been divided into small compact areas known as enumeration blocks (EB). Each EB comprises approximately 250-350 households. In twelve large size cities each enumeration block has been divided in to low, middle, and high-income groups. This frame was updated in 1995. It was used for drawing samples from the urban areas of the universe. For rural areas, the list of villages/mouzas/dehs according to Housing and Population Census, 1998 has been used as sampling frame.

A two-stage stratified random sample design was adopted. In the first stage, enumeration blocks in urban areas and villages/mouzas/dehs in rural areas have treated as the first stage primary

sampling units (PSU). The sample PSUs have been selected with probability proportional to the size (the estimated number of households in the PSU). With respect to the second stage, households within each sample PSU have been taken as secondary sampling units (SSU). SSU (households) within sample PSU have been selected by a systematic sampling technique with a random start. In each urban sample PSU, 12 households were selected, and in rural sample PSUs, 16 households were selected.

Out of total 1,050 PSUs, 578 were selected from rural areas and 472 from urban areas.

According to the province wise distribution 458 PSUs were located in Punjab, 264 Sindh, 188 NWFP and 140 in Balochistan. Of total 14,912 SSU (households), 9,248 were selected from rural areas and 5,664 from urban areas. Regarding province wise distribution 6,448 SSU were located in Punjab, 3,712 in Sindh, 2,720 in NWFP and 2,032 in Balochistan.

HIES-1998-99 provided information on average household size, average number of earners per household, percentage of earners in total population, individual average earning per month, distribution of earners by employment status as percentage of total income earners, percentage distribution of earners by employment status, by employment status in each consumption deciles; monthly individual income by employment status, per capita monthly consumption expenditure, average monthly household consumption/expenditure by income groups, per capita monthly income, average monthly income by income groups, per capita monthly savings by consumption and income deciles; percentages of income shares, income shares by consumption deciles, consumption / expenditures by commodity groups, consumption / expenditures by commodity groups in each decile, monthly expenditure on major food items, per capita monthly

consumption on major food items and percentage of household expenditures on fuel and lightning. All the above information is tabulated by urban/rural residence and provinces.

### **Multiple Indicator Cluster Survey of Pakistan-1995**

The commissioning of the Multiple Indicator Cluster Survey (MICS) owes to the Convention on the Right of the Child (CRC), which was adopted by the United Nations General Assembly on 20 November 1989. The CRC came into force on 2 September 1990, in less time than any other human rights convention. Pakistan strongly supported the UN General Assembly and ratified it as early as in September 1990. MICS was designed to gauge the progress towards the attainment of the goals set by the National Program of Action for Children in Pakistan.

The methodology of MICS (Pakistan) was developed in the light of a handbook for MICS prepared by the Planning Office, Evaluation and Research Office and Program Division of UNICEF. Suitable adaptations and additions were made according to the specific conditions and requirements of Pakistan. The cluster survey adopted a household as the basic unit of enquiry and the mother in the household as the respondent to the enquiry. The enquiry related to the characteristics of the household, the mother in the household and children in the household under age 12 years. The areas of enquiry addressed the concerns related to monitoring the progress towards the goals of the World Summit for Children (WSC).

The MICS was conducted among a nationally representative sample of approximately 15000 households all over the country. An all women team of nearly 100 women obtained information on 32717 boys and girls under 12 years of age from their mothers. All children under 5 were weighed and measured and the interviewers personally examined whether these children had a

scar on their arm indicating vaccination against BCG. Information was also obtained personally from housewives on sources of drinking water and sanitation facilities in their homes. The field team carried a kit to test the salt iodization. This test was executed in 12826 rural and urban homes of all the four provinces. Altogether sponsored by Government of Pakistan and carried out by Gallup Pakistan through the financial assistance of UNICEF.

The key findings on each of 8 sectors examined in MICS Pakistan-1995 were:

## MICS-1995 Findings

### INDICATORS

### Percent of Respondents

	PAKISTAN	URBAN	RURAL
<b>Sources of Drinking Water</b>			
Piped Water Supply in Dwelling	30	46	17
Hand pump in dwelling	46	38	52
Other water sources	24	16	31
<b>Sanitation</b>			
Flush latrine connected with water borne sewage	25	45	8
Flush latrine connected with septic tank	23	33	14
Others	53	22	78
<b>Salt Iodization</b>			
Percent of household using iodized salt	19	27	11
<b>Education</b>			
Gross enrolment rate	70	78	63

Net enrolment rate	66	75	60
Retention rate to grade 5	47	51	43
Primary School Entry Rate at 5 (Correct Age)	37	44	32
<b>Breast feeding (0-4 month old)</b>			
Breast feeding rate (non-exclusive)	95	95	96
Exclusive breast feeding (Full breast feeding)	16	15	16
<b>Timely complementary feeding (Weaning)</b>			
Complementary feeding at 4-5 months	15	19	12
Complementary feeding at 6-9 months	31	36	27
<b>Continued Breast Feeding</b>			
Continued breast feeding at 1 year	88	88	89
Continued breast feeding at 2 years	56	58	54
<b>MICS-1995 Findings</b>			
<b>Acute Respiratory Tract Infection (ARI)</b>			
ARI Prevalence (In mother's perception)	37	36	37
ARI Needing Assessment (ANA) Prevalence	24	21	25
<b>Diarrhoeal Diseases</b>			
Estimates of proportion suffering from diarrhea	26	23	27
ORT use rate per 1993 definition of WHO	97	97	96
ORT use rate per current definition	19	19	19
<b>Nutritional Status (Weight for age)</b>			

2 Standard Deviation from median	38	36	40
3 Standard Deviation from median	13	11	14

**Immunization Coverage**

BCG vaccination	75	79	72
BCG Scar	61	66	57
DPT -1	69	73	65
DPT -2	56	61	52
DPT -3	35	40	30
OPV-1	80	82	79
OPV-2	70	74	67
OPV-3	37	41	35
Measles	53	59	49
T.T coverage in mothers	36	49	27