THE NATIONAL SAMPLE SURVEY

FOURTEENTH ROUND : JULY 1958—JUNE 1959

NUMBER 70

TECHNICAL PAPER
ON
SAMPLE DESIGN

सत्यमेव जयते

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ACKNOWLEDGEMENT

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NATIONAL SAMPLE SURVEY
FOURTEENTH ROUND 1958-59

GEOGRAPHICAL DISTRIBUTION OF SAMPLE VILLAGES

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    " : DISTRICT --------   SUB–SAMPLE-2, •
(IN JAMMU & KASHMIR ONE DOT REPRESENTS 2 SAMPLES)

AFGHANISTHAN

JAMMU &
KASHMIR
H.P.

WEST PAKISTAN

PUNJAB

HIMACHAL
PRADESH

UTTAR PRADESH

N E P A L

RAJASTHAN

SIKKIM   BHUTAN
BIHAR

A S S A M

EAST
PAKISTAN

MANIPUR

TRIPURA

MADHYA PRADESH

BURMA

W-BENGAL

ORISSA

ARABIAN
SEA

BOMBAY

BAY OF BENGAL

ANDHRA

MYSORE

ANDAMAN &

NICOBAR ISLS.

MADRAS

LACCADIVE ISLS.

KERALA

CEYLON
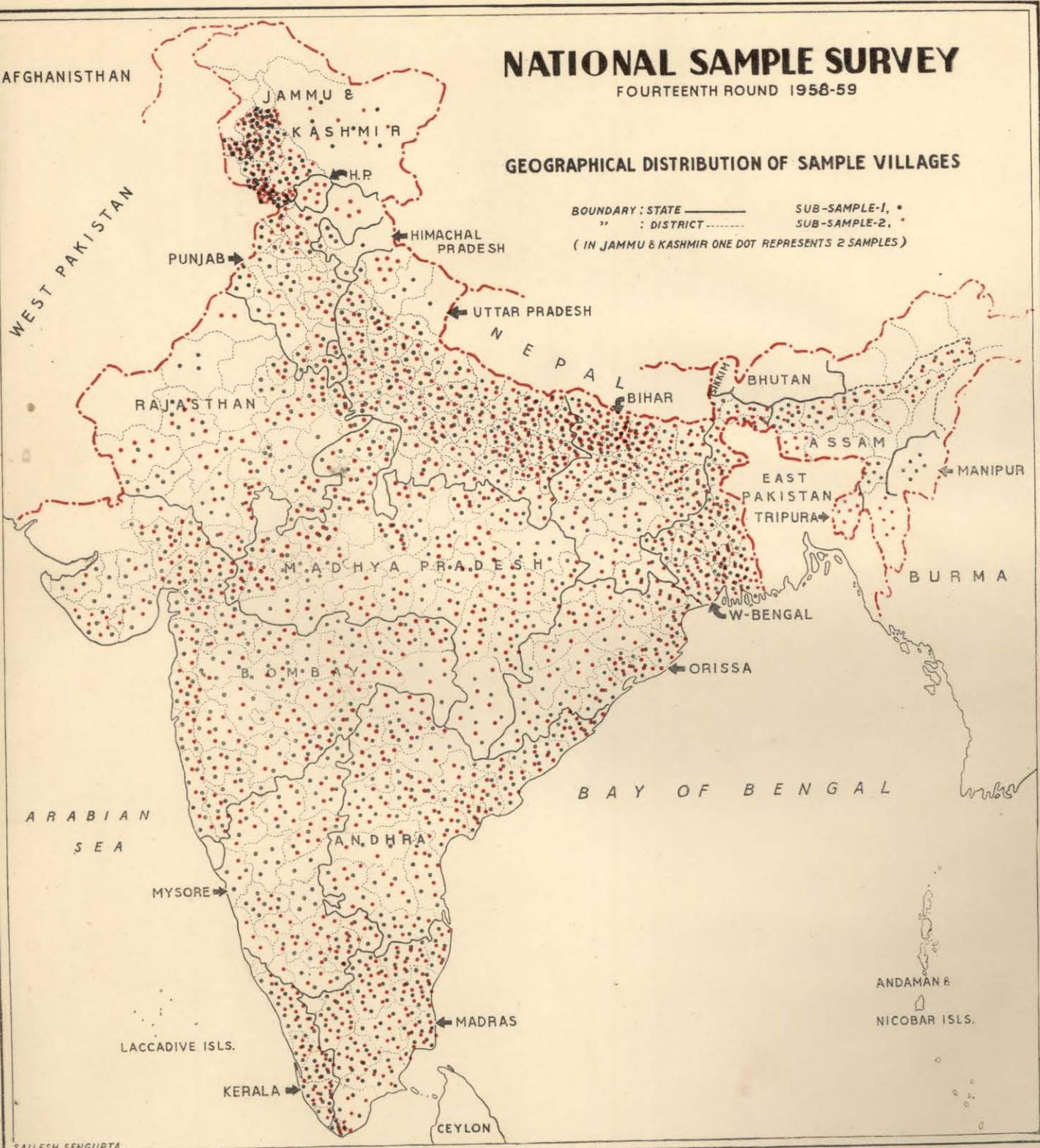
SAILESH SENGUPTA

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This report entitled 'Technical Paper on Sample Design of Fourteenth Round (July 1958—June 1959)' was prepared by the Indian Statistical Institute, Calcutta and is being published in the form in which it was submitted to the Government of India and Government are not responsible for the views contained therein.*

Summary : This technical paper describes in detail the sample design of the fourteenth round of the National Sample Survey (NSS), which is a multipurpose continuing survey being conducted in the form of rounds, each round covering some topics of current interest. In the introductory chapter are given the characteristic features of the design of the NSS together with a historical note. Chapters Two and Three deal with the technical details of the sample designs in the rural and the urban sectors respectively. The general sample design is a stratified two-stage one with villages in the rural sector and census enumeration blocks in the urban sector as first-stage units and households for the socio-economic survey and clusters of plots for the crop survey as second-stage units. An important feature of the design is that the sample in each stratum is drawn in the form of two independent interpenetrating sub-samples to be surveyed by two investigators.

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*The draft report (No. **D. 78**) was submitted to the Government of India in April 1961.

INTRODUCTION

Historical Note

1. The National Sample Survey (NSS) was initiated in 1950 to conduct sampling enquiries with a view to providing the Government and other organisations with socio-economic data which can be used for planning for national development and for various research purposes. It is a continuing survey being carried out in the form of rounds, each round covering some topics of current interest. The rounds of the NSS have so far been of varying duration ranging from 3 to 8 months. Uptill the eleventh round the gap between two successive rounds varied from 1 to 4 months, which period was utilised to retrain the field staff and to conduct some ad-hoc or pilot surveys. Since the eleventh round, attempts are being made to reduce the gap between two consecutive rounds so as to enable us to collect data without appreciably missing any part of the year. The NSS completed 13 rounds of sampling enquiries by the end of May 1958 and the fourteenth round was conducted during the period July 1958 to June 1959.

Subjects of Enquiry

2. The NSS is a multi-purpose survey. In the first few rounds, the emphasis was on getting statistical information needed for the computation of national income and this related to statistics on consumer expenditure and small scale household enter-prise. In the eighth round of the survey, the emphasis was shifted to the study of distribution of land holdings. The primary objective in the ninth round was to study the employment and unemployment situation in the country. In the tenth round of the survey, an exploratory study relating to the estimation of acreage and yield rates of cereal crops was undertaken along with the socio-economic enquiries. During the eleventh and the twelfth rounds the emphasis was on the study of economic conditions of agricultural labourers, such as their consumption, employment, wages and indebtedness. Stress was again laid on the crop survey in the thirteenth round.

Methods of Enquiry

3. In the NSS the work of data collection is done by specially trained quasi-permanent full-time investigators. The data on socio-economic characteristics are collected by investigators by personally interviewing the sample households or persons. In the case of crop survey, the acreage data are obtained for the selected plots (parcels of land) by direct physical observation and the yield rate is obtained by actually har-vesting crop standing in randomly located circular cuts in sample plots. The reference periods for the different enquiries may be a day, week, month or a year depending on the characteristics under consideration.

Responsibility

4. The Central Statistical Organisation, set up in 1951 by the Government of India to coordinate statistical activities of the different Ministries, State Governments and other statistical organisations in the country, is responsible for deciding the subject coverage and the methodology to be used in the NSS. The technical work relating to planning of the survey, formulation of the sample design, designing of schedules, writing of instructions and providing technical guidance to the field workers, processing and tabulation of the data and preparation of the final reports is done at the Indian Statistical Institute (ISI). The major portion of the field work in this large scale sample survey is done by the Directorate of NSS which is under the jurisdiction of the Cabinet Secretariat. The field work in West Bengal and Bombay City is being done by the field branches of the ISI.

Multi-purpose Survey

5. As mentioned earlier, the NSS is a multi-purpose survey. Multi-purpose surveys are generally recognised to be more economical than a series of uni-purpose surveys. The main advantage of such surveys is that there is better utilisation of available resources especially when the time taken for the journey and camp setting accounts for a considerable portion of the total time spent on the survey. Further, grouping of different subjects of enquiry in the same first-stage sample units (sample villages and urban blocks)* helps in increasing the sample size at the first stage. This means greater precision of the estimates than what would have been possible by conducting separate uni-purpose surveys for each of the characteristics within the same total budget, because the variation between first-stage sample units usually counts more than the variation within first-stage sample units for a number of characteristics. In other words, the precision attainable by separate uni-purpose surveys may be achieved by incurring a much smaller expenditure in a multi-purpose survey. It should, however, be mentioned that though multi-purpose surveys are in general more economical and in some sense more efficient than uni-purpose surveys the enquiries to be included in one survey should not be made so numerous and diversified as to overburden the investigators.

Reference Period

6.1. Indian economy being mostly dependent on agriculture is subject to pronounced seasonal fluctuation especially in the rural sector. To take this seasonal factor into account, it is desirable to make the survey period one complete year. The survey periods in the rounds previous to the fourteenth round varied from 3 months to 8 months. The survey period was made a complete year for the first time in the fourteenth round. It may, however, be mentioned that the eleventh and the twelfth rounds together accounted for one complete year with little gap between the rounds.

6.2. In the NSS, the practice has been to collect data from households on the basis of a moving reference period which is usually a week, month or year preced-

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*1951 Census enumeration blocks

ing the date of survey. Thus the data collected do not usually refer to the fixed time period but refer to overlapping time periods of equal length. This mode of survey will help in obtaining estimates of the averages of the characteristics over the period of the survey. This is in contrast to a point survey where the estimates obtained refer to a point of time. In an agricultural economy which is subject to considerable seasonal fluctuations, estimates based on a moving reference period are likely to be more meaningful than those relating to a fixed point of time.

6.3. For some characteristics, however, it may be desirable to collect the data for a fixed reference period but this is not possible in a survey like the NSS due to the employment of a permanent moving field staff. Because of this the survey has to be spread over a period of time. In such a situation it is not possible to have a fixed reference period, for this would introduce recall bias particularly for the units surveyed during the end of the survey period long after the fixed reference period has elapsed.

Interpenetrating Sub-samples

7. One of the important features of the sample design of the NSS has been the use of independent interpenetrating sub-samples for studying the effect of sampling and non-sampling variation in the estimates. Usually the sample for any round is drawn in the form of 2 or more independent interpenetrating sub-samples and are usually surveyed by different investigators. Further the data collected are also analysed sub-samplewise by two different agencies (cf. para 8). This procedure helps in analysing the total variation into its different components such as sampling variation, variation due to investigators, interaction between samples and the investigators, etc.

Participation of States

8. In the eighth round all the State Statistical Bureaus participated in the field work of the NSS by doing the field work for two-thirds of the total sample for their respective states mainly with a view to increasing the sample size for the land holding survey. This state participation in the work of the NSS also helped in providing some overall check on the survey results. Both the central and the state agencies use the same set of schedules and instructions for data collection. Since the eighth round, the participation of the states in the work of the NSS has become a regular feature and at present 12 out of the 15 states are participating both in the field and tabulation work of the NSS on full matching basis with the centre in the sense of doing the field and tabulation work in respect of as many units as covered by the central agency in their respective states. The total sample for each state is usually drawn in the form of 4 (or multiples of 4) interpenetrating sub-samples. Of these, 2 sub-samples are allotted to the state agency and the other 2 sub-samples to the central agency. Within an agency the 2 sub-samples are surveyed by two different parties of investigators. As mentioned earlier this procedure helps in analysing

the total error of an in the estimate into its components, such as between agency, between parties within agency, etc.

Fourteenth Round

9.1. The Chief Director of the NSS Directorate had invited suggestions regarding the subjects to be undertaken in the fourteenth round from the different Ministries of the Government of India and the states participating in the work of the NSS. A number of suggestions were received and these suggestions were carefully examined with a view to accomodating as many requirements of the requisitioning agencies as possible with the existing resources. Based on this, a draft programme for the fourteenth round, prepared by the ISI, was circulated to the members of the NSS Programme Advisory Committee. The draft proposals were considered in detail by a Working Group in its meeting held at Calcutta on 8th and 9th May 1958 and latter by the Programme Advisory Committee in its meeting held on 12th May 1958 and were accepted after certain modifications in the proposed schedules.

9.2. The subjects covered in this round are population, crop, income and expenditure, small-scale manufacture and handicrafts, and employment and unem-ployment in both the urban and rural sectors and population, births and deaths, village statistics, crop statistics and retail prices only in the rural sector. The details regarding the subject coverage in rural and urban sectors are given in later paragraphs.

9.3. The geographical coverage for the survey consisted of all-India exclud-ing Andaman and Nicobar Islands, Amindive and Laccadive Islands, the North-East Frontier Agency and the rural areas of Ladakh district in Jammu and Kashmir. The exclusion of these areas was necessitated due to cost and operational considerations.

9.4. In this round the states of Assam, Bihar, Bombay, Kerala, Orissa, Punjab and Uttar Pradesh participated in the work of the NSS on full matching basis and the state of Andhra Pradesh participated on half-matching basis. The sampling design and the programme of work for the state samples, both in the rural and urban sectors were exactly similar to those for the central samples. This participation helped considerably in increasing the sample size for these states.

TABLE 1 : ALLOCATION OF SAMPLE VILLAGES AND BLOCKS AND NET INVESTIGA-
TOR REQUIREMENTS FOR THE CENTRAL SAMPLE

| state | number of sample | | number of investigators (net) | | |
	villages	urban blocks	rural	urban	total
(1)	(2)	(3)	(4)	(5)	(7)
1. Andhra Pradesh	216	154	36	5	41
2. Assam*	96	24	16	2	18
3. Bihar	228	68	38	2	40
4. Bombay	312	431	52	14	66
5. Jammu and Kashmir	324	216	54	6	60
6. Kerala	72	63	12	2	14
7. Madhya Pradesh	252	88	42	3	45
8. Madras	180	233	30	7	37
9. Mysore	120	125	20	4	24
10. Orissa	120	16	20	1	21
11. Punjab**	96	180	16	5	21
12. Rajasthan	120	82	20	3	23
13. Uttar Pradesh	312	264	52	8	60
14. West Bengal	168	284	28	8	36
15. total	2616	2228	436	70	506

*Includes Manipur and Tripura.   **Includes Delhi and Himachal Pradesh.

TABLE 2 : ALLOCATION OF SAMPLE VILLAGES, BLOCKS AND NET INVESTIGATOR
REQUIREMENTS FOR THE PARTICIPATING STATES

| state | number of sample | | number of investigators (net) | | |
	villages	urban blocks	rural	urban	total
(1)	(2)	(3)	(4)	(5)	(6)
1. Andhra Pradesh*	108	77	18	3	21
2. Assam	84	20	14	1	15
3. Bihar	228	68	38	2	40
4. Bombay	312	428	52	14	66
5. Kerala	72	61	12	2	14
6. Orissa	120	16	20	1	21
7. Punjab	84	104	14	3	17
8. Uttar Pradesh	312	264	52	8	60

*Participation on half-matching basis.

TABLE 3: ALLOTTED SAMPLE SIZES FOR DIFFERENT ENQUIRIES
(CENTRAL SAMPLE)

sche-dule number		description	number of sample				
			villages	urban blocks	households/plots*		
					rural	urban	total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	1.1	income and expenditure	2616	2228	7848	2228	10076
2.	2.2	small scale manufacture and handicrafts	2616	2228	27032	6684	33716
3.	3.0	village statistics	2616	—	—	—	—
4.	3.01	retail prices of selected commodities	872**	—	—	—	—
5.	5.0	land utilisation survey	2616	—	156960†	—	156960
6.	5.1	crop-cutting experiments	872	—	5232†	—	5232
7.	10	employment and unemployment	2616	2228	10464**	8912	19376
8.	12.1	population, births and deaths enumeration	872	—	104640	—	104640
9.	12.1.1.	population, births and deaths re-enumeration	872	—	104640	—	104640
10.	12.2	births and deaths enumeration	2616	—	313920	—	313920

*'Household' applies to schedules 1.1, 2.2, 10, 12.1, 12.1.1 and 12.2 and 'plot' applies to schedules 5.0 and 5.1.

**Surveyed once in every two months.

†Surveyed once in every crop season.

RURAL SECTOR

Subject Coverage

1.1. The Working Group on Vital and Health Statistics of the Planning Commission, Government of India, desired that some exploratory work relating to the estimation of *rate of increase of population and of birth and death rates* should be taken up during the fourteenth round of the NSS. It may be mentioned that no firm estimates of these rates, which are essential for the developmental planning of the national economy, were then available. To fill this gap in the Indian population statistics, it was decided to collect data on births and deaths in this round on an intensive scale.

1.2. The rate of natural increase in population is obtained by taking the difference between the birth rate and the death rate. The rate of growth of population may be obtained by estimating the population at two points of time. For getting fairly good estimates for these rates, it was felt that complete enumeration of all the households in the sample villages would be desirable. For adopting the latter method of estimating the growth rate, it was necessary to survey the sample villages at two points of time with a sufficiently wide interval of time.

1.3. Information regarding the unorganised sector of economic activity, namely the small scale and cottage industry, is of vital importance in formulating developmental plans. Hence data on *household manufacturing enterprises* were collected with a view to throwing some light on this sector. As it is likely that there will be seasonal fluctuations, this information was collected over the seasons. It may be mentioned that this enquiry was taken up in some of the earlier rounds, the last round being the tenth round (December 1955--May 1956).

1.4. During the ninth round of the NSS (May—September 1955) data on *employment and unemployment* were collected. Since it would be of interest to compare the employment and unemployment situation with that observed three years ago, it was decided to have this enquiry in the fourteenth round. As there is much seasonal fluctuation in the employment pattern especially in the rural areas, the data were collected over the seasons in this round. The employment data were collected from the same set of sample households once in every two months as this would make the study of changes in employment pattern over the seasons more effective.

1.5. An enquiry into the family budgets and employment pattern of agricultural labour households by the Ministry of Labour was undertaken by NSS during its eleventh and twelfth rounds (August 1956—July 1957). The weights to be used in the construction of the cost of living index for the rural agricultural labour popula-

tion were obtained from this enquiry. To build up these indices the Ministry of Labour and Employment was in need of *retail price data* in rural areas. Hence the rural retail price collection was undertaken in the thirteenth round (September 1957— May 1958) and this was continued in this round. Price data were collected from the same set of sample villages once in every two months in this round, since it would make the comparison of the indices over time more effective.

1.6. The NSS has been collecting data on *household income and expenditure* since its inception. In this round also it was decided to take up this enquiry with a view to throwing some light on the seasonal variation in the expenditure pattern in the rural areas and to keep up the time series of estimates relating to the consumer expenditure pattern available from the first round onwards.

1.7. Since the tenth round of the NSS, intensive exploratory work has been undertaken with a view to estimating *crop acreage and yield rates* on the basis of an all-India sample by the method of direct physical observation. A crop survey was undertaken in this round also for providing estimates of the acreage and production of all the cereal crops taken together at the all-India level.

1.8. Besides the above enquiries, statistics relating to the availability of educational, medical and other social amenities in the sample villages were also collected. The subjects taken up for enquiry are shown in Table (4) along with their schedule numbers. Besides these schedules there were four other schedules 0.1, 0.11, 0.12 and 5.01 for listing and selection of households or plots for different enquiries. There was also a schedule (4.0) for keeping record of time spent on different survey operations by the investigators.

TABLE 4 : SUBJECTS TAKEN UP FOR ENQUIRY (RURAL)

	description	schedule number
	(1)	(2)
1.	income and expenditure	1.1
2.	small scale manufacture and handicrafts	2.2
3.	village Statistics	3.0
4.	retail prices of selected commodities	3.01
5.	land utilisation survey	5.0
6.	crop-cutting experiments	5.1
7.	employment and unemployment	10
8.	population, births and deaths enumeration	12.1
9.	population, births and deaths re-enumeration	12.1.1
10.	births and deaths enumeration	12.2

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Survey Period

2. The period of the survey was taken as one complete year as the seasonal fluctuations were to be taken into account and studied in case of enquiries like employment, household enterprises and income and expenditure. As it is desirable to collect data from the same set of households, or at least from the same set of villages, over the seasons for estimating seasonal fluctuations, the sample villages had to be visited periodically. The period was taken as two months, since this would enable us to cover all the seasons which are generally of 3 or 4 months duration. Again, as there are very few crops which stand for less than two months, there was little chance of missing some crop if the sample villages were visited once in two months. Hence this round consisted of six sub-rounds of two months duration each and all the sample villages were visited in each of the six sub-rounds.

Fixation of Work-load

3.1. The field staff available for the central sample was of the order of about 400 investigators together with the necessary supervisory staff. While planning this survey the strength of the existing field staff had to be borne in mind, as it would be difficult from the operational view point to recruit and train the additional field staff in a considerably short time. Another consideration that was taken into account was the sample size needed for giving fairly reliable estimates for the different characteristics that had been proposed to be surveyed. An idea regarding the sample sizes needed for different enquiries was obtained on the basis of the results of the previous rounds of the NSS.

3.2. Fixing up of the work-load for an investigator had to be done taking into consideration the sample sizes needed for the different enquiries, the operational difficulties involved and the time requirement for canvassing the various schedules. If one had choice regarding the number of investigators, then the procedure of fixing up the work-load would have been done taking into consideration the period and the scope of the survey. In this way we would have determined the number of investigators required for this survey. Since this choice was not available to us, it was the scope of the enquiry which had to be adjusted.

3.3. The problem regarding the fixation of the work-load for investigators may be stated as follows. The number of investigators available for the survey is fixed (of the order of 400). The period of the survey is given to be one year. The number of villages* to be surveyed for the most important enquiry in this round, namely population enquiry, should be of the order of 2500†. The time requirements for canvassing the different schedules are fixed on the basis of past experience. Taking into account all the above constraints, one had to determine how to achieve the

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*Village is a well-defined socio-economic unit consisting of households and plots (parcels of land). There are about 560,000 villages in India.

†This figure is based on empirical studies conducted on the basis of the data collected in the listing schedule during the eleventh round (August 1956—January 1957).

maximum utilisation of the available resources. In other words, how the scope of different enquiries are to be adjusted so as to get the maximum amount of data necessary for the purposes of national planning using the available field staff. It is not desirable to fix the work-load for the investigators on the basis of purely theoretical considerations. The approach had to be, of necessity, empirical—one of trial and success.

3.4. As there were about 400 investigators and about 2500 villages to be surveyed, each investigator had to survey six villages. Then, the problem reduced to that of fixing up work-load for only one investigator in these six villages. The number of working days in a year for an investigator was 280 days (number of Sundays 52, number of public holidays 18, casual leave 15 days). Privilege or earned leave was not considered here because there is a reserve of 10% investigators in the field to take account of such eventualities. The time requirements for the various schedules as obtained on the basis of the experience of the field staff during the thirteenth round in the different states are given below. In case of population schedules (12 series), the time requirements were based on try out of these schedules in the field.

TABLE 5 : AVERAGE TIME REQUIREMENTS FOR DIFFERENT SCHEDULES AND JOURNEY BETWEEN VILLAGES

schedule number		enquiry	time standard
(1)		(2)	(3)
1.	0.1	list of households	2 days/village
2.	1.1	income and expenditure	3 households/2 days
3.	2.2	small scale manufacture and handicrafts	2 households/day
4.	3.0	village statistics	½ day/village
5.	3.01	retail prices of selected commodities	1 day/village
6.	5.0	land utilisation survey	3 clusters of 10 plots/day
7.	5.1	crop-cutting experiments	2 cuts/day
8.	10	employment and unemployment	6 households/day
9.	12.1	population, births and deaths enumeration	10 days/village
10.	12.1.1	population, births and deaths re-enumeration	5 days/village
11.	12.2	births and deaths enumeration	5 days/village
12.		journey	2 days/village

3.5. It would have been desirable to fix the work-load on the basis of the time requirement in the different states and if possible even at lower levels since there is considerable variation in time requirement from region to region. But fixation of work-load was done on the basis of the average all-India time requirement, because there were a number of other considerations influencing the work-load of the investi-

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gator such as communication facilities, weather, etc. which could not be taken into account particularly owing to lack of factual information on these. It may be pointed out that the work-load for a particular investigator depends much on the actual sample villages, households and plots.

3.6. It was considered desirable to integrate the socio-economic and crop surveys, that is, to conduct both the enquiries in a common set of villages. This helped in reducing the time takn for journey and camp-setting and hence the number of sample villages could be increased for all the inquiries. This meant greater precision for estimates since usually the contribution to the total variation from sampling villages is large for many characteristics.

3.7. To study seasonal fluctuation it would have been desirable to collect the information on consumer expenditure and household enterprise from the same set of sample households in each of the sub-rounds. But this could not be done since the field staff had experienced some resistance on the part of informants in giving the detailed information required in this schedule more than once in a short period of time.

3.8. Considering the sample size desired for different enquiries, initially it was proposed to have the following programme of work : collection of data on population, births and deaths from all the sample villages in the first and the last sub-rounds, on prices in one-third of the sample villages in each sub-round, on village statistics in all the villages in any sub-round, and on land utilisation in all the sample villages and yield survey in one-third of the sample villages in each crop season, and canvassing of schedule 1.1 for 1 household, schedule 2.2 for 2 households and schedule 10 for 4 households par sample village in each sub-round.

3.9. The total number of working days required for the above programme of work was 330 as against the available 280 working days for an investigator. Hence this programme was found to be impracticable. Further the work-load was not evenly spread out over the six sub-rounds. The work-load in the first and the last sub-rounds was very heavy compared with that in the other sub-rounds. The above programme of work, therefore, needed modification in two directions. The over-all work-load had to be reduced and it had to be spread evenly over the six sub-rounds. Even spreading of the work-load over the sub-rounds was necessary to ensure equal duration of the sub-rounds and a fairly constant time interval between two successive investigations of the same village.

3.10. As a large portion of the time was taken up by schedule 12.1 (population), the work programme relating to this schedule was examined carefully with a view to achieving substantial reduction in the overall work-load and even-spread of the work over sub-rounds. After this examination it was decided to canvass schedule 12.1 in only one sample village per investigator in each of the first two sub-rounds and to take up schedule 12.1.1. for these two villages in the last two sub-rounds, one

in each sub-round. Schedule 12.1 was simplified by omitting the detailed person by person enumeration to form schedule 12.2. This schedule was meant to be canvassed in one sample village in each of the last four sub-rounds. These changes, in effect, meant that we would be getting data on births and deaths from all the six villages allotted to an investigator at the rate of one village per sub-round and that the population count at two points of time could be done only in one-third of the sample villages, the gap between the two points being about eight months. This modification of the work programme helped considerably in solving the problem of work-load mentioned above.

3.11. The following were some of the other modifications in the work programme. The sample size for schedule 1.1 was reduced by half and that for schedule 2.2 was reduced to 10 from 12 households for an investigator in each sub-round except the first. It was decided to collect village statistics in all the sample villages in the third sub-round instead of the first sub-round, which had a heavy work-load even after this modification. It may be pointed out that the work-load for crop survey has been calculated on the basis of three crop seasons whereas in many of the states there would perhaps be only two seasons. Hence it was expected that the time requirement taken at the planning stage would be adequate.

3.12. The final programme of work for an investigator in the rural sector in the different sub-rounds of this round was arrived at by adopting the method of trial and success with a view to getting the maximum amount of the data with the available resources. Tables (6) and (7) give the finalised work-load for an investigator and the time requirements for the different schedules. The six villages allotted to an investigator were numbered from 1 to 6 according to the order of selection. An examination of these tables shows that the work load for the first sub-round was quite heavy even with the above modifications. Hence it was decided to start the survey a week earlier than the scheduled time so that for completing the first sub-round work 9 weeks were available.

Programme of Work

4.1. In each stratum, the same two investigators were working throughout the survey period, each investigating a sub-sample of six villages in each of the sub-rounds. The six sample villages allotted to an investigator were numbered from 1 to 6 in the sample list according to their order of selection and were visited in that order in each sub-round. It was expected that the sample villages 1,2,3 would be investigated in the first month and the sample villages 4,5,6 in the second month of each sub-round. The work specified for one sub-round had to be finished in that sub-round itself as far as possible. In each agricultural season the land utilisation survey was carried out in all the sample villages and the crop-cutting experiments in sample villages 3 and 6.

4.2. If the work of the first sub-round could not be completed in the first sub-round period (first two months), then attempts were made to complete the work

TABLE 6 : SAMPLE VILLAGES TO BE SURVEYED FOR THE DIFFERENT
SOCIO-ECONOMIC ENQUIRIES BY AN INVESTIGATOR AND THE
CORRESPONDING TIME REQUIREMENTS

	sche-dule num-ber	sub-round											
		1		2		3		4		5		6	
		sam-ple vill-ages	num-ber of days	sam-ple vill-ages	num-ber of days	sam-ple vill-ages	num-ber of days	sam-ple vill-ages	num-ber of days	sam-ple vill-ages	num-ber of days	sam-ple vill-ages	num-ber of days
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1.	0.1	1–6	10*	–	–	–	–	–	–	–	–	–	–
2.	1.1	1,3,5 (3)	2	1–6 (3)	2	1–6 (3)	2	1–6 (3)	2	1–6 (3)	2	1–6 (3)	2
3.	2.2	1–6 (12)	6	1–6 (10)	5	1–6 (10)	5	1–6 (10)	5	1–6 (10)	5	1–6 (10)	5
4.	3.0	–	–	–	–	1–6	3	–	–	–	–	–	–
5.	3.01	2,5	2	2,5	2	2,5	2	2,5	2	2,5	2	2,5	2
6.	10	1–6 (24)	4	1–6 (24)	4	1–6 (24)	4	1–6 (24)	4	1–6 (24)	4	1–6 (24)	4
7.	12.1	1	10	4	10	–	–	–	–	–	–	–	–
8.	12.1.1	–	–	–	–	–	–	–	–	1	5	4	5
9.	12.2	–	–	–	–	2	5	5	5	3	5	6	5
10.	journey	1–6	12	1–6	12	1–6	12	1–6	12	1–6	12	1–6	12
11.	total	–	46	–	35	–	33	–	30	–	35	–	35

*In sample village 1, the information required in schedule 0.1 was obtained along with data collected for schedule 12.1.

(The figures in brackets denote the total number of sample households to be investigated in the case of household schedules).

Total number of working days required for socio-economic survey : 214

TABLE 7 : SAMPLE VILLAGES TO BE SURVEYED FOR THE CROP-
SURVEY BY AN INVESTIGATOR AND THE CORRESPONDING
TIME REQUIREMENTS FOR A CROP SEASON

	schedule number	in each of the three seasons	
		sample village	number of days
	(1)	(2)	(3)
1.	5.0	1—6 (360)	12
2.	5.1	3,6 (12)	6
3.	journey (revisit)	3,6	4
4.	total	—	22

(The figures in the brackets denote the total number of plots to be surveyed).
Total number of working days required for crop survey : 66
Total number of working days required for the modified programme : 280.

specified for the first and the second sub-rounds by the end of the second sub-round period (in the first four months). Similarly if the work specified for the first two sub-rounds could not be finished in time, then attempts were made to complete the work of the first three sub-rounds by the end of the third sub-round period (in the first six months) and so on. The work of any particular sub-round had to start immediately after the completion of work of the previous sub-round, but not earlier than ten days preceding the starting date of that sub-round period.

Sample Design (general)

5.1. Complete integration of the socio-economic and crop surveys was achieved by selecting the villages circular systematically with equal probability after proper stratification and arrangement. In other words, the land utilisation and yield surveys as well as the various socio-economic enquiries were undertaken in a common set of villages. This integration helped in getting a considerably larger sample size for both the surveys than would have been possible with the necessary sub-round restrictions discussed in section 2. It is expected that the loss of efficiency in having equal probability selection as compared to varying probabilities selection could be offset, at least partially, by using the method of ratio estimation at the tabulation stage.

5.2. The general sampling design was a stratified two-stage one where the villages were the first-stage units and households and clusters of plots formed the second-stage units for socio-economic enquiries and crop survey respectively. In the case of yield survey, crop plots* and circular cuts in them formed the third and fourth-stage units respectively. The strata were formed by grouping contiguous tehsils which were homogeneous with respect to 1951 census population density, altitude above sea-level and food crops, and equalising strata populations as far as possible within each state. From each stratum 2 circular systematic samples of 6 villages were selected with independent random starts after arranging the tehsils according to geographical contiguity to allow for interpenetration of investigators at stratum level. Such interpenetration helped in obtaining an easy estimate of the total error of the estimate including the differential non-sampling error. Within each selected village, the required number of households were selected from all the households in it systematically with a random start for the different socio-economic enquiries after some suitable arrangement of the households. For the land utilisation survey, the required number of clusters of plots were selected systematically from the slelected villages. In one-third of the villages, crop-cutting experiments were conducted for the cereal crops.

Allocation of Sample Villages

6.1. The sample size for this round in the rural sector was about 2600 villages. These were allocated to the states on a joint consideration of their population, geographical area, crop acreage and the number of persons engaged in household enterprise obtained on the basis of 1951 census. Special weight was given to the state of Jammu

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*Plots growing one or more of the specified cereal crops.

and Kashmir in the final allocation as separate estimates had to be obtained for that state.

6.2.   As different languages are being spoken in different regions it was not feasible to transfer the investigators from one region to another.   Recruitment or discharging of investigators at short notice would have been difficult.   Hence in making the allocation the present investigating strength in the different administrative blocks of the NSS were taken into consideration.   The allocations were finally rounded off to multiples of 12 with a view to allowing 2 investigators to work in each stratum.

TABLE 8 :   ALLOCATION OF SAMPLE VILLAGES TO THE STATES ON THE BASIS
OF DIFFERENT CRITERIA

	allocation of villages proportional to						
state	rural population (P)	geographical area (G)	GP	$G\sqrt{pq}$ (p:prop. of net cultivated area q=1-p)	number of persons engaged in small scale manufacturing industries	number of investigators in 13th round	final allocation‡
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Andhra Pradesh	208	201	218	220	371	182	216
2. Assam*	80	186	129	118	31	85	96
3. Bihar	292	128	205	140	101	205	228
4. Bombay	279	362	339	406	352	319	312
5. Jammu and Kashmir	20	176	63	65	n.a.	108	324+
6. Kerala	95	28	55	31	139	57	72
7. Madhya Pradesh	185	325	261	346	158	255	252
8. Madras	183	95	141	106	204	182	180
9. Mysore	121	142	139	157	108	160	180
10. Orissa	113	115	121	123	113	114	120
11. Punjab**	116	111	119	114	132	114	96
12. Rajasthan	105	251	173	262	134	137	120
13. Uttar Pradesh	441	216	328	239	544	313	312
14. West Bengal	162	64	109	73	166	177	168
15. total	2400	2400	2400	2400	2399	2409	2616

n.a. =not available *Includes Manipur and Tripura.   **Includes Delhi and Himachal Pradesh.

+Due to subsequent increase in field strength for provision of better estimates for this state.

‡The final allocation of villages to the state samples of Bihar, Bombay, Kerala, Orissa and Uttar Pradesh were the same as those given for the central sample in the above table, whereas for Assam (excluding Manipur and Tripura) and Punjab (excluding Delhi and Himachal Pradesh) it was 84 each, and for Andhra Pradesh it was 108.

(Allocation in proportion to $G\sqrt{pq}$ is considered as this has been empirically found to be a good approximation to the optimum allocation for estimating net cultivated area).

6.3. Within a state the allocation of the sample size to the strata was in proportion to the strata populations. This, together with the need for equal workload in each stratum, made it necessary to form strata, each having approximately the same population.

Stratification

7.1. In 1957 the Ministry of Education and Scientific Research published the Indian National Atlas giving a variety of maps showing population density, relief, food crops grown, etc. In each state, strata were formed by grouping contiguous tehsils* which are homogeneous with respect to population density, altitude above sea level and cultivation of food crops. At the same time the population of each stratum was made approximately the same. The number of strata in a state was taken as one-twelfth of the allocation of sample villages for that state, since two investigators had to be posted in every stratum, each surveying a sub-sample of six villages, to take account of the differential investigator bias also in the calculation and analysis of the total error in the estimates.

7.2. The above system of stratification was adopted as it was felt that strata so formed would be more or less homogeneous for a number of subjects of enquiry that were undertaken in this round. This survey, being a multi-purpose one, had to take a number of criteria into account in stratification and consequently this system of stratification may not necessarily be optimum for certain specific enquiries. The operational procedure followed at the time of stratification is given below.

7.3. From the political map of India, state, district, and tehsil boundaries of every state were traced out. This sketch of each state was superimposed on the map showing altitude above sea level, and the tehsils in the state were classified into three strata on the basis of altitude groups formed. The sketched-out map of that state was then superimposed on the map showing the population density and the tehsils were classified into three density groups formed in such a way that approximately one-third of the tehsils falls in each group. For big states like Uttar Pradesh, the map showing food crops was also used to form 2 or 3 groups of the tehsils on the basis of crops grown there. Thus all the tehsils in each state were classified into 9, 18 or 27 classes. A specimen of a table showing the classification of tehsils in a state is given in Table (9).

7.4. After getting this two- or three way table, the tehsils were arranged in a serpentine order with bends at as short intervals as possible in such a way that any two consecutive tehsils in the list are contiguous on the map and are roughly homogeneous with respect to population density, altitude above sea level and food crops. This type of serpentine arrangement was used so that, as far as possible, compact strata could be formed at the time of demarcation of strata. At the time of

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*Tehsil is an administrative unit consisting of villages and a few towns. There are about 2500 such units in India. Tehsil was taken as the unit of stratification instead of village, since the relevant information was available only at tehsil level and not at village level.

3

TABLE 9 : SPECIMEN WORKING SHEET USED FOR CLASSIFYING THE TEHSILS IN UTTAR PRADESH INTO DIFFERENT DENSITY, ALTITUDE AND FOOD CROP CLASSES

population density per square kilometre	food crop	altitude above sea-level in metres		
		less than 150	150—300	above 300
below 80	rice	k: 3, 4	—	—
	wheat	—	Q: 1, 2, 3, 4 V:2, x:2, 5, 6	B: 3, K:2, 3, Q: 5, 6, T:1, 2, x:4
	others	—	U: 4	B: 1, 2, 4, K:1, R:1, 2, 3, 4, U:2, 3
80—240	rice	F: 2, 6, 8, e:1, 3, k:1, 2, s:4	—	—
	wheat	E: 3, 4, G:3, 4, I:1, 2, 3, 4, 5, 6 J: 2, 3, O:1, 3, X:1, 2, 3, Y:1, 3, 4, f: 1, 2, 3, 4, 5, r:2, t:4, v:1, 2, 3, x: 1, 3, y: 1, 2, 3, 4	A: 1, 4, C:1, 2, 5, 6, 7, E:1, 2, H:1, 2, 3 J: 1, O: 2, 4, V:1, 3, Y:2, a:1, 4, 5, b:1, 3, 5 h: 1, 2, 3, 4, i:1, j:1, 2, 3, l:2, 4, m:2, 3, 4 o: 1, 2, 3, 4, 5, p:1, 2, 3, 4, 6, t: 1, 2, 3, u:2, 4	u: 1
	others	—	U: 1	—
above 240	rice	D: 1, 2, 3, 4, 5, 6 F:1, 3, 4, 5, 7, L:1, 2, 3 M:1, 2, 3, N:1, 2, 3, 4 P:1, 2, 3, 4, 5 S:1, 2, 3, 4, W:1, 2, 3 Z: 1, 2, 3, 4, c:1, 2, 3, d:1, 2, 3, 4, 5, e: 2, q:1, 2, 3, 4, s:1, 2, 3, w:1, 2, 3, 4	—	—
	wheat	G: 1, 2, g:1, 2, 3, 4 r:1, 3, v:4	A: 2, 3, 5, 6, C:3, 4, H:4, a:2, 3, b:2, 4 i: 2, 3, 4, j:4, l:1, 3, m:1, 5, 6, n:1, 2, 3, 4, 5, 6, p:5, u:3	—
	others	—	—	—

(Alphabet codes stand for districts and numeral codes as given in National Atlas for tehsils within districts)

A—Aligarh, B—Almora, C—Agra, D—Azamgarh, E—Etawah, F—Allahabad, G—Unnao, H—Etah, I—Kanpur, J—Kheri, K—Garhwal, L—Ghazipur, M—Gonda, N—Gorakhpur, O—Jalaun, P—Jaunpur, Q—Jhansi, R—Tehrigarhwal, S—Deoria, T—Dehradun, U—Nainital, V—Pilibhit, W—Pratapgarh, X—Fatehpur, Y—Farukhabad, Z—Faizabad, a—Budaun, b—Bareilly, c—Ballia, d—Basti, e—Bahraich, f—Banda, g—Barabanki, h—Bijnor, i—Bulandsahr, j—Mathura, k—Mirzapur, l—Muzaffarnagar, m—Moradabad, n—Meerut, o—Mainpuri, p—Rampur, q—Raebareli, r—Lucknow, s—Varanasi, t—Shahjahanpur, u—Saharanpur, v—Sitapur, w—Sultanpur, x—Hamirpur, y—Hardoi.

arranging the tehsils top priority was given to contiguity, next priority to population density, third priority to the altitude above sea level with food crops getting the last priority. This order of priority was given with a view to having compact investigation zones (section 8) and because of the importance attached to getting good estimates of population growth rate. It is expected that arrangement with respect to altitude and population density would help in having a good stratification for at least major crops. After arranging tehsils, required number of strata were formed by grouping consecutive tehsils and equalising the strata populations.

TABLE 10 : POPULATION DENSITY AND RELIEF (ALTITUDE ABOVE SEA LEVEL) CLASSES INTO WHICH THE TEHSILS IN EACH STATE WERE CLASSIFIED FOR THE PURPOSE OF STRATIFICATION

state	density class : population per square kilometre			relief class : altitude above sea level in metres		
	1	2	3	1	2	3
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Andhra Pradesh	— 40	40—160	160—	— 75	75—300	300—
2. Assam*	— 40	40—100	100—	—300	300—	—
3. Bihar	—160	160—400	400—	— 75	75—300	300—
4. Bombay	— 60	60—120	120—	—150	150—600	600—
5. Madhya Pradesh	— 40	40— 80	80—	—300	300—600	600—
6. Madras	— 40	40—160	160—	— 75	75—300	300—
7. Mysore	— 80	80—120	120—	—300	300—600	600—
8. Orissa	— 80	80—160	160—	—300	300—600	600—
9. Punjab**	— 80	80—160	160—	—300	300—	
10. Rajasthan	— 20	20— 60	60—	—300	300—600	600—
11. Uttar Pradesh	— 80	80—240	240—	—150	150—300	300—
12. West Bengal	—200	200—300	300—	—300	300—900	900—

*Includes Manipur and Tripura.   *Includes Delhi and Himachal Pradesh

7.5. Since the sample size for Jammu and Kashmir was large, it was possible to consider one tehsil or a group of two contiguous tehsils as a stratum. It may be mentioned that the list of tehsils given in the National Atlas for Kerala did not tally with that available in the NSS frame, which is based on the census district handbook. Hence the stratification in Kerala was done on the basis of the maps given in the census volumes. Even in some of the other states it was not possible to identify a few tehsils mentioned in the census records on the map and vice-versa. In such cases the list of tehsils as given in the census records was adopted, since the details regarding the villages in the tehsils included in the National Atlas but excluded from the census records were not available.

7.6. The map of Uttar Pradesh showing the boundaries of the state together with their density and relief features is reproduced here to illustrate the method of stratification outlined in the earlier paragraphs. This map will help in giving an idea as to the extent to which it has been possible to observe the different criteria laid down for stratification.

Investigation Zones

8.1. Since in this round the strata were formed by grouping tehsils which were homogeneous with respect to population density, the area of some strata happened to be large. In such cases the strata were further sub-divided into compact investigation zones, each of which had an area not greater than 6000 square miles with a view to providing approximately the same geographical coverage for each investigator. In all other cases the stratum itself was taken as an investigation zone. Thus each stratum consisted of one or more investigation zones.

8.2. In strata which formed single investigation zones, two sub-samples of six villages each were selected systematically with independent random starts. In cases of strata which consisted of two or more investigations zones, two investigation zones were selected with probability proportional to the number of villages in them and with replacement ; and from each selected investigation-zone, a sample of six villages was selected systematically with a random start. Thus in each stratum two independent sub-samples of six villages each were selected and these were surveyed by two different investigators.

TABLE 11 : DISTRIBUTION OF STRATA BY NUMBER OF INVESTIGATION ZONES

state	total number of strata	number of strata with number of investigation zones						number of investigation zones	
		1	2	3	4	5	6	total	not selected
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. Andhra Pradesh	18	10	7	1	—	—	—	27	3
2. Assam*	8	5	—	2	—	1	—	16	5
3. Bihar	19	15	4	—	—	—	—	23	1
4. Bombay	26	10	14	2	—	—	—	44	10
5. Jammu and Kashmir	27	27	—	—	—	—	—	27	—
6. Kerala	6	6	—	—	—	—	—	6	—
7. Madhya Pradesh	21	5	13	3	—	—	—	40	10
8. Madras	15	15	—	—	—	—	—	15	—
9. Mysore	10	3	7	—	—	—	—	17	2
10. Orissa	10	5	4	1	—	—	—	16	3
11. Punjab**	8	4	3	1	—	—	—	13	1
12. Rajasthan	10	1	6	1	1	—	1	26	10
13. Uttar Pradesh	26	23	2	—	1	—	—	31	3
14. West Bengal	14	14	—	—	—	—	—	14	—
15. total	218	143	60	11	2	1	1	315	48

*Includes Manipur and Tripura.   **Includes Delhi and Himachal Pradesh.

INDIAN STATISTICAL INSTITUTE
NATIONAL SAMPLE SURVEY : FOURTEENTH ROUND (RURAL) : 1958-'59

H. P.

TIBET

PUNJAB

DELHI

RAJASTHAN

NEPAL

BIHAR

MADHYA PRADESH

RELIEF
HEIGHT ABOVE SEA LEVEL IN METRES
- BELOW-150
- 150 - 300
- ABOVE - 300

POPULATION DENSITY
No. OF PERSONS PER SQ KILO M.
- LESS THAN - 80
- 80 - 240
- ABOVE - 240

UTTAR PRADESH
BOUNDARY : STATE
DISTRICT
TEHSIL
STRATUM
INVESTIGATION ZONE

SCALE : K.M.
0   50   100

SAILESH SENGUPTA

SPECIMEN MAP SHOWING STRATA BOUNDARIES TOGETHER WITH POPULATION DENSITY AND
RELIEF FEATURES OF THE STATE

stratum no.	no. of villages	area in sq. miles	1951 census population* (000)	stratum no.	no. of villages	area in sq. miles	1951 census population* (000)
(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
1	6411	5303	1995	14	3982	4833	2287
2	5297	2359	2153	15	3757	3774	2081
3	5818	2467	2100	16	4025	4248	2080
4	3810	2073	2030	17	4705	8889	2267
5	4705	2358	2072	18	3082	3931	2169
6	6041	2317	1948	19	3067	39`6	2121
7	4616	3476	2216	20	3598	3478	2`34
8	3750	3508	2160	21	5477	4701	2239
9	5688	2357	1944	22	5332	4574	1937
10	5109	2399	2087	23	2558	2922	2`58
11	3935	2679	2010	24	2708	3`63	2`10
12	3988	5142	2287	25	5141	4390	1750
13	3751	4162	2264	26	14997	13087	1919
				total	125318	106506	51518

*adzusted for not available cases.

(In strata 1 and 17, two investigation zones and in stratum 26, your investigation zones were formed).
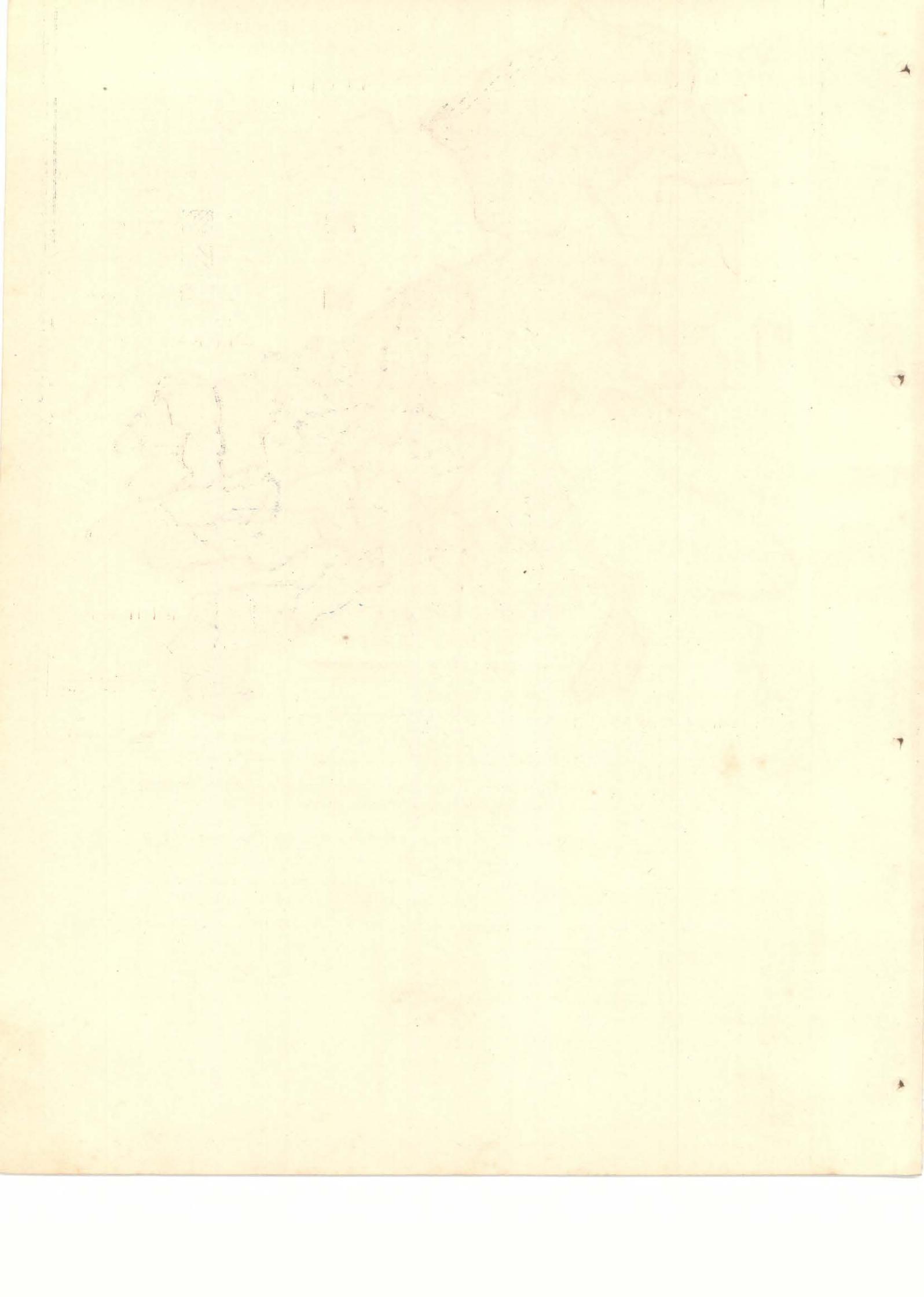
Selection of Villages

9.1. The sampling frame being used in the NSS is the 1951 census list of villages. In the first few rounds, the NSS field staff had compiled the frame from the census records available at tehsil or district level. This frame is in manuscript form and using this frame had become more difficult with the passage of time. This frame was being replaced by that given in the census district handbook as and when these handbooks became available. For this round sampling was done using the census district handbooks in the case of about 90% of the districts and for the remaining districts the basic materials collected by the field staff have been utilised.

9.2. After having formed the investigation zones, the work of selection of villages was taken up. For this purpose, the number of villages in each of the tehsils was found out and these figures were posted against the respective tehsils. While finding the number of villages in each tehsil from the census district handbook or from the manuscript records, it was not possible to take the highest serial number, as the list given included certain duplications, areas declared urban, etc. The number of duplications, number of blank serial numbers and number of villages declared urban had to be subtracted from the highest serial number. Adjustments were also made in the case of villages transferred from one tehsil to another.

9.3. Within an investigation zone the arrangement of tehsils adopted for demarcation of strata was retained for selecting the villages. Let the corrected number of villages in the tehsils so arranged in a particular stratum (investigation zone) be $N_1, N_2, \ldots\ldots\ldots N_k$. Against these tehsils the cumulative totals $S_1 \ (=N_1)$, $S_2 \ (=S_1+S_2)$, $\ldots\ldots\ldots\ldots S_k \ (=S_{k-1} + N_k)$ were found. A random start was taken from 1 to S_k (say R_1). With this random start, a circular systematic sample of six villages was selected with the interval I, the integral part of $\dfrac{S_k{}^*}{6}$. This constituted sub-sample 1 of the central sample. A similar sample drawn with an independent random start (R_2) constitutes sub-sample 2 of the central sample. The actual procedure of selection adopted is illustrated by the following example. The actual serial number in the census handbook which was to be selected was the serial number shown in column (6) of Table (12) increased by the number of serial numbers less than or equal to that number which have been excluded from the frame.

9.4. For the state sample, the same procedure was adopted except that the random start used was $R_1+I/2$ for sub-sample 1, and $R_2 + I/2$ for sub-sample 2. Corresponding sub-samples of the central and state sub-samples are not independent because of this procedure of linking. This linking ensures better representation of the geographic spread of villages in each stratum of the participating states. The two sub-samples are independent for both the central and state samples.

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*If R is the random start and I is the sampling interval, then the circular systematic sample consists of villages corresponding to $R + jI(j=0, 1,2,3,4,5)$. In case for some j, $R+jI>N$, $R+jI—N$ is to be considered.

TABLE 12 : PROCEDURE OF SELECTING A SAMPLE OF SIX VILLAGES FROM A STRATUM

zone : North India   State : Punjab   Stratum : 2

district	tehsil	number of villages	cumulated number of villages	selected numbers	selected village serial number	order of selection
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Jullunder	Nakodal	285	285	87	87	2
2. Kapurthala	Kapurthala	431	716	667	382	3
3. Jullunder	Jullunder	382	1098			
4. Hosiarpur	Hosiarpur	488	1586	1247	149	4
5. ,,	Una	519	2105	1827	241	5
6. Kangra	Hamirpur	64	2169			
7. ,,	Desagohipur	143	2312			
8. ,,	Nurpur	190	2502	2407	95	6
9. Gurdaspur	Pathankot	392	2894			
10. Hosiarpur	Dasuya	588	3482	2989	95	1

Sampling interval $I = \left[\dfrac{3482}{6}\right] = 580$; random start $R = 2989$.

9.5. Ordinarily the census boundaries of the village coincides with its revenue boundaries but there may be instances, although infrequent, where the census boundary of a village does not tally with its revenue boundary. It may be noted that for the socio-economic survey the census village was the sample unit whereas for the crop survey the revenue village was the sample unit.

Interpenetrating Sub-samples

10. As mentioned earlier, the sample of villages was drawn in the form of two independent and interpenetrating sub-samples to be surveyed by two different sets of investigators. In each stratum, the same 2 investigators carried out the survey each surveying a sub-sample of 6 villages. The state sub-samples were linked with the central sub-samples in a systematic manner to get better spread of the sample and also to make the study of the differential agency bias more effective. Thus in each stratum of the participating States, there are 4 interpenetrating sub-samples, 2 of which are surveyed by the central agency and the other 2 sub-samples being surveyed by the state agency. Further the round is divided into 6 sub-rounds of 2 months each. Almost all the socio-economic enquiries are spread over the 6 sub-rounds in a random manner so as to enable the study of the differential time effect on the characteristic under consideration. It may be noted that this procedure of interpenetrating of the sample over agencies, investigators and time would enable us to analyse the total variation in estimates into its components such as variation between agencies, investigators, interaction between agency and investigators, etc.

Hamlet-group Selection (Socio-economic Survey)

11.1. The number of households varies widely from village to village. The following procedure was adopted to ensure uniformity in work-load within a village.

Some of the big villages are likely to consist of some well-defined hamlets. The hamlets were grouped to form the required number of groups having approximately the same population and one such group was to be selected at random with equal probability. The number of hamlet groups to be formed in a particular sample village was worked out such that an investigator would not have to list more than 800 households in all the six villages assigned to him taken together. For this purpose, the population of the sample villages in 1951 were used as current population figures were not available at the time of planning this survey. If the total 1951 census population in the 6 villages in a sub-sample in a stratum was less than 3500, hamlet group selection was not allowed in any of the 6 villages.

11.2. The number of hamlet groups to be formed in a sample village was given in the list of sample villages. If the investigator found on local enquiry that the population of the village had changed considerably since the 1951 census, he was allowed to change the number of hamlet groups to be formed on the following lines :

(i) If on visiting a sample village the investigator found that its present population was more than or equal to k times and not more than $k + 1$ times of what it was in 1951, the number of hamlet groups to be formed was k times the number specified in the sample list.

(ii) If the present population of a sample village, for which hamlet group selection has been indicated in the sample list, was less than half of what it was in 1951, the number of hamlet groups to be formed was the quotient obtained when dividing the number of groups specified by two.

11.3. In a village where hamlet group selection was to be resorted to, the hamlets in that village were listed in the alphabetical order of their names. If the number of hamlet groups to be formed was k, then the groups were formed by taking consecutive hamlets in the list such that the percentage of total population covered in each group is $\frac{100}{k}$ as far as possible.

11.4. In case the investigator found it convenient to form hamlet groups by grouping contiguous hamlets, he was allowed to proceed in that manner. After forming such groups, the hamlets within each group were arranged in the alphabetical order of their names. These groups were then arranged in the alphabetical order of the names of the hamlets coming first in the within-group arrangement.

11.5. If there were no hamlets in a village where hamlet group selection was found necessary, the investigator was allowed to use the blocks (groups of households) formed, if any, by the census authorities or to form the required number of areal units himself, by subdividing the village in a convenient way.

11.6. After the formation of the required number of hamlet groups, one such group was selected with equal probability. The socio-economic survey was to be confined only to the selected hamlet group.

TABLE 13 :   DISTRIBUTION OF SAMPLE VILLAGES BY THE NUMBER OF HAMLET GROUPS FORMED

state	number of hamlet groups															number of villages		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	18	sur-veyed	casu-alties	allo-tted
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1. Andhra Pradesh	126	41	13	10	8	4	6	3	1	1	1	–	1	1	–	216	–	216
2. Assam*	89	2	–	–	–	–	–	–	–'	–	–	–	–	–	–	91	5	96
3. Bihar	195	18	4	6	2	–	2	–	–	–	1	–	–	–	–	228	–	228
4. Bombay	251	40	4	8	1	2	2	1	–	–	–	–	–	–	–	309	3	312
5. Jammu and Kashmir	310	5	–	2	1	–	–	–	–	1	–	–	–	–	–	319	5	324
6. Kerala	20	14	10	3	8	4	4	3	1	2	1	–	1	–	1	72	–	72
9. Madhya Pradesh	246	4	1	1	–	–	–	–	–	–	–	–	–	–	–	252	–	252
8 Madras	86	40	17	10	10	3	3	5	2	2	–	1	1	–	–	180	–	180
9. Mysore	109	8	1	1	–	–	–	–	–	–	–	–	–	–	–	119	1	120
10. Orissa	118	–	–	–	–	–	–	–	–	–	–	–	–	–	–	118	2	120
11. Punjab**	86	8	2	–	–	–	–	–	–	–	–	–	–	–	–	96	–	96
12. Rajasthan	107	10	3	–	–	–	–	–	–	–	–	–	–	–	–	120	–	120
13. Uttar Pradesh	276	25	5	1	1	2	–	–	–	–	–	–	–	–	–	310	2	312
14. West Bengal	144	12	6	3	1	–	–	2	–	–	–	–	–	–	–	168	–	168
15. all India	2163	227	66	45	32	15	17	14	4	6	3	1	3	1	1	2598	18	2616

*Includes Manipur and Tripura.

**Includes Delhi and Himachal Pradesh.

Division of Sample Village (crop survey)

12.1. As mentioned earlier the revenue village corresponding to the selected census village was taken as the sample unit for the crop survey. In case the selected census village consisted of more than one revenue village, one of the revenue villages was selected with equal probability. If the census village was a part of a revenue village, the entire revenue village was taken up for crop survey.

12.2. If the area of a sample village was greater than 16 square miles and consisted of a number of hamlets having separate survey maps (or village records), the hamlets were grouped to form hamlet groups of not less than 2 square miles in area and one such hamlet group was selected with equal probability. In case hamlet-wise village maps were not available, but the village area was mapped in two or more map sheets, one of the map sheets (or a group of the map sheets each with area not less than 2 square miles) was selected with equal probability. In case neither the hamlet-wise maps nor village area mapped on different sheets were available, but the village map was available on one sheet, then a sub-sheet having an area of at least 2 square miles formed by folding the map sheet into different parts was selected with equal probability. In the above-mentioned cases, the crop survey was confined to the selected hamlet or hamlet group or part of the village covered by the selected map sheet or sub-sheet.

12.3. In cadastrally unsurveyed villages where village maps or alternative records were not available, plots (parcels of land) possessed by a sample of households were surveyed. In such cases, crop survey was confined to the hamlet-group selected for socio-economic survey in that village.

Selection of Households

13.1. A list of all the households residing in the village/hamlet group to be used as a frame for sampling households was prepared starting from that point where the 1951 census enumeration began. If it was not known where the census numbering started, the listing of households was taken up from approximately the north-west corner of the village. If hamlet group selection was done in a sample village, the hamlets in the selected group were taken up in the alphabetical order of their names for the purpose of listing households. At the time of listing the households in the sample village, information on household size, self-employment in manufacturing enterprise and principal means of livelihood was collected. This information was utilised in selection of households for the different enquiries. Facsimiles of filled-in listing schedules are given at the end of this technical paper to illustrate the procedures of selection of sample households for different enquiries described in this section.

13.2. To avoid any possible bias on the part of the investigator in selecting the random number, the column of the random number table to be referred to was linked up with the last two digits of the serial number of the sample village. The order in which the random numbers should be selected for different enquiries was also pre-

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specified. Each investigator was provided with a random number table having 104 columns with 50 four-digited random numbers in each column.

13.3.1 *Income and Expenditure (Schedule 1.1)* : In the first sub-round one household was selected with equal probability from each of the sample villages 1, 3 and 5 for canvassing this schedule. The sample villages 1, 3 and 5 were considered to ensure geographical spread of the samples over the stratum as the sample of 6 villages assigned to an investigator was selected systematically with a random start arranging the tehsils in a serpentine order. A sample of 15 households to be surveyed for this schedule in the second and subsequent sub-rounds was selected circular systematically from all the households in the 6 selected villages (or hamlet groups) taken together. This could not be done in the first sub-round since the frames for all the villages were not available at the beginning of the sub-round. This procedure of selection ensures proportional allocation of sample households to the selected villages.

13.3.2 Before selection the households in each of the sample villages 1, 3 and 5 were arranged in such a way that the households with less than 5 persons came first and those with 5 and more persons came next. In villages 2, 4 and 6 this arrangement by household size classes was reversed. This was done to ensure proper repre-sentation from these two classes of households. It would have been desirable to have the above arrangement for all the households in the six villages taken together, but this was not done so as to avoid the renumbering of households after selecting the households separately from each village in the first sub-round. The sample households with orders of selection 1, 6 and 11 were surveyed in the second sub-round, those with order of selection 2, 7 and 12 in the third sub-round and so on.

13.4. *Small-scale manufacture and handicrafts (Schedule 2.2)* : For this the frame consisted of all the households self-employed in a non-registered manufacturing enterprise. In the first sub-round a sample of 2 households was selected circular systematically after arranging the households so that those having manufacturing enterprise as their principal means of livelihood came first and the other households came next in villages 1, 3 and 5. In villages 2, 4 and 6 this arrangement was reversed. A circular systematic sample of 50 households to be surveyed in the second and subsequent sub-rounds was selected with a random start from all the households self-employed in a non-registered manufacturing enterprise in the 6 villages (or hamlet groups) assigned to an investigator with the arrangement of the households effected in the first sub-round as indicated above. The sample households with orders of selection 1, 6, 11, 16...............46 were surveyed in the second sub-round, those with orders of selection 2, 7, 12, 17...........47 in the third sub-round and so on.

13.5. *Employment and unemployment (Schedule 10)* : The number of households to be selected from each sample village was specified in the sample list. This number was arrived at by allocating 24 households to the 6 sample villages proportional to their 1951 census population. In the case of villages which were uninhabited in 1951, one household was allotted in anticipation of their having become inhabited

since 1951. From each sample village a circular systematic sample of the required number of households was selected with a random start after arranging the households according to the household size classes 1—4 and 5 and above. The same set of sample households were surveyed in each of the six sub-rounds.

Selection of Plots for Crop Survey

14.1. The unit of observation for crop survey was a plot which was defined as a distinct piece of land having a major survey number. If a plot had no survey number given to it, then it was associated with the adjoining plot having the lowest major survey number among the plots adjoining the unnumbered plot. The plots in the sample village were considered to be grouped into mutually exclusive clusters of 10 consecutive survey numbers or sampling serial numbers such as 1—10, 11—20, 21—30, 31—40 and so on.

14.2. From each sample village (or selected division) 6 clusters of 10 consecutive plots each (survey numbers 1—10, 11—20,............) were selected systematically with a random start from 1 to I, the sampling interval, which was taken as the integer next to the quotient obtained by dividing the highest survey number by 6. This selection procedure was adopted in sample villages where cadastral maps were available (method 1). In the case of villages where only a list of plots was available, the above selection procedure was adopted after giving sampling serial numbers to the plots (method 2). In the absence of a cadastral map or a list of plots, a systematic sample of 6 households was selected with a random start from 1 to the sampling interval (method 3). For each crop season, data on land utilisation were collected for all the 60 sample plots in the case of methods 1 and 2 and all the plots possessed by the 6 sample households in the case of method 3.

14.3. In order to relieve the strain on the investigators in some specified hilly tracts, desert areas and inaccessible regions, the work-load was reduced by allowing selection of 6 clusters of 5 plots each in villages where methods 1 and 2 were adopted and 3 households in villages where method 3 was adopted.

14.4. In the case of sample villages selected for crop-cutting work, the crop plots in the sample clusters were arranged according to the crops grown in them in the following order, viz., paddy, jowar, bajra, ragi, maize, wheat and barley, the plots with mixed crops occurring two or more times in the appropriate places. A sample of 6 crop plots was selected with probability proportional to allocated crop area, systematically, with a random start from 1 to the sampling interval. Crop-cutting experiments were carried out in concentric circular cuts of radii 2' 3" and 4' located at random in each of the selected crop plots. In the case of partial cuts, a full cut was also obtained and the data for both the partial cut and the full cut were reported. The crop cutting survey was carried out in the same sample villages in each of the crop seasons.

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Estimation Procedure

15.1. *Notation*

s subscript for s-th stratum ;

i subscript for i-th village or selected part in i-th village ;

j subscript for j-th household/cluster ;

k number of strata ;

V total number of villages ;

v number of sample villages surveyed in the sub-sample (including uninhabited villages and excluding casualties not substituted) in a particular sub-round ;

v' number of villages reporting price for a commodity ;

D number of hamlet groups for socio-economic survey/divisions for crop survey formed within the village ($D = 1$ in case no such division was done) ;

H total number of households/highest survey number/highest sampling serial number of the plots ;

h number of sample households for the schedule/plots surveyed in the round/sub-round/season (excluding casualties not substituted) ;

x value of the characteristic (in the case of classificatory characteristic this value is 1 if the unit belongs to the class, otherwise 0) ;

G total geographical area of stratum ;

g geographical area of sampled village/cluster ;

p price of the commodity ;

r proportion of area under particular type of land utilisation ;

T estimate of the total of any characteristic in a schedule from a particular sub-sample for the round/sub-round/season.

Socio-economic Survey

15.2.1. The following table gives unbiased estimators and the corresponding multipliers for the total value of any characteristic based on any particular sub-sample by nature of enquiry and by sub-rounds.

TABLE 14 : UNBIASED ESTIMATORS* AND MULTIPLIERS FOR DIFFERENT ENQUIRIES

schedule	sub-round	estimator	multiplier
(1)	(2)	(3)	(4)
1. income and expenditure (1.1)	1	$\sum\limits_{s=1}^{k} \dfrac{V_s}{v_s} \sum\limits_{i=1}^{v_s} D_{si} \dfrac{H_{si}}{h_{si}} \sum\limits_{j=1}^{h_{si}} x_{sij}$	$\dfrac{V_s}{v_s} D_{si} \dfrac{H_s}{h_{si}}$
2. small scale manufacture and handicrafts (2.2)	2 to 6	$\sum\limits_{s=1}^{k} \dfrac{V_s}{v_s} \dfrac{\sum\limits_{i=1}^{v_s} H_{si}}{h_s} \sum\limits_{i=1}^{v_s} D_{si} \sum\limits_{j=1}^{h_{si}} x_{sij}$	$\dfrac{V_s}{v_s} \dfrac{\sum\limits_{i=1}^{v_s} H_{si}}{h_s} D_{si}$
3. village statistics (3.0)	3	$\sum\limits_{s=1}^{k} \dfrac{V_s}{v_s} \sum\limits_{i=1}^{v_s} x_{si}$	$\dfrac{V_s}{v_s}$
4. retail prices of selected commodities (3.01)	1 to 6	$\dfrac{\sum\limits_{s=1}^{k} \sum\limits_{i=1}^{v'_s} p_{si}}{\sum\limits_{s=1}^{k} v_s'}$	$\dfrac{1}{\sum\limits_{s=1}^{k} v_s'}$
5. employment and unemployment (10)	1 to 6	$\sum\limits_{s=1}^{k} \dfrac{V_s}{v_s} \sum\limits_{i=1}^{v_s} D_{si} \dfrac{H_{si}}{h_{si}} \sum\limits_{j=1}^{h_{si}} x_{sij}$	$\dfrac{V_s}{v_s} D_{si} \dfrac{H_{si}}{h_{si}}$
6. population, births and deaths (12.1, 12.1.1, 12.2)	1 to 6	$\sum\limits_{s=1}^{k} \dfrac{V_s}{v_s} \sum\limits_{i=1}^{v_s} D_{si} \sum\limits_{j=1}^{H_{si}} x_{sij}$	$\dfrac{V_s}{v_s} D_{si}$

The figures in brackets denote the schedule numbers.

*Except for schedule 3.01 where a biased estimator was used for operational convenience.

Crop Survey

15.3.1. An estimator of the area under a given type of utilisation for a particular season and for a sub-sample or for the sample as a whole is given by

$$A = \sum_{s=1}^{k} \hat{A}_s$$

where $\hat{A}_s = \dfrac{V_s}{v_s} \sum\limits_{i=1}^{v_s} f_{si} D_{si} \dfrac{H_{si}}{h_{si}} \sum\limits_{j=1}^{h_{si}} g_{sij} r_{sij}$ if s is a hilly stratum ;

$$= G_s \dfrac{\sum\limits_{i=1}^{v_s} \hat{A}_{si}}{\sum\limits_{i=1}^{v_s} g_{si}}, \quad \hat{A}_{si} = g_{si} \dfrac{\sum\limits_{j=1}^{h_{si}} g_{sij} r_{sij}}{\sum\limits_{j=1}^{h_{si}} g_{sij}} \text{ if } s \text{ is a plains stratum.}$$

where $f_{si} = 1$ if the surveyed village coincided with the selected census village,

= number of revenue villages contained wholly or partly in the selected census village, or

= inverse of the number of census villages contained wholly or partly in the surveyed revenue village.

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15.3.2. An estimator of the yield rate for a particular crop in a season was obtained as follows, separately for pure and mixed crops and within these separately for hilly strata and plains strata from sample villages taken up for crop-cutting experiments :

$$\hat{Y} = \frac{\sum'_s \hat{A}_s \, \hat{Y}_s}{\sum'_s \hat{A}_s}$$

where $\hat{Y}_s$ = simple average of yield rates over the cuts taken for the crop in the sth stratum,

$\hat{A}_s$ = estimate of area under the crop obtained from the villages where land utilisation survey was conducted,

$\sum'_s$ denotes summation over strata reporting crop-cutting experiments for the crop.

15.3.3. An estimator of production of crop was also obtained separately for pure and mixed crops and for hilly and plains strata separately, as product of the yield rate obtained as shown above from the reporting strata and the estimate of the area under the crop based on all the sample villages in all the strata, i.e.,

$$\hat{P} = \hat{Y} \, \hat{A}.$$

The final estimate was the sum of the four production estimates obtained as described before.

15.3.4. The above estimates are for the green weight of the crop. The estimate for the dry weight was obtained by multiplying the final estimate for each state by a driage factor. This factor was the ratio of the total dry weight to the total green weight of the crop (pure and mixed) obtained from the circular cuts 2'3" radius for the whole state.

Variance Estimator

15.4.1. If $\hat{X}_i$ $(i = 1,2)$ is the ith sub-sample estimate (unbiased) of the total value X, then a combined estimate $\hat{X}$ is given by

$$\hat{X} = \tfrac{1}{2} (\hat{X}_1 + \hat{X}_2) = \tfrac{1}{2} \sum_{s=1}^{k} (\hat{X}_{s1} + \hat{X}_{s2})$$

where $\hat{X}_{si}$ $(i = 1,2)$ is the ith sub-sample estimate for the total in the sth stratum. An unbiased estimator of the variance of X is given by

$$\hat{V}(\hat{X}) = \tfrac{1}{4} \sum_{s=1}^{k} (\hat{X}_{s1} - \hat{X}_{s2})^2.$$

Another estimate $\hat{V}(\hat{X}) = \tfrac{1}{4} (\hat{X}_1 - \hat{X}_2)^2$ can be given but this is less efficient than the former one.

15.4.2. An estimator $\hat{R}$ of the ratio between two totals $R = \dfrac{X}{Z}$ is given by

$$\hat{R} = \frac{\hat{X}}{\hat{Z}} = \frac{\hat{X}_1 + \hat{X}_2}{\hat{Z}_1 + \hat{Z}_2} = \frac{\sum\limits_{s=1}^{k} (\hat{X}_{s1} + \hat{X}_{s2})}{\sum\limits_{s=1}^{k} (\hat{Z}_{s1} + \hat{Z}_{s2})}.$$

An estimator of the variance of $\hat{R}$ is given by

$$\hat{V}(\hat{R}) = \frac{1}{4\hat{Z}^2} \sum_{s=1}^{k} \left[(\hat{X}_{s1} - \hat{X}_{s2})^2 - 2\hat{R}(\hat{X}_{s1} - \hat{X}_{s2})(\hat{Z}_{s1} - \hat{Z}_{s2}) + \hat{R}^2 (\hat{Z}_{s1} - \hat{Z}_{s2})^2 \right].$$

A less efficient estimator of $\hat{V}(\hat{R})$ but easier to compute is given by

$$\hat{V}(\hat{R}) = \tfrac{1}{4} \left(\frac{\hat{X}_1}{\hat{Z}_2} - \frac{\hat{X}_2}{\hat{X}_2} \right)^2$$

15.4.3. An estimator of the variance of $\hat{P}$, the production estimate is given by

$$\hat{V}(\hat{P}) = \tfrac{1}{4} \left[\frac{\hat{P}_1^1}{\hat{A}_1^1} \hat{A}_1 - \frac{\hat{P}_2^1}{\hat{A}_2^1} \hat{A}_2 \right]^2$$

where $\hat{P}^1$ and $\hat{A}^1$ denote production and crop acreage estimates based on the strata reporting crop-cutting for that crop.

URBAN SECTOR

Subject Coverage

1.1. To get a complete picture for the country as a whole, the survey was undertaken in the urban sector also as in the previous rounds. The subjects taken up for survey in this round in the urban sector were (*i*) consumer expenditure, (*ii*) small-scale household manufacturing enterprise and (*iii*) employment and unemployment. These subjects were included with a view to comparing the employment and unemployment situation with that obtained in the ninth round (May—November 1955) and the information on household manufacturing enterprise with that obtained in the tenth round (December 1955—May 1956) and to continuing the time series of data on consumer expenditure.

1.2. A list of schedules canvassed in this round is given in Table (15). Besides these schedules, there was a schedule (0.2) for listing and selection of households for these enquiries. There was also a schedule (4.0) for recording time spent on different survey operations by the investigators.

TABLE 15 : SCHEDULES TAKEN UP FOR ENQUIRY (URBAN)

	schedule number	description
	(1)	(2)
1.	1.1	income and expenditure
2.	2.2	small scale manufacture and handicrafts
3.	10	employment and unemployment

Survey Period

2. For reasons similar to those mentioned for the rural survey, the period for the urban survey was also taken as one complete year. This period was divided into two sub-rounds of 6 months each as against 6 sub-rounds of 2 months each in the rural sector, since it was felt that there would not be substantial seasonal variation in the urban sector in the characteristics to be studied.

Fixation of Work-load

3.1. For the urban sector, it was decided to resurvey the ninth round sample of 2108 blocks* so as to make the comparison of employment and unemployment situation with that obtained in the ninth round more effective. Since the number of investigators in Jammu and Kashmir was increased considerably since the ninth round for getting better estimates for that state, the sample size of 108 blocks surveyed in the ninth round was increased to 216 blocks in that State for the fourteenth

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*During the 1951 Census of Population, towns and cities were divided into blocks of about 150 households each for the purpose of the census enumeration.

round. Thus the total number of blocks selected for this round came to 2228 blocks including 12 sample blocks selected afresh in Chandigarh, the newly-built capital of the Punjab State.

3.2. On the basis of the available investigator strength of 70 investigators for the urban survey, it was found that an investigator should cover about 36 blocks. As the survey had to be completed in a period of one year, the average number of net working days available for surveying one block came to about 6 days. After considering the sample size desired for the different enquiries and the time requirements in the urban areas, the work-load in each sample block was fixed as in Table (16).

TABLE 16 : WORK-LOAD AND TIME REQUIREMENTS IN A SAMPLE BLOCK

	schedule number	description of work and time requirement	number of days (net)
	(1)	(2)	(3)
1.	0.2	listing of households (about 150 households ; 50 households/day)	3.0
2.	1.1	income and expenditure (1 household ; 1 household/day)	1.0
3.	2.2	household manufacturing enterprise (3 households ; 2 households/day)	1.5
4.	10	employment and unemployment (4 households ; 4 households/day)	1.0
5.	—	journey (1 block ; 1½ days/block)	1.5
6.		total number of days per block	8.0

Interpenetrating Sub-samples

4. The sample of blocks selected for survey in this round had been drawn in the form of 4 independent interpenetrating sub-samples. Sub-samples 1 and 3 were surveyed by one party of investigators and sub-samples 2 and 4 by a different party of investigators. The survey in sub-samples 1 and 2 was conducted first during the first sub-round of six months and sub-samples 3 and 4 were surveyed in the second sub-round period. In the case of participating states, a similar procedure was followed with the 4 independent interpenetrating sub-samples allotted to them for being surveyed by the state agency.

Sample Design (general)

5.1. As recorded earlier all the ninth round sample blocks were resurveyed in this round, except for the sample blocks in Madras City and Jammu and Kashmir. In these cases, as fresh frames were available, samples were drawn from the new frames to minimise the difficulties experienced in the field in identifying 1951 census blocks, the sampling design being the same as was adopted in the ninth round. The general sampling design is a stratified two-stage one where 1951 census blocks were first-stage units and households were the second-stage units. The details of the sampling design adopted for sampling blocks in the ninth round is given below.

5.2. In the case of the state sample, for those states and parts of states which had been covered by the state sample in the ninth round, the sample blocks of that round were retained and fresh selection was resorted to in the case of states or parts of states not covered by the ninth round state sample.

Stratification

6.1. Each city with a population of 300,000 and above as well as each capital town of the former* part 'A' and part 'B' states except Shillong, capital of Assam was taken as a separate stratum. This was done because the unemployment situation was likely to be more acute in such places and at least rough ideas would be needed about the unemployment characteristics for these towns and cities. In the case of Greater Calcutta, 8 strata were formed, each stratum consisting of several adjoining wards†, in view of greater heterogeneity of the population. In Jammu and Kashmir, Jammu town was considered as separate stratum besides Srinagar. In the rest of the urban area, towns within natural divisions formed separate strata. There were altogether 94 strata in the whole of the Indian Union including Jammu and Kashmir.

Allocation of Sample Blocks

7. The first-stage unit within each stratum was a 1951 census enumeration block consisting of roughly 100 to 200 households. Out of the 2228 blocks sampled throughout India for this round, 216 were from Jammu and Kashmir and 12 from Chandigarh in Punjab. The rest of the blocks were allocated to the different strata in proportion to their respective non-agricultural population in 1951. However, as the acuteness of the unemployment problem in densely populated areas demanded special consideration, preferential weights were given to the cities and towns treated as separate strata. This was achieved by first allocating 1600 blocks to all the strata on the basis of their respective non-agricultural population and then the remaining 400 blocks only to the cities and towns treated as separate strata on the same basis. In all cases the stratum allocations were rounded off to the nearest multiples of 4 in view of the requirement of 4 independent sub-samples. Since the ninth round sample blocks were retained for this round except in a few cases and since these blocks had been selected prior to reorganisation of states, the number of sample blocks in some of the reorganised states is not a multiple of 4. The allocations to the different states are shown in Table (1).

Selection of Urban Blocks

8.1. Since the socio-economic characteristics are likely to be related to the means of livelihood pattern of the region, all the towns (excepting those treated as separate strata) in each natural division were arranged according to their means of

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*Prior to the reorganisation of States on 1st November 1956, the States of the Indian Union had been divided into three categories, parts *A*, *B* and *C*, on political and administrative considerations.

†Areal units formed during the 1951 census for facilitating census enumeration.

livelihood pattern. Within each town the census blocks were arranged according to their geographical nearness. With this arrangement of towns and blocks, 4 circular systematic samples were drawn with independent random starts.

8.2. In the 1951 population census, the means of livelihood were classified into the following 8 broad classes, (4 agricultural and 4 non-agricultural), and the distribution of population in these 8 classes was given for each town in the country in the census publications.

class	means of livelihood
I	cultivators of land wholly or mainly owned and their dependants
II	cultivators of land wholly or mainly unowned and their dependants
III	cultivating labours and their dependants
IV	non-cultivating owners of land, agricultural rent receivers and their dependants
V	production other than cultivation
VI	commerce
VII	transport
VIII	other services and miscellaneous sources

8.3. The following dichotomies were considered :

A : towns and cities having 25% or more of population dependent on means of livelihood classes I, II, III and IV,

$\overline{A}$: others ;

B : towns and cities having 25% or more of population dependent on means of livelihood class V,

$\overline{B}$: others ;

C : towns and cities having 25% or more of population dependent on means of livelihood class VI,

$\overline{C}$: others ;

D : towns and cities having 25% or more of population dependent on means of livelihood class VIII,

$\overline{D}$: others.

classification (order of arrangement)

$\bar{A}$	B	$\bar{C}$	$\bar{D}$
A	B	$\bar{C}$	$\bar{D}$
A	B	$\bar{C}$	D
$\bar{A}$	B	$\bar{C}$	D
$\bar{A}$	B	C	$\bar{D}$
A	B	C	$\bar{D}$
A	B	C	D
$\bar{A}$	B	C	D
$\bar{A}$	B	C	D
A	$\bar{B}$	C	D
A	$\bar{B}$	C	$\bar{D}$
$\bar{A}$	$\bar{B}$	C	$\bar{D}$
$\bar{A}$	$\bar{B}$	$\bar{C}$	D
A	$\bar{B}$	$\bar{C}$	D
A	$\bar{B}$	$\bar{C}$	$\bar{D}$
$\bar{A}$	$\bar{B}$	$\bar{C}$	$\bar{D}$

8.4.   There were 16 joint means of livelihood classes within which the towns and cities could be classified, since four dichotomies were considered. All towns belonging to the joint class $\bar{A} B \bar{C} \bar{D}$, namely, those having 25% or more of their population dependent on the means of livelihood class V and having less than 25% of the population dependent on each of the means of livehood classes I to IV and VIII, were put together first in the arrangement. The towns and cities belonging to the joint class $A B \bar{C} \bar{D}$ came next in the arrangement, and so on, as shown above. This particular arrangement was adopted with a view to ensuring proper representation in the sample for the different classes with special emphasis on classes B and C. This can be seen from the arrangement where all the B's, $\bar{B}$'s, C's and $\bar{C}$'s come together if the arrangement is taken to be circular. Emphasis was given to classes B and C since they represent production other than cultivation and commerce respectively, both of which are important from the view point of the unemployment situation in urban sector.

8.5. The towns and cities within each of the above classes were further arranged according to geographical nearness as far as possible. The blocks were then arranged within each town or city according to their geographical nearness. The blocks were made as nearly equal in population content as possible by merging two or more adjacent blocks and sometimes by splitting the original blocks in terms of census house numbers. In Jammu and Kashmir, means of livehlihood figures were not available for the towns. So the towns as well as the blocks within them were arranged according to geographical nearness before selection. After the arrangement, 4 circular systematic samples of blocks were selected with independent random starts with a view to obtaining 4 independent sub-samples.

8.6. If a selected block was found to be very large, the investigator divided it into a number of artificial blocks each consisting of about 100-200 households. One of these blocks was then selected with equal probability and the survey was confined to the households in it. This was done with a view to equalising the work-load between different sample blocks and to avoiding the spending of too much time in listing households for sample selection. In such cases, the inflation factor was suitably changed.

Self-weighting Design for Employment Survey

9.1. To facilitate the work at the tabulation stage and to increase the efficiency of the sample, a self-weighting design* was adopted for the employment and unemployment enquiry. This was done by fixing the sampling intervals and random starts to be used in selecting households for the employment survey in the selected blocks (or artificial blocks) in such a way that the inflation factor (multiplier) remains the same for all sample households. The constant inflation was so chosen as to get 4 sample households per block on the average for this survey. On the basis of the figures for the number of households in these sample blocks during the ninth round, it was found that the work-load would vary much from block to block if one inflation factor was aimed at. To reduce the variation in work-load in the different blocks, 6 different inflation factors had to be used. In the case of areas where fresh selection was resorted to, the 1951 census population of the sample blocks were used in choosing the inflation factor and fixing the sampling interval in the sample blocks.

9.2. If B_s and b_s are the number of blocks in the population and in the sample respectively for the sth stratum and H_{si} and h_{si} the number of households in the population and in the sample respectively for the ith selected block of the sth stratum, the inflation factor f_{si} is given by

$$f_{si} = \frac{B_s}{b_s} \frac{H_{si}}{h_{si}}.$$

If the design were self-weighting, the value of the constant inflation factor k would be the ratio of the total number of households in the urban sector to the number of sample households desired for the survey. The total number of households in the

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*A Design where the inflation factor is the same for all sample observations.

urban sector estimated on the basis of the ninth round survey (13.53 million) was inflated by 8% to allow for the increase since 1955. Hence the value of k is 1733.12 (=14.614 million ÷ 2108* × 4). The sampling interval I_{si} to be taken for the ith selected block of sth stratum was obtained as follows :

$$I_{si} = k \frac{b_s}{B_s}$$

9.3. The ratio of H_{si} as obtained in the ninth round (or in 1951 census for cases where fresh selection was adopted) to I_{si} was used to obtain an idea of the expected number of sample households in each sample block. The interval was changed using the following scheme with a view to equalising the work-load between sample blocks. Only in Jammu and Kashmir where the sizes of the blocks were very small, $\frac{1}{4} I_{si}$ was used uniformly as the sampling interval for every block.

TABLE 17 : SCHEME FOR CHANGING THE SAMPLING INTERVAL SO AS TO EQUALISE THE WORK-LOAD BETWEEN SAMPLE BLOCKS

multiplier code (c)	central sample		state sample	
	$\dfrac{H_{si}}{I_{si}}$	sampling interval	$\dfrac{H_{si}}{I_{si}}$	sampling interval
(1)	(2)	(3)	(4)	(5)
1	< 2	$\frac{1}{2}I_{si}$	<2	$\frac{1}{2}I_{si}$
2	2— 5	I_{si}	2— 4	I_{si}
3	5—10	$2I_{si}$	4— 8	$2I_{si}$
4	10—20	$4I_{si}$	8—16	$4I_{si}$
5	20—40	$8I_{si}$	16—32	$8I_{si}$

9.4. It may be noted that for the same sampling interval, the range of variation of H_{si}/I_{si} specified in the above table is less for the state sample than for the central sample. This was done because the figures for H_{si} used for the state samples were obtained from the 1951 census and the actual number of households is expected to have increased in this intervening period.

Selection of Households

10.1. After properly identifying the sample block with the help of the block boundaries given in the sample list (and after formation and selection of an artificial block, if necessary), a list of all the households in that block (or artificial block) was prepared starting from the point where the census enumeration began. At the time of listing the households, information on household size, self-employment in manufacturing enterprise and principal means of livelihood was collected to be used for sampling households for different enquiries. As explained in para 13.2 of Chapter Two, the column of the random number table to be referred to sample selection in a sample

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*The number of blocks was later raised to 2228 due to an increase of 108 sample blocks in Jammu and Kashmir and 12 blocks in the Punjab State.

urban block was linked up with the last two digits of the serial number of the sample block. Facsimile of a filled-in listing schedule is given at the end of this technical paper to illustrate the procedures of selection of sample households for different enquiries described in this section.

TABLE 18 : DISTRIBUTION OF SAMPLE BLOCKS BY THE INFLATION FACTORS
IN DIFFERENT STATES

state	inflation factor $(k=1733.12)$						total
	$\frac{1}{4}k$	$\frac{1}{2}k$	k	$2k$	$4k$	$8k$	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Andhra Pradesh	—	47	53	50	4	—	154
2. Assam*	—	3	17	3	1	—	24
3. Bihar	—	10	42	15	1	—	68
4. Bombay	—	62	259	103	6	1	431
5. Jammu and Kashmir	216	—	—	—	—	—	216
6. Kerala	—	16	44	3	—	—	63
7. Madhya Pradesh	—	9	54	19	6	—	88
8. Madras	—	52	116	60	5	—	233
9. Mysore	—	19	70	33	3	—	125
10. Orissa	—	1	10	4	1	—	16
11. Punjab**	—	56	96	13	1	2	168
12. Rajasthan	—	4	70	8	—	—	82
13. Uttar Pradesh	—	45	147	65	7	—	264
14. West Bengal	—	59	197	26	1	1	284
15. total	216	383	1175	402	36	4	2216

*Includes Manipur and Tripura;   **Includes Himachal Pradesh and Delhi and exchudes Chandigrah

10.2. *Income and expenditrue (schedule 1.1)* : One household was selected with equal probability from all the households in each of the sample blocks (or artificial blocks).

10.3. *Household manufacturing enterprise (schedule 2.2)* : For this schedule, from each sample block (or selected artificial block) a circular systematic sample of 3 households was selected with a random start from all households self-employed in unregistered manufacturing enterprise, after arranging them such that those with manufacturing enterprise as their principal means of livelihood came first and the other households came next.

10.4. *Employment and unemployment (schedule 10)* : All the households in the selected block (or artificial block) were arranged such that those with at least one unemployed person came first and the other household came next. Using this arrangement a linear systematic sample of households was selected using the random start and interval specified in the sample list and without completing the cycle.

Estimation Procedure

11.1. *Notation :*

s subscript for the sth stratum

i subscript for the ith block in the sth stratum

j subscript for jth household in the ith block of the sth stratum

c subscript for the cth multiplier code of the block for schedule 10

k number of strata

B total number of blocks in a stratum

b number of blocks surveyed in the sub-sample

D number of artificial blocks formed in a sample block

H number of households in the block (or artificial block)

h number of sample households surveyed

M multiplier corresponding to the code

y value of the characteristic

11.2. An unbiased estimator of total value of any characteristic in schedules 1.1 and 2.2 based on a particular sub-sample is given by

$$\hat{Y} = \sum_{s=1}^{k} \frac{B_s}{b_s} \sum_{i=1}^{b} D_{si} \; \frac{H_{si}}{h_{si}} \sum_{j=1}^{h_{si}} Y_{sij}$$

and an unbiased estimator of total value of any characteristic in schedule 10 based on a particular sub-sample is given by

$$\hat{Y} = \sum_{c} M_c \sum_{sij} Y_{sij}$$

where the second summation is taken over all sample blocks with the multiplier code c.

11.3. If $\hat{Y}_i$ is the estimate obtained from the ith sub-sample ($i=1, 2, 3, 4$), the combined estimate is given by $\hat{Y} = \frac{1}{4} \sum_{i=1}^{4} \hat{Y}_i$. An unbiased estimator of the variance of $\hat{Y}$ is given by

$$\hat{V}(\hat{Y}) = \frac{1}{12} \sum_{s=1}^{k} \sum_{i=1}^{4} (\hat{Y}_{si} - \hat{Y}_s)^2$$

where $\hat{Y}_{si}$ is the estimate of sth stratum total from the ith sub-sample and $\hat{Y}_s$ is the combined estimate of the sth stratum total. It may be noted that another estimator of the variance of $\hat{Y}$ is given by

$$\hat{V}(\hat{Y}) = \frac{1}{12} \sum_{i=1}^{4} (\hat{Y}_i - \hat{Y})^2.$$

But this is less efficient than the former estimate.

11.4. An estimator of the ratio $R \left(= \dfrac{Y}{Z} \right)$ of two totals Y and Z is $\hat{R} = \dfrac{\hat{Y}}{\hat{Z}}$.

An estimator of the variance of $\hat{R}$ is given by

$$\hat{V}(\hat{R}) = \frac{1}{12\hat{Z}^2} \sum_{s=1}^{k} \left[\sum_{i=1}^{4} (\hat{Y}_{si} - \hat{y}_s)^2 - 2\hat{R} \sum_{i=1}^{4} (\hat{Y}_{si} - \hat{y}_s)(\hat{Z}_{si} - \hat{Z}_s) + \hat{R}^2 \sum_{i=1}^{4} (Z_{si} - Z_s)^2 \right].$$

An alternative estimator which is less efficient is given by

$$\hat{V}(\hat{R}) = \tfrac{1}{12} \sum_{i=1}^{4} (R_i - \bar{R})^2$$

where R_i is the estimate of the population ratio from the ith sub-sample and $\bar{R} = \tfrac{1}{4} \sum_{i=1}^{4} R_i$.

FACSIMILE OF THE SCHEDULE OF INVESTIGATION

CENTRAL*

ORIGINAL*

GOVERNMENT OF INDIA NATIONAL SAMPLE SURVEY: 1958–59
Schedule 0.1 : List of households (main sheet)

RURAL

(Fourteenth Round)

[1] identification : sample village					
1. serial number	1698	8. state .... WEST BENGAL			
2. zone-state-natural division	342	9. district .... JALPAIGURI			3
3. stratum	14	10. tehsil/taluk/thana* ..... SALBANI			
4. sub-sample	2	11. village .... RAMPUR			
5. sample village	5	12. hamlet (s)...... UTTAR PARA			
6. sub-round	1				
7. C.P.A. classification**	O	13. number of households in village/hamlet-group*			36

[2]   particulars of investigation and scrutiny

sr. no.	item	investigator	inspector	field scrutiniser
(0)	(1)	(2)	(3)	(4)
1.	name	S. LAHA		
2.	roll number	52		×
3.	date of survey/inspection/scrutiny	13.8.58		
4.	date of receipt—despatch	11/9		
5.	number of scrutiny sheets attached	×	×	
6.	signature			

[3]   particulars of hamlet-group selection †

sr. no.	name of hamlet	percent. of total population (00)	hamlet group number	random number	sr. no.	name of hamlet	percent. of total population (00)	hamlet group number	random number
(0)	(1)	(2)	(3)	(4)	(0)	(1)	(2)	(3)	(4)
1.	JAN PARA	25	1						
2	MATH PARA	30							
3	UTTARPARA	45	2	2					

[4]   remarks by investigator

[5]   comments by inspector

* delete whichever is inapplicable

** not in C.P.A.–0; in NES block–1; in community project or community development block–2; in post intensive block–3

† to be filled only in the case of villages against which 'H' has been marked in the sample list

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[6] list of households and record of selection

(0) house number	(1) household serial number	(2) name of head of household	(3) name of father/mother/husband of head of household	(4) relation to head (a)	(5) household size	(6) group (b)	(7) class (c)	(8) nature of enterprise (d)	(9) industry code	(10) 1-4	(11) above 4	(12) class 1	(13) class 2	(14) land utilisation 5.0	(15) employment 10	(16) 1	(17) 2	(18) 3	(19) 4	(20) 5	(21) 6	(22) 1	(23) 2	(24) 3	(25) 4	(26) 5	(27) 6	(28) period of stay in village sample (e)
1	1	Dharanidhar Das	L/Chintamoni	1	10	2	2	1	288		21		1									2					15/25	5
2	2	Banamali Das	L/Harocharan	1	12	2	2	1	288		22		2		2								16/36					5
3	3	Umesh ch. Santra	L/Gobinath	1	5	3	x	x			23																	5
4	4	Bhadreswar Santra	Sabitri Dasi	2	7	3	x	x			24								9									5
5		SITALA MANDIR																										
6	5	Nakori ch. Das	L/Sanatan	1	6	3	x	x			25																	5
7	6	Nitai ch. Das	Champak Bala Dasi	2	6	2	2	1	288		26		3											17/37				5
8	7	Raghunath Shaw	L/Halu Charan	1	10	3	x	x			27																	5
9	8	Pulin ch. Bag	M/-Jaladhi Dasi	2	4	3	x	x		1																		4
10	9	Bibin Behari Das	L/Gurai Prasad	1	9	3	x	x			28																	5
11	10	Bai Kuntha Gharui	L/Bharat	1	6	3	x	x			29																	5
12	11	Bikram Gharui	L/Bharat	1	4	3	x	x		2																		5
13	12	Gourhari Seemal	L/Shambhu	1	4	3	x	x		3								8										5
14	13	Bishnulal Das Adhikari	L/Kenaram	1	5	3	x	x			30																	5
15	14	Banamali Santra	L/Kartick	1	4	3	x	x		4					4													5
16	15	Iswar ch. Das	L/Kailash	1	5	3	x	x			31				3													5
16	16	Gajendra Barik	L/Halu	1	2	3	x	x		5																		5
17	17	Gobindra Santra	L/Maddal	1	2	2	1		288	6			4												18/38			5
18	18	Tilottama Santra	H/L Sridhar	3	2	3	x	x		7																		3
19	19	Iswar ch. Santra	L/Maddal	1	2	2	1		288	8			5													19/39		5
20	20	Gunamayee Santra	H/L Gorachand	3	3	3	x	x		9																		5

code numbers : (a) relation to head : father-1, mother-2, husband-3; (b) group : self-employed in manufacturing—registered-1, self-employed in manufacturing-not registered-2, others-3; (c) class : manufacturing as principal means of livelihood-1, manufacturing as subsidiary means of livelihood-2, (d) nature of enterprise : only manufacturing-1, only servicing-2, mixed-3; (e) period of stay : not more than 6 months-1, 6 months to 1 year-2, 1 year to 2 years-3, 2 to 5 years-4, more than 5 years-5

+ only in case of villages having no maps or land records

Technical Paper on Sample Design

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GOVERNMENT OF INDIA NATIONAL SAMPLE SURVEY : 1958-59
Schedule 0.1 : List of households (auxiliary sheet)

RURAL

(Fourteenth Round)

1. serial number	1698	2. zone-state-natural division	3|2	3. stratum	14	4. sub-sample	2	5. sample village	5	6. sub-round	1

[6] list of households and record of selection

house number (0)	household serial number (1)	name of head of household (2)	name of father/mother/husband of head of household (3)	relation to head (a) (4)	household size (5)	household category group (b) (6)	class (c) (7)	nature of enterprise (d) (8)	industry code (9)	sampling serial number for schedule 1.1 & 10 household size 1-4 (10)	above 4 (11)	2.2 class 1 (12)	class 2 (13)	land utilisation 5.0 (14)	employment 10 (15)	income and expenditure 1.1 sub-round 1 (16)	2 (17)	3 (18)	4 (19)	5 (20)	6 (21)	enterprise 2.2 sub-round 1 (22)	2 (23)	3 (24)	4 (25)	5 (26)	6 (27)	period of stay in sample village (e) (28)
21	21	Panchanan Paul	L/ Nilkantha	1	3	3	x	x		10																		4
21	22	Vanur-Raran Paul	L/ Nilkantha	1	2	3	x	x		11																		4
22	23	Kunja Bihari Santra	L/ Baikuntha	1	2	2	2	1	288	12			6									1				20 40	5
23	24	Gunadhar Maity	M/ Rajubala	2	4	3	x	x		13					1													5
24	25	Gorachand Maity	L/ Kunja Maity	1	2	3	x	x		14						1												5
25		UNINHABITED HOUSE																										
26	26	Bindu Bala Maity	H/ Murari Maity	3	1	2	2	1	288	15			7										1,21 41					5
27	27	Gunadhar Maity	L/ Sadai Charan	1	4	3	x	x		16																		5
28	28	Gopal Das	L/ Baikuntha Das	1	7	2	2	1	288		32		8											2,22 42				5
29		UNINHABITED HOUSE																										
30	29	Surendra Nath Das Adhikari	L/ Haradhan	1	6	2	2	1	288		33		9												3,23 43			5
31	30	Radharath Sasmal	L/ Gokul	1	3	3	x	x		17																		5
32	31	Janaki Bala Dasi	H/ Parikshit	3	2	3	x	x		18																		5
33	32	Nilkantha Santra	L/ Kartick	1	8	3	x	x			34																	5
34	33	Baneswar Bera	L/ Gopal	1	8	3	x	x			35																	5
35	34	Shila Prasad Maity	L/ Konar Narayan	1	11	2	2	1	288		36		10													4,24 44		5

code numbers : (a) relation to head : father–1, mother–2, husband–3, (b) group : self-employed in manufacturing–registered–1, self-employed in manufacturing–not registered–2, others–3; (c) class : manufacturing
as principal means of livelihood–1, manufacturing as subsidiary means of livelihood–2 ; (d) nature of enterprise : only manufacturing–1, only servicing–2, mixed–3; (e) period of stay : not more
than 6 months–1, 6 months to 1 year–2, 1 year to 2 years–3, 2 to 5 years–4, more than 5 years–5
† only in case of villages having no maps or land records
* delete whichever is inapplicable

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National Sample Survey

[6] list of households and record of selection

house number	household serial number	name of head of household	name of father/ mother/husband of head of household	relation to head (a)	household size	household category		nature of enterprise (d)	industry code	sampling serial number for schedule				landt utilisation 5.0	employment 10	order of selection for schedule												period of stay in sample village (e)
						group (b)	class (c)			1.1 & 10		2.2				income & expenditure 1.1						enterprise 2.2						
										household size		class 1	class 2			sub-round						sub-round						
										1-4	above 4					1	2	3	4	5	6	1	2	3	4	5	6	
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)
36	35	Gourhari Shaw	M/ Astami Bala	2	3	3	x	x		19																		5
37	36	Narahari Shaw	L/ Jhalu	1	2	3	x	x		20																		5

code numbers :· (a)· relation to head : father–1, mother–2, husband–3; (b) group : self-employed in manufacturing—registered–1, self-employed in manufacturing–not registered–2, others–3; (c) class : manufacturing as principal means of livelihood–1, manufacturing as subsidiary means of livelihood–2, (d) nature of enterprise : only manufacturing–1, only servicing–2, mixed–3; (e) period of stay : not more than 6 months–1, 6 months to 1 year–2, 1 year to 2 years–3, 2 to 5 years–4, more than 5 years–5

† only in case of villages having no maps or land records

Technical Paper on Sample Design

CENTRAL*

ORIGINAL*

GOVERNMENT OF INDIA NATIONAL SAMPLE SURVEY : 1958-59
Schedule 0.2 : List of households (main sheet)

URBAN

(Fourteenth Round)

[1] identification particulars of sample block

1. serial number	348	7. state	UTTAR PRADESH			
2. zone-state-natural division	326	8. district	BANARAS .			32
3. stratum	8	9. town	BANARAS			102
4. sub-round — sub sample	H	10. number of households in sample block				62
6. sample block	06	11. last sampling serial number for schedule 2.2				8

[2] particulars of investigation and scrutiny

sr. no.	item	investigator	inspector	field scrutiniser	
(0)	(1)	(2)	(3)	(4)	
1.	name	L.S. GUPTA	S.R. JAIN	B.B VERMA	
2.	roll number	15	3	x	
3.	date of survey/inspection/scrutiny	1 and 2-9-58	18.9.58 / 14.10.58	30.12.58	
4.	date of receipt–despatch	8 9-58	8.10.58	14.10.58	23.10.58	31.12.58
5.	number of scrutiny sheets attached	x	x		
6.	signature	*(signature)*	✓	✓	

[3] particulars of sampling households

sr. no.	enquiry	random start	sampling interval	sampling serial numbers surveyed for the enquiry
(0)	(1)	(2)	(3)	(4)
1.	household enterprise (schedule 2 2)	4	02	4, 6, 8
2.	employment and demography (schedule 10)	13	. 17	13, 30, 47

[4] remarks by investigator

[5] comments by inspector

The schedule was returned to the investigator for necessary corrections

* delete whichever is inapplicable

Sch. 0.2-1

[6] list of households and record of selection

house number	household serial number	name of head of household	household size	household category — type(a)	group(b)	phase(c)	nature of enterprise (d)	industry code	number of unemployed persons — educated	others	sampling serial number for schedule 10 type 1	2.2 type 2	class 1	class 2	order of selection for schedule 10	2.2	period of stay in sample town/city(e)	number of births in household in past year	number of deaths in household in past year
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
106/56	1	Hanuman Prashad	4	2	3	×	×	×	×	×		3					5		×
"	2	Bajrang Bahadur	5	2	3	×	×	×	×	×		4					5	1	×
"	3	Hari Prasad	6	2	3	×	×	×	×	×		5					5	×	×
"	4	Smt Ram Kishori	1	2	3	×	×	×	×	×		6		8		3	5	×	×
"	5	Swami Dayal	8	1	2	2	2	388	×	1	1	7					5	×	1
"	6	Gajju Narain	1	2	3	×	×	×	×	×		8					5	×	×
"	7	Kailash Nath	2	2	3	×	×	×	×	×		9	1				5	×	1
"	8	Sital Prasad	5	2	2	1	1	209	×	×		10					5	×	×
106/57	9	Babu lal	6	2	3	×	×	×	×	×		11					5	×	×
"	10	Manna lal	4	2	3	×	×	×	×	×		12					5	×	×
"	11	Nathu Ram	4	2	3	×	×	×	×	×		13			1		5	×	×
"	12	Munna lal Tripathi	8	2	3	×	×	×	×	×		14					5	×	×
"	13	Ram Kherosan	1	2	3	×	×	×	×	×		15					5	×	×
"	14	Jagat Narain	3	2	3	×	×	×	×	×		16	2				5	×	×
"	15	Lala Ram	10	2	2	1	1	900*	×	×		16	2				5	×	×
"	16	Raghu Ram	4	2	2	1	1	900*	×	×		17	3				1	×	×
106/58	17	Beshu	1	2	3	×	×	×	×	×		18					1	×	×
"	18	Dhanni	1	2	3	×	×	×	×	×		19					1	×	×
"	19	Barsati	1	2	3	×	×	×	×	×		20					2	×	×
"	20	Jhagun Mukhtar	1	2	3	×	×	×	×	×		21					2	×	×
"	21	Hira	1	2	3	×	×	×	×	×		22					1	×	×
"	22	Ram Ashray	1	2	3	×	×	×	×	×		23					1	×	×
"	23	Kishan	1	2	3	×	×	×	×	×		24					1	×	×
"	24	Ghanshyam Ranvi	1	2	3	×	×	×	×	×		25					1	×	×
"	25	Gattu	1	2	3	×	×	×	×	×		26					1	×	×
"	26	Achraj lal	1	2	3	×	×	×	×	×		27					1	×	×
"	27	Baiju	1	2	3	×	×	×	×	×		28					1	×	×
"	28	Mahadeo	1	2	3	×	×	×	×	×		29					1	×	×
"	29	Siya Ram	1	2	3	×	×	×	×	×		30				2	5	×	×
"	30	Raj Kumar	1	2	3	×	×	×	×	×		31					3	×	×
106/59	31	Bandu Ram	8	2	2	1	2	393	×	×		32	4			1	5	×	1
"	32	Sheosaran Das	5	2	2	1	2	393	×	×		33	5				5	×	×
"	33	R.S. Misra	13	2	3	×	×	×	×	×		34					5	×	×
"	34	Rooplal Shukla	7	2	3	×	×	×	×	×		35					5	×	1
"	35	R. Narula	6	2	3	×	×	×	×	×		36					5	×	×
"	36	Brij Mohan	6	2	3	×	×	×	×	×		37					5	1	×
"	37	Saw Mittelwala	6	2	3	×	×	×	×	×		38					5	×	×
106/60	38	W/o Laxmi Narain	9	2	3	×	×	×	×	×		39					5	×	×
"	39	Raj Kumar Katyar	5	2	3	×	×	×	×	×		40					5	×	×
"	40	Chunni lal	4	2	3	×	×	×	×	×		41					5	×	×

code numbers (a) type : unemployed–1, not unemployed–2; (b) group : self-employed in manufacturing as principal means of livelihood–1, manufacturing employed in manufacturing not registered–2, others–3; (c) class: manufacturing as principal means of livelihood–1, self-employed in manufacturing registered–1, self-employed in manufacturing as subsidiary means of livelihood–2; (d) nature of enterprise : only manufacturing–1, only servicing–2, mixed–3; (e) period of stay : not more than 6 months–1, 6 months to 1 year–2, 1 year to 2 years–3, 2 to 5 years–4, more than 5 years–5

* Manufacture of Betel leaves S.

× selected for Sch. 1.1

ORIGINAL*
DUPLICATE

CENTRAL*
STATE

GOVERNMENT OF INDIA NATIONAL SAMPLE SURVEY : 1958-59
Schedule 9.2 : List of households (auxiliary sheet)

(Fourteenth Round)

URBAN

identification particulars of sample block

1. serial number	348	3. stratum	8	5. sub-sample	1
2. zone-state-natural division	326	4. sub-round	1	6. sample block	0 6

(6) list of households and record of selection

house number	household serial number	name of head of household	household size	household category type (a)	group (b)	class (c)	nature of enterprise (d)	industry code	number of unemployed persons estimated	others	sampling serial number for schedule type 10	type 22	classclass 1	2	order of selection for schedule 10	22	period of stay in sample term/day (e)	number of births in household in past year	number of deaths in household in past year
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
												42					4	×	×
106/60	41	mant Tribadi	2	2	3	×	×	×	×	×		43					5	×	×
106/61	42	Pt Devi sankar	8	2	3	×	×	×	×	×		44					4	×	×
"	43	P.D. Malaya	5	2	3	×	×	×	×	×		45					5	×	×
"	44	Tribti	7	2	3	×	×	×	×	×		46					5	×	×
"	45	L Ghosh	7	2	3	×	×	×	×	×		47	3				5	7	×
"	46	Lala chaturmal	7	2	3	×	×	×	×	×		48					5	1	1
"	47	bhagwan das	6	2	3	×	×	×	2	×	2						5	×	×
"	48	Sardar Bijli	19	1	3	×	×	×	×	×		49					5	×	×
"	49	W/o Anant Ram	3	2	3	×	×	×	×	×		50					5	×	1
"	50	Dayal Das	3	2	3	×	×	×	×	×		51					5	×	1
"	51	Jetha Mal	6	2	3	×	×	×	×	×		52					5	×	×
"	52	Smt Shaloni Devi	1	2	3	×	×	×	×	×		53					5	×	×
"	53	Govind Ram Gupta	6	2	3	×	×	×	×	×		54					5	×	×
"	54	Ganoo Mal	9	2	3	×	×	×	×	×		55					5	×	×
"	55	Ram Soran	5	2	2	1	2	883	×	×		56	6		2		5	×	×
"	56	Ram Bilaso	6	2	2	1	209	×	×			57	7				5	×	1
"	57	Baboo Ram	5	2	2	1	1	×	×			58					5		
"	58	Sat Durga devi	4	2	3	×	×	×	×	×			—	—	—	—	2	×	×
106/62	59	Sundar lal	4	2	2	1	1	209	×	×			—	—	—	—	1	×	×
	60	Raghunath	3	2	2	1	1	209	×	×			—	—	—	—	5	×	×
106/64	61	Shikhar Rajan	3	2	3	×	×	×	×	×			×				3	×	×
106/65	62	Adim Shankar Triwedi	4	2	3	×	×	×	×	×									

* delete whichever is inapplicable
code numbers (a) type : unemployed–1, not unemployed–2, (b) group : self-employed in manufacturing-registered–1, self-employed in manufacturing-not registered–2, (c) class : manufacturing as principal means of livelihood–1, manufacturing as subsidiary means of livelihood–2, others–3, (d) nature of enterprise : only manufacturing–1, only servicing–2, mixed–3, (e) period of diary means of livelihood–2, others–3, (d) nature of enterprise : only manufacturing–1, only servicing–2, mixed–3, (e) period of stay : not more than 6 months–1, 6 months to 1 year–2, 1 year to 2 years–3, 2 to 3 years–4, more than 5 years–5

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CENTRAL*   ORIGINAL*

GOVERNMENT OF INDIA NATIONAL SAMPLE SURVEY : 1958-59
Schedule 0.12 : Working sheet for sampling households

RURAL   (Fourteenth Round)

[1] identification particulars of sample villages

1. zone-state-natural division	332	2. stratum	9	3. sub-sample	2	4. state West Bengal ....

sample village	serial number	district name	code	tehsil	village	number of hamlet groups	hamlet (s)
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	1555	Howrah	09	Panchla	Jayrampur	X	
2	1556	Howrah	09	Uluberia	Uttar Pirpur	2	Berapara, Mollapara Dolapara
3	1557	Howrah	09	Bagnan	Chakur	3	Dakphan para
4	1558	24 Parganas	14	Budge Budge	Subhi	X	
5	1559	24 Parganas	14	Bhangar	Kapinagar	X	
6	1560	24 Parganas	14	Naihati	Garifa	X	

[2] particulars of investigation and scrutiny

sr. no.	item	investigator	inspector	field scrutiniser
(0)	(1)	(2)	(3)	(4)
1	name	S. Khasanbis	P. Das Gupta	
2	roll number	169	96	
3	date of selection/inspection/scrutiny	7. 9. 59	10. 9. 59	
4	date of receipt-despatch	8. 9. 59	10.9.59	11.9.59	
5	number of scrutiny sheets attached			
6	signature	S. Khasanbis	P Das Gupta	

[3.1] selection of households for schedule 1.1

row number	sample village	number of house-holds	cumu-lative total of col. (2)	sub-round number												sampling serial numbers selected				
				2		3		4		5		6				sub-round number				
				selected number	order of selection	selected number	order of selection	selected number	order of selection	selected number	order of selection	selected number	order of selection	2	3	4	5	6		
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)		
1								26	8	71	9	116	10			26	71	116		
2																				
3	1	121	121																	
4				161	11	206	12	251	13					40	85	130				
5																				
6	2	161	282																	
7				400	1					296	14	341	15	118	⊗		14	59		
8																				
9	3	150	432																	
10						445	2	490	3						13	58				
11																				
12	4	100	532																	
13										535	4	580	5				3	48		
14																				
15	5	49	581																	
16				625	6	670	7							44	89					
17																				
18	6	108	689																	

sampling interval (I)	45			random start (R)	400

* delete whichever is inapplicable

Sch. 0.12—2

[3.2] selection of households for schedule 2.2

row number (0)	sample village (1)	number of house-holds (2)	cumu-lative total of col. (2) (3)	sub-round number 2 — selected number (4)	order of selection (5)	sub-round number 3 — selected number (6)	order of selection (7)	sub-round number 4 — selected number (8)	order of selection (9)	sub-round number 5 — selected number (10)	order of selection (11)	sub-round number 6 — selected number (12)	order of selection (13)	sampling serial numbers selected, sub-round 2 (14)	3 (15)	4 (16)	5 (17)	6 (18)
1				4	1	6	2	8	3	10	4	12	5	4	6		10	12
2				14	6	16	7	18	8	20	9	22	10	14	16	18		22
3				24	11	26	12	28	13	30	14	32	15	24	26	28	30	32
4				34	16	36	17	38	18	40	19	42	20	34	36	38	40	42
5				44	21	46	22	48	23	50	24	52	25	44	46	48	50	52
6				54	26	56	27	58	28	60	29			54	56	58	60	
7	1	60	60															
8												62	30					2
9				64	31	66	32	68	33	70	34	72	35	4	6	8	10	12
10				74	36									14				
11																		
12																		
13																		
14	2	14	74															
15						76	37	78	38	80	39	82	40		2	4	6	8
16				84	41	86	42	88	43					10	12	14		
17																		
18																		
19																		
20																		
21	3	15	89															
22										90	44	92	45				1	3
23																		
24																		
25																		
26																		
27																		
28	4	3	92															
29																		
30																		
31																		
32																		
33																		
34																		
35	5	0	92															
36				94	46	96	47	98	48	100	49	102	50	2	4	6	8	10
37																		
38																		
39																		
40																		
41																		
42	6	20	112															

sampling interval (I): 2   random start (R): 04