Conducting Fieldwork and Survey Design

(Prepared for Young Scholars Participating in SARNET Labour Economics Training)

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Structure of Presentation

- Data Sources; Advantages of Sample Surveys

- Some Important National Level Sample Surveys

- Orientation to Survey Methodology of NSS

  ➢ Historical Note on Formation

  ➢ Scope & Salient Features of NSS

  ➢ Some Important Subjects Covered

  ➢ Survey Design (with illustration from 68th round)

  ➢ Major Refinements in Survey Design

  ➢ Schedules of Enquiry

  ➢ Uses of Data

Data Sources

- Administrative Records
- Censuses
- Sample Surveys

Why Sample Surveys?

Advantages of Sample Surveys over Complete Enumeration Survey / Census:

- Less time for fieldwork & release of results

- Cost effectiveness

- Better data quality by engaging much less personnel and imparting proper training

- Possible to provide population estimate within a tolerable (pre-specified) margin of error

Some Important National Level Sample Surveys

- Household & Establishment Surveys by NSSO

- Annual Survey of Industries by CSO

- National Family Health Surveys, M/o HFW

- Recent Employment-Unemployment Surveys being conducted annually by Labour Bureau

- Census cum Surveys of Micro, Small & Medium Enterprises by DC (MSME)

- Income & Expenditure Surveys, India Human Development Survey (2005) by NCAER

Orientation to
Survey Methodology of NSS

Historical Note on Formation of NSS

- Absence of reliable and adequate statistics on various aspects of economic & social life felt for a long time

- National Income Committee (1949) also noticed large data gaps in the compilation of national income

- National Sample Survey (NSS) set up in 1950 by late Prof P C Mahalanobis with active support of Pt. Jawaharlal Nehru

Historical Note…

- NSS initiated to conduct sampling enquiries for providing data on socio-economic parameters for planning & other purposes

- Early years: Survey methodology & writing reports by ISI; Fieldwork by Directorate of National Sample Survey, GoI

- Problem of coordination & delay in release of results finally led to creation of NSSO under resolution of March 1970

Scope & Salient features of NSS

- Geographical coverage – whole country except a few inaccessible areas
- Continuing survey as successive '*rounds*'
- Methods of enquiry:
  - Interviewing respondents
  - Data as per books of A/Cs if available in case of Establishment Surveys
  - Crop Surveys: Direct physical observation of selected plots for acreage data & crop cutting experiments for yield rate

Scope & Salient features…

- Multiplicity of subjects in a round rather than uni-subject surveys => Advantages:

  o Better utilization of resources considering time of journey, camp setting,...

  o Increased sample size of PSUs with improved precision of estimates

  (Precautions taken: Not so many subjects in a round that would complicate sample design & overburden the investigators)

Scope & Salient features…

- Moving reference period (day/week/month/ year) – To reduce recall error and eliminate the effect of seasonality

- Survey duration mostly of one year / six months – Samples drawn in the form of sub-rounds; uniform spread of fieldwork within the sub-round

- Participation by States at least on an equal matching sample basis – Independent estimate as per 'state sample' as cross-check; Advantage of pooling

- Independent sub-samples – Easy computation of standard errors of estimates even in a complex design

Scope & Salient features…

- Sample size of recent rounds:

  12,000 – 16,000 PSUs; 10-20 Households/est. per PSU

  (Above sample size fairly <u>adequate</u> for many variables to provide state level estimates (but <u>not true</u> for rare events or those with higher variability)

- Permanent trained field investigators ensuring good quality data (now contract investigators also)

Scope & Salient features…

- Control of non-sampling errors through following measures:

❑ Two-tier training before commencement of fieldwork

❑ Periodic meetings at the regional level

❑ Training of data entry/processing staff

❑ Documentation of various scrutiny programmes and their implementation

(Field offices and data processing centres of NSSO are in different locations across the country ensuring smooth execution of above)

Scope & Salient features…

- Field offices at various locations (HQ / Regional Offices / Sub-regional Offices)

- Senior officials involved in centralized training to discuss concepts, definitions and schedules of enquiry as in detailed Instructions Manual

- Followed by regional level trainings on survey methodology & data validation rules

- Field inspection

- Feedback sessions

Scope & Salient features…

- NSS has produced a rich database useful for policy formulations and researchers both within and outside country

- Fieldwork of NSS 72nd Rd (2014-15) currently in progress

- Preparatory work for finalizing survey methodology of NSS 73rd round initiated; A Working Group constituted

Some Important Subjects Covered
(43rd Round:1987-88 onwards)

Subject	Round No.
Consumer Exp.	Almost each round barring a few (large sample every 5 yrs; last: 68)
Empl.-unempl.	--- Do ---
Unorg. Manufacture	45 (1989-90), 51, 56, 62, 67
Trading enterprises	46, 53, 67
Service sector-Others	57, 63, 67

Subjects covered...

Subject	Round No.
Survey on tribes	44
Housing / bldg. cons.	44, 49, 58, 65, 69
Education	47, 52, 64, 71
Disability	47, 58
LLH, Debt & Invest.	48, 59, 70
Slums	49, 58, 65, 69

Subjects covered...

Subject	Round No.
Health care	52, 60, 71
CPR	54
Travel habit	43, 54, 65, 72
Migration	43, 49, 55, 64
Aged persons	42, 52, 58, 60
Indian farmers	59, 70

Other important subjects covered earlier

- Vital statistics (9, 12)
- Population, births & deaths (14-23, 28, 38, 39)
- Agriculture & animal husbandry (1-7, 11)
- Crop cutting experiments (10-26)
- Village statistics (Frequently covered earlier but now with less frequency)

Sample Design

- Broad sample design: Stratified <u>two-stage</u> (for smaller villages / urban blocks) or <u>three-stage</u> (larger villages/blocks):

  ➢ Primary Sampling Units (PSU):Villages/blocks

  ➢ Segmentation of large PSUs & selecting sample seg.

  ➢ Ultimate Sampling Units (USUs): Households/ establishments within each sample PSU

<u>Note that</u> multi-stage design is the only available option because it is difficult to maintain up-to-date frame of all households/establishments for countries of large size like Ours

Sample Design…

- Sampling frame (PSU)

<u>Household Surveys</u>:

Rural: Census list of villages

Urban: Census list of EBs (till 15th round);

List of Urban Frame Survey blocks (thereafter)

<u>Establishment Surveys</u>:

Above with count of number of establishments/workers as per Economic Census to capture adequate number of establishments – particularly the bigger units

Sample Design…

- Sampling frame (USU)

✓ A list of USUs (i.e. households/establishments) prepared during survey by making a house to house visit within each selected PSU or selected segment(s) in case of large PSUs

✓ Certain auxiliary information collected during the listing operation for stratification of USUs before sampling of USUs

Sample Design…

- First-stage Strata (of PSUs)

<u>Rural</u>: District

<u>Urban</u>:

(1) Each M+ City – a separate stratum

(2) All other cities/towns within a district (from NSS 61st round) / NSS Region X Specified size class of towns (till 60th round and 65th round)

Sample Design…

- Sampling Procedure

<u>PSUs:</u>

Rural – Probability proportional to size (PPS)

Urban – Equal probability (PPS in Establishment Surveys with use of EC frame)

[Size measure in case of PPS: Population in HH Survey; No. of workers as per EC in Establishment Survey]

<u>USUs:</u>

Equal probability after appropriate stratification of households/establishments into a certain number of homogeneous groups i.e. strata

A Few Examples of Stratification of HH

Subject	Round	Stratification
Domestic Tourism	65	Rural: Structure type (Pucca / No pucca) x At least one member with overnight trip / Same day trip during last 30 days Urban: MPCE class in place of structure
Housing Condition	65	Rural: Pucca/Semi-P/Others Urban: MPCE Class

A Few Examples of Stratification of HH

Subject	Round	Stratification
Survey of Farmers	59	4 land possessed classes with the condition of some farming activity during last year
Land & Livestock Holding	59	Land possessed classes
Debt & Investment	59	Rural: Land holding classes x Indebted / Not indebted Urban: MPCE classes x above

A Few Examples of Stratification of HH

Subject	Round	Stratification
Disability	58	Mental disability (1); Speech/Hearing/Visual (2); Locomotor (3)
Morbidity, Health Care & Condition of the Aged	60	A member hospitalized during last 365 days (1); One child of age < 5 yrs (2); One member og age 60+ (3); Remaining HHs

Stratification of Establishments

(See Reports on NSS Rounds 62, 63 & 67 for details)

- Strata of own-account establishments by broad industrial category

- Strata of establishments with hired workers by broad industrial category

- Special efforts to form strata of larger units in terms of employment size or those with imprecise estimates of gross value added per worker

Stratification in Annual Survey of Industries

- ASI covers registered manufacturing sector
- Units in frame grouped into 2 categories:

  Census sector (bigger units; W: 100+)

  Sample sector (other units)

- Sample sector units stratified by State/District X Industry groups
- Sample units selected from each stratum by circular systematic sampling after arranging them by number of workers

Illustration on Sample Design: 68th Rd.

- Sampling frame: List of census villages/UFS blocks

- Stratification

  Rural: rural part of district

  Urban: Each million plus city; All other towns taken together within a district

- Sub-stratification: n/4 in number, each with equal population in case of rural and equal no. of HHs for urban (n: sample size for str.)

Illustration from NSS 68th Rd…

- PSU Selection: PPSWR (R); SRSWOR (U)
- Segmentation of large PSUs and selection of 2 segments (one having max. population)
- Stratification of households:

Rural: Relatively affluent (1); Remaining with major earning from non-agr. (2), Others (3)

Urban: Top 10% of the households (1); Middle 60% (2); Bottom 30% (3)

(Cut-off points in terms of average Monthly Per Capita Expenditure which varied across NSS Regions)

Estimation Procedure

- Use of design-based formula for estimation of totals/aggregates

- 'Multipliers' to inflate sample values which take into account the following: no. of PSUs surveyed; selection probability of PSU; no. of segments formed; no. of USUs listed & surveyed in the PSU/segment/ second stage stratum

- Multipliers worked out at the level of PSU x segment x second stage strata

Estimation Procedure

- Sample values multiplied by multipliers and then added up to derive first-stage stratum level estimates

- Stratum level estimates of aggregates added to obtain state (x sector) level estimates

- State totals give all-India estimate

- Ratios worked out at the last stage for the domain of interest

Estimation Procedure

$$\hat{Y}_j = \frac{Z}{n_j} \sum_{i=1}^{n_j} \frac{1}{z_i} \left[D_i^* \times \frac{H_{i2j}}{h_{i2j}} \sum_{k=1}^{h_{i2j}} y_{i2jk} \right]$$

$$\hat{Y}_j = \frac{N}{n_j} \sum_{i=1}^{n_j} \left[D_i^* \times \frac{H_{i2j}}{h_{i2j}} \sum_{k=1}^{h_{i2j}} y_{i2jk} \right]$$

Major Refinements in Sample Design

❑Overall sampling strategy broadly remained the same over NSS Rounds but certain refinements incorporated at different points of time

❑Some major ones are described in subsequent slides

Major Refinements…

- Sample size of PSUs increased manifold over time (from 1,000 plus in the initial rounds to around 12,000 – 14,000 now)

- Urban sampling frame of PSUs switched over from Census EBs till 15th round to NSSO's list of UFS blocks due to some shortcomings of EBs

- Economic Census initiated in 1977 to provide sampling frame for selecting PSUs in the Establishment Surveys to ensure adequate no. of units in the sample

Major Refinements…

- Urban strata (of PSUs) changed to district since 61st round (2004-05) from NSS Region x Size class of towns earlier to facilitate generation of district level estimates for local planning

- Sampling method of PSUs changed to PPSWR (rural) / SRSWOR (urban) since 61st round from Circular Systematic Sampling (CSS) with PPS (rural) / Equal Probability (urban) earlier

Major Refinements…

- Self-weighting design experimented in many rounds of 4–18 to save time & cost of tabulation

- Segment selection (large PSUs) in Establishment Surveys: Segment having max. concentration of units with prob. 1 and a sample from remaining at random introduced in Trade Survey (41st round: 1985-86) as compared to random sampling earlier

Major Refinements…

- USU selection changed to SRSWOR from 61st round instead of CSS with Equal Probability earlier

- A combination of list frame of bigger units and usual area frame approach for other units experimented in 62nd and 63rd rounds of Establishment Surveys for improving the estimates of gross value added

Schedules of Enquiry

- Listing Schedule [for (a) listing of all USUs i.e. households or establishments, as the case may be, in the selected PSU/Segment through a house-to-house visit; (b) collecting some auxiliary information at the household level for stratification; (c) grouping the USUs into a certain no. of strata; and (d) sampling of USUs]

- Detailed Schedule of Enquiry to collect information at the household or establishment level

Structure of Detailed Schedule

- Organized into a number of blocks

- A block on identification particulars

- One block on household/est. particulars

- One block on demographic particulars of household members

- Few blocks on items of information to be collected from the USU (see next slide)

Structure of Detailed Schedule…

Examples:

A. Household Consumer expenditure:

Blocks on: Food; Non-food: Clothing & bedding, Footwear, Durables, … (with appropriate reference periods)

B. Establishment Surveys:

Blocks on Fixed assets, Employment & compensation, Expenses, Receipts, Loan,… (with appropriate reference periods)

[See for details: Survey Reports/ NSSO/www.mospi.gov.in]

Uses of Data

Two Major Uses:

- For planning purposes & policy formulations

- For research purposes (by Individuals / Institutions)

Uses of Data…

NSS Survey on Household Consumer Expenditure:

- Percentage distribution of persons by average monthly per capita expenditure (MPCE) class as per the survey used to arrive at Head Count Ratio (HCR) i.e. proportion of persons below the poverty line (poor) for different states/UTs

[This survey collects information on quantity (for certain items) and value of household consumption of different items of consumption as per certain reference periods; It is used to derive aggregate and per capita consumption]

Uses of Data…

NSS Survey on Household Consumer Expenditure:

- Provides per capita intake of calorie, protein and fat by Indian people (after appropriately converting quantities of consumption into calorie, etc.)

- Aggregate consumption figures at the item level provides a crosscheck the with the corresponding estimates of private final consumption expenditure (PFCE) alternatively available as per the National Accounts of Statistics, to take remedial measures for bridging this divergence

Uses of Data…

NSS Survey on Employment-Unemployment

- Provides important indicators like Worker Population Ratio (WPR), Unemployment Rate (UR), Proportion out of Labour Force, etc. in the country and in its States/UTs

- Size of workforce by industry and occupation, Employment in informal sector and in MGNRGEA, Extent of job creation, Wage rate, Extent of child labor & participation in hazardous activities, etc.

Uses of Data…

NSS Survey on Employment-Unemployment..

- Worker population ratios (WPR) as per principal and subsidiary statuses by industry used to derive Labor Input for estimation of GDP

- Time series data reveal changes in the labor market situation

Uses of Data…

Annual Survey of Industries (by CSO)

- Covers organized manufacturing sector comprising units having 10 or more workers with power or 20 or more workers without power (Frame based on list by CIF)

- Estimated gross value added used to assess the share of organized mfg. sector in GDP

- Time series data => Structural changes

Uses of Data…

Establishment Surveys by NSSO

- Relative importance of states/UTs in terms of number of establishments/workers engaged in the unorganized sector

- Estimates of gross valued added (GVA) per worker used in the estimation of GDP

- Estd. no. of 'unorganized' mfg. sector units with at least 10 workers give an indication of the extent of weakness of ASI frame

Uses of Data…

Census-cum-surveys of MSME Units

- A useful source to assess the size of MSME sector and its composition by industry

- Gross value of output (GVO) by the mfg. units in the MSME sector coupled with GVA to GVO ratio from NSSO's Establishment Survey on Unorganized Manufacture being used in the National Accounts to arrive at GDP by MSME component of Unorg. Mfg.

Uses of Data…

Other Important Household Survey of NSS having uses for planning purposes

- Situation Assessment Survey of Farmers

- Housing Condition

- Social Consumption (Healthcare, Education)

- Disability

- Aged Persons & Their Living Conditions

- Land & livestock holdings, Debt & investment

Thank You