सत्यमेव जयते

GOVERNMENT OF NCT OF DELHI

POOLING & POOLABLITY ANALYSIS

CENTRAL AND STATE SAMPLE DATA

NSS 66th ROUND, Sch 1.0

HOUSEHOLD CONSUMER EXPENDITURE (TYPE I & II)

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PREFACE

National Statistical Commission constituted a committee under the Chairmanship of Prof.R.Radhakrishna on Pooling of Central and State samples of National Sample Surveys (NSS) to identify the preconditions for pooling of Central and State sample NSS data to suggest appropriate methodology for pooling the data to bridge the data gaps and in turn strengthen the database for decentralized planning and governance.

The necessity for pooling the Central and State data arose due to the growing need for improving the precision of estimates of policy parameters such as the incidence of poverty, State Domestic Product (SDP), District Domestic Product (DDP) etc and for strengthening the database at district level required for decentralized governance.

Earlier, DES-Delhi has attempted pooling of state and central samples of NSS66th Round Sch 1.0 data. The pooling is done on the basis of weighted average mean methodology as suggested by Minhas-Sardana report on pooling. The Draft report is submitted to NSSO for their comments.

Later, NSC committee has suggested certain poolability tests and its methodologies. Two workshops were also organized by NSSO to achieve the objectives. Accordingly, DES,Delhi has tested various parameters in poolability test. Pooled results based on the poolabilty tests are reproduced in this report.

The final pooled report contains the parameter like MPCE, Household and population along with social group, religion, cooking, dwelling, lighting, sex-ratio, internet users, and education level. This report has been prepared by Sh.Hemant Kumar, Statistical Assistant under the guidance of Dr.R.N.Sharma,Joint Director and Sh.D.B.Gupta, Deputy Director. Effort of EDP unit of this Directorate especially Sh.P.K.Srivastava, Programmer along with Mrs.Nidhi Rajpal & Mrs. Madhu Yadav,Asstt. Programmer is highly appreciated.

This is a first step by DES,Delhi to understand the concepts and methodology of pooling of socio economic round data and it is hoped that better results would be obtained in future analysis. Comments and valuable suggestions from the Researchers and Scholars on this report are most welcome.

Jan, 2014

(Dr. B.K.Sharma)

Spl.Secy-cum-Director

CONTENTS

Chapter 1
Introduction and Background

Background

The National Sample Survey (NSS) was set up in 1950, to bridge large gaps in statistical data needed for planning, policy formulation and computation of national income aggregates, especially in respect of the unorganized and household sector of the economy. NSSO has been conducting nationwide multi-subject, integrated, large scale sample surveys in the form of successive rounds covering various aspects of social, economic, demographic, industrial and agricultural statistics. These surveys are undertaken striking a balance between the urgent and contemporary need for reliable statistical data on different topics and the constraints of limited resources, both physical and financial. The subject coverage of Socio-Economic enquiries for different rounds is decided on the basis of a 10-year cycle. Certain topics like labour force, household consumer expenditure, social consumption, housing condition of people, and unorganized non agricultural enterprise surveys, Household Land and Live stock Holding and Debt and Investment are repeated at quinquennial or decadal intervals. The remaining years are for open rounds in which subjects of current/special interest are undertaken on the demand of other Central Ministries, and national and international organizations, etc. NSSO has become synonymous with reliable estimates on various aspects of economic and social life in India based on large scale sample surveys.

State's Participation in NSS surveys

DES, Delhi has been participating in the NSS surveys of Household consumer expenditure since 27th round (1972-73),32nd (1977-78),38th (1983),43rd (1987-88),50th (1993-94),55th (1999-2000),61th (2004-05) & 66th (2009-2010) round by using the same concepts, definitions and procedures and by adopting the same sample design based on independently drawn sample as that of NSSO. These two field operations are generally referred as central and State samples of the National Sample Survey. Sample sizes of central and state samples are equal for most of the States/UTs (equal matching sample). But there are some States including Delhi, where the number of samples surveyed by State statistical agencies is double to that of the size of the central samples.

Main Objectives of Pooling

One of the objectives of States participation in the NSS surveys is to provide a mechanism by which sample size will be increased and the pooling of the two sets of data would enable better estimate at lower sub state level, particularly at district level. At the State level, this will result in increased precision of the estimates and at disaggregated level, estimates will be more stable. But the major benefit will be derived in the case of estimates are generated at sub-state level like NSS region/districts.

National Statistical Commission constituted a committee under the Chairmanship of Prof.R.Radhakrishna on Pooling of Central and State samples of National Sample Surveys (NSS) to identify the preconditions for pooling of Central and State sample NSS data to suggest appropriate methodology for pooling the data to bridge the data gaps and in turn strengthen the database for decentralized planning and governance. The National Statistical Commission in its report has observed the importance of pooling in the statement: " the statistical agencies of different State governments have been participating in the NSS programme and canvassing the same questionnaires in matched samples of households in their respective States following identical concepts, definitions and procedures. Results from the central samples and state sample(s) have occasionally been compared. The main purpose of the programme is to pool the two samples and obtain dependable estimates for regions within the States". The Commission recommended: "The State sample data should be processed regularly within a reasonable time after the completion of fieldwork and attempts should be made to obtain and utilize pooled estimates by combining central and state samples".

Emerging need for pooling of estimates

There has been of late major thrust for lower level data for decentralized planning and development. The 73rd and 74th constitutional amendment (1992) has brought into existence the democratically elected grassroots institutions of local self governance, with respective delegated functions, both in rural and urban areas. This has enhanced the demand for local level statistics and necessitated requirement of developing basic capabilities at grass root levels to organize such statistics in a harmonious manner. In this context, it is envisaged that the survey resources in overall NSS programme both by Central and State Agencies can be more effectively utilized to generate lower level estimates of key indicators at district level. 13th Finance Commission, in Para 12.99 of its report, noted that "Comparable estimates of district income are extremely relevant for

measuring intra-state income disparities. This will enable State Governments to effectively plan policy and programme interventions. They could also be used as a parameter for horizontal distribution of fiscal transfers". The Commission also recommended for granting finance to State Governments, which should be utilized by them for strengthening statistical infrastructure at the district level. These requirements are subsequently brought in institutional framework in the implementation of the 13th Finance Commission. The States started participating in the programme of collecting socioeconomic data on the same subjects from the 8th round (July 1954- June 1955) using the same concepts, definitions and procedures and by adopting the same sample design based on independently drawn sample as that of NSSO.

One of the objectives of States participation in the NSS programme is to provide a mechanism by which sample size will be increased and the pooling of the two sets of data would enable better estimates at lower sub state level, particularly at district level.

Data Entry and Validation Software

The State DES of Delhi developed its own software for data entry and validation and the central sample data which has been entered in central software has been converted to state format so as to pool the data of two sets. Pooling has been done for NSS 66th round on different parameters like Household Consumer Expenditure (Food and non-food) based on URP, MRP and MMRP, No of household, Population , social group, religion, cooking, lighting, dwelling, access of internet, literacy rate and sex-ratio etc based on the methods prescribed by NSC committee and the poolability tests like non-parametric test (Wald-Wolfowitz run test) and parametric test, Divergence between the estimates of central and state sample, RSE for food, non-food & total MPCE, pooling by inverse weight of the variance of the estimates and pooling by simple average of the estimates were attempted using software developed in house in Delhi.

Poolability Test of central and state sample

Though the central sample and state sample are drawn independently following identical sampling design with same concepts, definitions and instructions to collect the state sample data but due to lack of adequate training of field and processing staff of State/UTs, the data files in some cases are not properly validated. There is also expected agency bias in the two sets of data generated by different agencies. As such they cannot be merged for generating pooled estimate. Therefore one needs to test that the samples are coming from identical distribution function. Since the parametric distribution of the

sample mean is unknown one may adopt non-parametric tests such as K-S test, Wald-Wolfowitz run Test, Median test etc to test that the samples are coming from identical distribution function.

An attempt by DES, Delhi

Minhas and Sardana in their paper titled "A note on pooling of central and state samples data of National Sample Survey" which appeared in *Sarvekshana July- September 1990* proposed a methodology for computation of pooled multiplier and laid down certain guidelines and procedure to be followed by the State DESs in the pooling exercise. One of the key recommendations was that the State DESs should provide fully validated data to computer center adopting the data entry formats and validation procedures as followed by DPD, NSSO, in their entirety. Methodology given in their paper is the same as that recommended by technical group headed by S. C. Chaudhury in 1983. They had also argued that adopting the methodology of multiplier calculation, pooled estimate at stratum level cannot lie outside the range of estimates based on central and state sample but the estimate at higher level such as region or state may lie outside the range of estimates prepared based on central and state sample separately.

DES, Delhi made an attempt and followed the methodology of Minhas and Sardana in order to pool the state and central data. DES, Delhi has successfully poolled the central and state data of 66th NSS round. Some of the results based on pooled data are presented in this report. This report will be sent to NSSO for their comments and after approval of the NSSO same will be finalized.

Limitation of Report

In Delhi the district wise sample frame is not available. Hence samples have not been drawn at district level. Therefore poolability testing & analysis has been done on the basis of sector wise (Urban and Rural) for unit level data.

Methodology and software used

Complete analysis and poolablility testing is based on nonparametric and parametric test especially Z-test/Run Test and Median Test as per nature of unit level data either discrete or continuous in nature. For overall test we have used the poolablilty software supplied by NSSO (MOSPI) in the workshop held in January and August 2013.

Poolability of data and its analysis has been worked out with the help of SPSS & Micro soft office 2007. There are several methods available for pooling of statistical data for analysis of two sets of unit level data to compare the variation of entire data among the attributes. We have used two methods as per our own connivance for pooling the accepted attributes with sector and items wise. The used methods are Weightage Mean Method and Aggregate estimate.By virtue of weighing the two estimates at the domain level at which two estimates are pooled, the pooled estimate will always lie between the central and state sample estimates.

In this report we have also calculate the standard Errors (SE) and Relative standard Errors(RSE) for checking the percentage of errors and its deviation from central point. The SE is the standard deviation of the Sample-mean's estimate of a population mean. (It can also be viewed as the standard deviation of the error in the sample mean relative to the true mean, since the sample mean is an unbiased estimator) SE is usually estimated by the sample estimate of the population standard deviation (sample standard deviation) divided by the square root of the sample size (assuming statistical independence of the values in the sample).The RSE is simply the standard error divided by the mean of the sample. After getting the value of RSE for Urban and rural sectors of state and central level data we need to pool that RSE to check the percentage of error which is likely to occur at the time of pooling. The complete methodology adopted by guidance of NSSO & NSC and material supplied in the NSSO workshop.

Parameters considered for poolability Test

Considering the smaller sample size at district level following broad parameters were considered for poolability test. In this report total ten parameter of NSS 66th round (Type-I and Type-II) has been considered for pollability test and analysis. In which Median test has been applied for the data of discrete nature and Run test has been applied for the data of continuous nature.

a) Parameters of Continuous Nature:- MPCE of Food, Non-Foof and Total MPCE derived from detail item(food and non-food wise) from URP, MRP and MMRP
b) Parameters of Discrete Nature :-Household size,Population, social group, religion, cooking, lighting, dwelling, access of internet, literacy and sex-ratio

Tables generated for pooling in the form of Statement.

1. Summary of Run test & Median Test Result for various parameters for pooled sample for rural and urban sectors(Sch.1.0, Type-1)
2. Summary of Run test & Median Test Result for various parameters for pooled sample for rural and urban sectors(Sch.1.0, Type-2)

3. Summary of Sector wise result of run test of MPCE(FOOD, NON FOOD) for pooled sample((Item wise) (Sch.1.0, Type-1))
4. Test Result for various parameters for pooled sample for rural and urban sectors(Sch.1.0, Type-1)
5. Test Result for various parameters for pooled sample for rural and urban sectors(Sch.1.0, Type-2)
6. Sector wise result of run test of MPCE(FOOD, NON FOOD) for pooled sample((Item wise) (Sch.1.0, Type-2))
7. Estimated Value and Estimated RSE for MPCE (URP & MRP)Sch.1.0 Type-1)
8. Pooled Results for No. Of Household and Population (Sch.1.0) Type-1
9. (A)Monthly Per Capita Expenditure (MPCE) (Rs.) by sector & broad group of food & non-food items(Sch.1.0): (Type-1,MRP)

9.(B)Monthly Per Capita Expenditure (MPCE) (Rs.) by sector & broad group of food & non-food items(Sch.1.0): (Type-1,URP)

10. Percentage Distribution of expenditure of Broad Groups of Food and Non-Food Items (Sch.1.0): (Type-1, MRP).
11. Percentage Distribution of expenditure of Broad Groups of Food and Non-Food Items (Sch.1.0): (Type-1, URP).
12. Estimated Value of No of Households & Population for each MPCE Class-wise(Rural,Type-1,MRP& URP)
13. Estimated Value of No of Households & Population for each MPCE Class-wise(Urban,Type-1,MRP & URP)
14. Monthly Per Capita Expenditure (MPCE) (Rs.) by sector & broad group of food & non-food items(Sch.1.0): (Type-1 of MRP)

14(A) Monthly Per Capita Expenditure (MPCE) (Rs.) by sector & broad group of food & non-food items(Sch.1.0): (Type-1 of URP)

15. Household Monthly Per Capita Expenditure (MPCE) (Rs.) by sector & broad group of food & non-food items(Sch.1.0): (Type-1 of MRP)

15(A) Household Monthly Per Capita Expenditure (MPCE) (Rs.) by sector & broad group of food & non-food items(Sch.1.0): (Type-1 of URP)

16. Pooled Tables with RSE for food & non food items of Type-1
17. Pooled Tables General Households (Sch.1.0, Type-1) including cooking, dwelling, lighting, sex-ratio, internet users, education level.
18. RSE Tables For General Households (Sch.1.0, Type-1) including cooking, dwelling, lighting, sex-ratio, internet users, education level.

19. Estimated no of household & Persons for each MPCE Class(Rural,Type2)
20. Estimated no of household & Persons for each MPCE Class(Urban,Type2)
21. Monthly Per Capita Expenditure (MPCE) (Rs.) by Rural sector & broad group of food & non-food items(Sch.1.0): (Type-2 of URP)
22. Monthly Per Capita Expenditure (MPCE) (Rs.) by Urban sector & broad group of food & non-food items(Sch.1.0): (Type-2 of URP)
23. Pooled Tables Monthly Per Capita Expenditure (MPCE) (Rs.)(Sch.1,Type-2)
24. Pooled Tables for General Households Monthly Per Capita Expenditure (MPCE) (Rs.) ,(Sch.1.0, Type-2)
25. Pooled Tables for General Households including cooking, dwelling, lighting, sex-ratio, internet users, education level.

Sample size of Delhi: Total sample size of Delhi State for central and state sample is given below:

Delhi – RURAL				
	Central sample		**State sample**	
Schedule	**FSU surveyed**	**HH surveyed**	**FSU surveyed**	**HH surveyed**
1.0 Type-I	8	59	16	128
1.0 Type-II	8	59	16	128
10	8	59	16	128
Delhi – URBAN				
	Central sample		**State sample**	
Schedule	**FSU surveyed**	**HH surveyed**	**FSU surveyed**	**HH surveyed**
1.0 Type-I	120	842	240	1859
1.0 Type-II	120	842	240	1859
10	120	842	240	1859

CHAPTER-2

Summary of Poolability Test Result(Sch.1.0)

Statement: 1 (Sch.1.0-Type1): Number of Parameters for which Poolability was Accepted/Rejected(Y/N) by run test using Z-Statistic (one sided) and Median test

Parameter tested	Sector	
	Rural	Urban
(1)	(2)	(3)
Run test using Z-statistic (one sided)		
MPCE(URP)	Y	Y
MPCE(MRP)	Y	Y
Food-Items(MRP)	Y	N
Noon-Food-Items (MRP)	Y	N
Median Test		
Social Group	N	Y
Religion	Y	N
Cooking	N	N
Lighting	Y	Y
Type of Dwelling	N	Y
Access to Internet	N	N
House hold Size	Y	N
Population	Y	N

The Z-statistic by run test at 1% critical error has been applied for rural and urban areas of Delhi for poolability test of parameters like MPCE(URP) & MPCE(MRP) and MPCE for food & nonfood items(MRP).These parameters are accepted the null hypothesis in the case of sch-1.0 , type-1 unit level data for rural sector .However, in case of urban sector only MPCE(URP) & MPCE(MRP) have been accepted and MPCE(MRP) for food & nonfood items separately have been rejected. The Median test has been applied for discrete nature of parameters (eight in numbers) in which four parameter i.e. Religion ,lighting , household size and population have been accepted by null hypothesis in the case of rural sector and three parameters i.e. social group, lighting and the dwelling in the case of urban sector at 1% critical level having single degree of freedom. It is very surprising result in the case of population and household of urban sector both parameters are rejected by applied test that means necessary steps to be taken to avoid the non sampling errors at the time of collection of unit level data by surveyors.

Statement: 2 (Sch.1.0-Type2): Number of Parameters for which Poolability was Accepted/Rejected(Y/N) by run test using Z-Statistic (one sided) and Median test

Parameter tested	Sector	
	Rural	Urban
(1)	(2)	(3)
Run test using Z-statistic (one sided)		
MPCE	Y	Y
Food-Items	Y	N
Noon-Food-Items	Y	N
Median test		
Social Group	Y	Y
Religion	Y	Y
Cooking	Y	Y
Lighting	Y	Y
Type of Dwelling	Y	Y
Access to Internet	Y	Y
House hold size	Y	Y
Population	Y	Y

The Z-statistic by run test at 1% critical error has been applied for rural and urban areas of Delhi for parameters like MPCE as a whole and separate for food & non-food items. These parameters are accepted the null hypothesis in the case of sch-1.0 , type-2 unit level data for rural sector . For urban sector, MPCE as a whole is accepted, however completely reverse result has been observed in the case of urban consumption of food and non-food items. The Median test has been applied for discrete nature of parameters(eight in numbers) in which all the parameters have been accepted by null hypothesis in the case of both the sectors at 1% critical level having single degree of freedom. It reveals that the collected unit level data is significant having negligible non sampling errors at the time of collection of unit level data by surveyors. Hence sch.1.0 of type 2 data reflects the quality of data which is the great achievement of our surveyors.

Statement 3: [SCHEDULE 1.0 TYPE-I ,MRP RUN TEST

Sector wise result of run test of MPCE(FOOD, NON FOOD) for pooled sample

$Z_{0.01}$ = - 2.33 [one sided test] reject if z-value < $Z_{0.01}$

ITEM CODE	ITEM_NAME	URBAN		RURAL	
		Z-VALUE	ACCEPT	Z-VALUE	ACCEPT
Food_items					
129	cereal	-16.77189369	N	-1.156643393	Y
159	Pulses & pulse product	-21.93590344	N	-3.405985665	N
169	Milk & milk product	-18.25440333	N	1.180729781	Y
179	Sugar	-37.29736322	N	-6.736629501	N
189	Salt	-38.39844743	N	-10.32703881	N
199	Edible oil	-34.75693204	N	-3.761451898	N
209	Egg, fish & meat	-16.62547271	N	-1.397401137	Y
249	Vegetables	-12.6213892	N	0.054540908	Y
269	Fruits(fresh)	-33.27345786	N	-1.954438817	Y
279	Fruits(dry)	-18.37420082	N	-2.233223904	Y
289	Spices	-33.96863717	N	-1.848748707	Y
309	Beverages	-12.55989914	N	-1.660000757	Y
319	Pan	-8.254054212	N	-1.056580233	Y
Non food_items					
329	Tobacco	-20.34242443	N	-4.416366887	N
339	Intoxicants	-12.01117355	N	-1.204890051	Y
359	Fuel and light	-11.48449739	N	-2.949755105	N
379	Clothing	-16.15835853	N	-0.946175934	Y
389	Bedding	-34.91205019	N	-4.013530078	N
399	Footwear	-32.3993106	N	-1.999814815	Y
409	Education	-8.7240705	N	-0.971078772	Y
419	Medical	-9.838637635	N	-1.732050808	Y
429	Medical non-institutional	-9.39812145	N	2.787676748	Y
439	Entertainment	-16.43779114	N	2.613231638	Y

449	Minor durable-type goods	-33.27736362	N	-1.938845021	Y
459	Toilet articles	-28.39678743	N	1.459078834	Y
479	Other household consumable	-22.02257343	N	-1.954667517	Y
499	Consumer services excluding conveyance	-18.67543218	N	-1.577643804	Y
519	Conveyance	-36.17865488	N	-2.223555775	Y
529	Rent	-23.77415489	N	-1.543322178	Y
539	Taxes & cesses	-11.5819992	N	1.565433769	Y
549	Durable goods	-30.1596432	N	-0.886674815	Y
449	Minor durable-type goods	-33.27736362	N	-1.938845021	Y
459	Toilet articles	-28.39678743	N	1.459078834	Y

Form above test result it is clear that urban data of item wise food and non-food of MPCE is not required to pooled which is also seen when we check out the combined poolability after clubbing the all items of food and non-food. But it is not good sign for statistical data collection. The collected primary data had must be pooled if we are hot avoiding the non-sampling errors at the time of data collection. I t is clear that" requirement for rechecking the unit level data after again field visit.

When we go through poolability test of food and non-food item of MPCE in the case of type 2 data the similar result have been found with acceptance/rejection of all the items which is again the nonfavorable condition for pooled the unit level data in the case of urban. Hence the complete table of poolability test of item wise description is not required to present however the pooling result of type 2 is enclosed in result part of this report

When we consider the household and population for poolability testing of unit level data by median test then urban test fail in the case of type 1 however acceptance in the case of type 2 data. Therefore improvement must be required in the case of urban data after then pooled the two data.

Chapter 3

POOLABILITY TESTING RESULT
(Type-1&Type-2)

Statement4: Test Result of Run test and Median Test for sch.1.0(Type-1)

	MEDIAN TEST AT 0.01 SIGNIFICANCE LEVEL HAVING SINGLE DEGREE OF FREEDOOM =6.635			
Parameter	URBAN	ACCEPTED	RURAL	ACCEPTED
Social Group	11.37137	N	6.624323	Y
Religion	1.252002	Y	8.850959	N
Cooking	11.7776	N	6.947333	N
Lighting	0.483152	Y	0.24027	Y
Dwelling	30.83112	N	1.301242	Y
Access to Internet	22.97451	N	11.04583	N
House hold	4.39	Y	16.49	N
Population	4.93	Y	16.39	N

	RUN TEST AT 0.01 SIGNIFICANCE LEVEL HAVING SINGLE DEGREE OF FREEDOOM =-2.33			
Parameter	URBAN	ACCEPTED	RURAL	ACCEPTED
MPCE(URP)	-2.65301	N	-1.94221	Y
MPCE(MRP)	-0.6676	Y	0.969061	Y
Food-Items(MRP)	-14.0046	N	-0.07293	Y
Noon-Food Items(MRP)	-16.2965	N	-0.36624	Y

<u>Statement 5:</u> Test Result of Run test and Median Test for sch.1.0(Type-2)

	CHISQUARE TEST AT 0.01 SIGNIFICANCE LEVEL HAVING SINGLE DEGREE OF FREEDOOM =6.635			
Parameter	URBAN	ACCEPTED	RURAL	ACCEPTED
Social Group	0.0496	Y	3.247247	Y
Religion	0.0003	Y	0.3963	Y
Cooking	0.6441	Y	0.0019	Y
Lighting	0.0174	Y	0.0014	Y
Dwelling	0.0225	Y	0.0305	Y
Access to Internet	6.1615	Y	0.0015	Y
House hold	0.0040	Y	0.4817	Y
Population	0.0040	Y	0.4817	Y

	RUN TEST AT 0.01 SIGNIFICANCE LEVEL HAVING SINGLE DEGREE OF FREEDOOM =-2.33			
Parameter	URBAN	ACCEPTED	RURAL	ACCEPTED
MPCE(MRP)	-1.55573	Y	0.969061	Y
Food-Items(MRP)	-13.4116	N	-0.0638	Y
Noon-Food Items(MRP)	-24.0755	N	-1.98199	Y

Statement 6: Sector wise result of run test of MPCE(FOOD, NON FOOD) for pooled sample $Z_{0.01}$ = - 2.33 [one sided test] reject(N) if z-value < $Z_{0.01}$ otherwise(Y)

(Sch.1.0,Type-2)

S.No.	Items	URBAN	RURAL
1	cereal	N	Y
2	gram	N	Y
3	cereal substitutes	N	Y
4	pulses&pulse products	N	Y
5	milk&milk products	N	Y
6	sugar	N	Y
7	salt	N	Y
8	edible oil	N	Y
9	egg. Fish & meat	N	Y
10	vegetables	N	Y
11	fruits(fresh)	N	Y
12	fruits(dry)	N	Y
13	spices	N	Y
14	beverages,refreshments,etc	N	Y
15	**food:total(1-14)**	N	**Y**
16	Pan,tobacco &intoxicants	N	Y
17	fuel & light	N	Y
18	clothing & bedding	N	Y
19	footwear	N	Y
20	education	N	Y
21	medical(institutional)	N	Y
22	medical(non-institutional)	N	Y
23	entertainment	N	Y
24	minor durable type goods	N	Y
25	toilet articles	N	Y
26	other household consumables	N	Y
27	consumer services excluding conveyance	N	Y
28	conveyance	N	Y
29	rent	N	Y
30	taxes &cesses	N	Y
31	durable goods	N	Y
32	**non-food total (16-31)**	**N**	**Y**
33	**total expenditure(15+32)**	**N**	**Y**

Chapter 3

Statement of Pooled Results

Pooled Results& RSE OF Type-1

Statement 7: Estimated Value and Estimated RSE for MPCE (Sch.1.0 Type-1)

(i)MPCE (URP)

	Estimated MPCE			Estimated RSE		
SECTOR	**Central**	**State**	**Pooled**	**Central**	**State**	**Pooled**
Urban	2181.98	2840.07	2603.48	0.29641	0.31282	0.03026
Rural	1566.56	1709.63	1645.68	0.19971	0.20918	0.02092

(i)MPCE (MRP)

	Estimated			Estimated RSE		
SECTOR	**Central**	**State**	**Pooled**	**Central**	**State**	**Pooled**
Urban	2411.69	2904.87	2748.77	0.299871	0.35649	0.03098
Rural	1714.29	1761.03	1750.67	0.20958	0.20998	0.02098

Statement 8: Pooled Results for No. Of Household &Population (Sch.1.0)Type-1

A	Estimated Household			Estimated RSE_Household		
SECTOR	**Central**	**State**	**Pooled**	**Central**	**State**	**pooled**
Urban	2916686	2752610	2807302	0.96389	0.915621	0.09462
Rural	202089	221162	214804	0.21255	0.25967	0.02239

B	Estimated Population			Estimated RSE_Population		
SECTOR	**Central**	**State**	**pooled**	**Central**	**State**	**pooled**
Urban	10850008	11707206	11421473	3.46812	3.78921	0.03612
Rural	595414	1046042	895833	0.19718	0.320548	0.02098

Statement 9. Monthly Per Capita Expenditure (MPCE) (Rs.) by sector & broad group of food & non-food items:

RURAL (Type 1- MRP)

S.No	Items	State Sample	Central Sample	Pooled Sample
1	cereal	152.22	111.57	143.22
2	cereal substitutes	0	0	0
3	pulses&pulse products	42.43	32.38	40.21
4	milk&milk products	217.87	200.71	214.06
5	egg. Fish & meat	16.19	27.18	18.62
6	vegetables	92.93	113.14	97.41
7	fruits(fresh)	24.67	33.93	26.72
8	fruits(dry)	4.45	1.13	3.72
9	spices	24.19	25.16	24.4
10	Beverages,refreshments,etc	104.65	177.39	120.77
11	**Food :total(1-10)**	**771.28**	**793.22**	**776.15**
12	clothing & bedding	117.15	106.47	114.78
13	footwear	25.43	24.19	25.15
14	education	159.61	102.96	147.06
15	medical(institutional)	1.5	0	1.17
16	medical(non-institutional)	23.34	18.58	22.29
17	entertainment	32.18	32.72	32.3
18	minor durable type goods	4.98	1.06	4.11
19	toilet articles	51.47	50.69	51.29
20	other household consumables	43.24	54.62	45.76
21	consumer services excluding conveyance	96.53	107.05	98.86
22	conveyance	127.33	138.22	129.75
23	rent	64.88	74.08	66.92
24	taxes &cesses	11.82	7.56	10.88
25	durable goods	64.35	20.15	54.56
26	**non-food total (12-25)**	**989.75**	**921.07**	**974.53**
27	**total expenditure(11+26)**	**1761.03**	**1714.29**	**1750.68**

Statement 11: Percentage Distribution of expenditure of Broad Groups of Food and Non-Food Items:

RURAL(Type 1- MRP)

S.No	Items	State Sample	Central Sample	Pooled Sample
1	cereal	8.64	6.51	8.18
2	cereal substitutes	0.00	0.00	0.00
3	pulses& pulse products	2.41	1.89	2.30
4	milk& milk products	12.37	11.71	12.23
5	egg. Fish & meat	0.92	1.59	1.06
6	vegetables	5.28	6.60	5.56
7	fruits(fresh)	1.40	1.98	1.53
8	fruits(dry)	0.25	0.07	0.21
9	spices	1.37	1.47	1.39
10	beverages, refreshments, etc	5.94	10.35	6.90
11	**food: total(1-10)**	**38.58**	**42.17**	**39.36**
12	clothing & bedding	6.65	6.21	6.56
13	Footwear	1.44	1.41	1.44
14	Education	9.06	6.01	8.40
15	medical(institutional)	0.09	0.00	0.07
16	medical(non-institutional)	1.33	1.08	1.27
17	Entertainment	1.83	1.91	1.84
18	minor durable type goods	0.28	0.06	0.23
19	toilet articles	2.92	2.96	2.93
20	other household consumables	2.46	3.19	2.61
21	consumer services excluding conveyance	5.48	6.24	5.65
22	Conveyance	7.23	8.06	7.41
23	Rent	3.68	4.32	3.82
24	taxes &cesses	0.67	0.44	0.62
25	durable goods	3.65	1.18	3.12
26	**non-food total (12-25)**	**46.77**	**43.07**	**45.97**

Statement 10: Percentage Distribution of expenditure of Broad Groups of Food and Non-Food Items:

RURAL(Type 1- URP)

Sr.No.	item	State Sample	Central Sample	Pooled Sample
1	cereal	8.9	7.12	8.7
2	cereal substitutes	0	0	0
3	pulses and pulses products	2.48	2.07	2.44
4	milk and milk products	12.74	12.81	13.01
5	egg, fish & meat	0.95	1.73	1.13
6	vegetables	5.44	7.22	5.92
7	fruits (fresh)	1.44	2.17	1.62
8	fruits (dry)	0.26	0.07	0.23
9	spices	1.41	1.61	1.48
10	beverage, refreshments ,etc	6.12	11.32	7.34
11	**food: total (1 - 10)**	**39.74**	**46.12**	**41.87**
12	clothing & bedding	5.08	0.98	4.32
13	Footwear	1.3	0.05	1.06
14	Education	7.87	5.68	7.56
15	medical (institutional)	0.32	0	0.26
16	medical (non-institutional)	1.37	1.19	1.35
17	Entertainment	1.88	2.09	1.96
18	minor durable-type goods	0.29	0.07	0.25
19	toilet articles	3.01	3.24	3.12
20	other households consumables	2.53	3.49	2.78
21	consumer services excluding conveyance	5.65	6.83	6.01
22	Conveyance	7.45	8.82	7.88
23	Rent	3.79	4.73	4.07
24	taxes & cesses	0.69	0.48	0.66
25	durable goods	3.95	0.07	3.21
26	**non-food total (12-25)**	**45.18**	**37.72**	**44.49**

Statement 12:Estimated number of households and persons by sex for each mpce class												
RURAL Type I MRP												
State Sample					Central Sample				Pooled Sample			
MPCE CLASS	**households**	**persons**	**% person**	**household size**	**households**	**persons**	**% persons**	**Household size**	**households**	**persons**	**% person**	**household size**
upto 500	0	0	0.0	0.00	0	0	0.0	0.00	0	0	0.0	0.00
501-1000	14053	82812	7.9	5.89	34134	171297	28.8	5.02	20747	112307	12.5	5.41
1001-1500	72155	401458	38.4	5.56	43208	150794	25.3	3.49	62506	317903	35.5	5.09
1501-2000	50223	249692	23.9	4.97	23730	41560	7.0	1.75	41392	180314	20.1	4.36
2001-2500	52291	186415	17.8	3.56	57466	130734	22.0	2.27	54016	167854	18.7	3.11
2501-3000	15644	48227	4.6	3.08	32719	57532	9.7	1.76	21336	51329	5.7	2.41
above 3000	16795	77439	7.4	4.61	10832	43497	7.3	4.02	14808	66125	7.4	4.47
all classes	221162	1046042	100.0	4.73	202089	595414	100.0	2.95	214804	895833	100.0	4.17
URBAN												
State Sample					Central Sample				Pooled Sample			
MPCE CLASS	**households**	**persons**	**% person**	**household size**	**households**	**persons**	**% persons**	**Household size**	**households**	**persons**	**% person**	**household size**
upto 500	1752	15765	0.1	9.00	21179	84715	0.8	4.00	8227	38748	0.3	4.71
501-1000	116072	733569	6.3	6.32	229011	1317052	12.1	5.75	153718	928064	8.1	6.04
1001-1500	517124	2764210	23.6	5.35	541007	2700368	24.9	4.99	525085	2742929	24.0	5.22
1501-2000	443988	1949846	16.7	4.39	535264	1886551	17.4	3.52	474413	1928748	16.9	4.07
2001-2500	331430	1266629	10.8	3.82	433290	1258411	11.6	2.90	365383	1263890	11.1	3.46
2501-3000	248101	955524	8.2	3.85	250049	792000	7.3	3.17	248750	901016	7.9	3.62
above 3000	1094143	4021663	34.4	3.68	906888	2810910	25.9	3.10	1031725	3618079	31.7	3.51
all classes	2752610	11707206	100.0	4.25	2916686	10850008	100.0	3.72	2807302	11421473	100.0	4.07

Statement 13:Estimated number of households and persons by sex for each mpce class

RURAL **Type I URP**

	State Sample				Central Sample				Pooled Sample			
MPCE CLASS	**households**	**persons**	**% persons**	**Household size**	**households**	**persons**	**% persons**	**Household Size**	**households**	**persons**	**% person**	**household size**
upto 500	0	0	0.0	0.00	0	0	0.0	0.00	0	0	0.0	0.00
501-1000	27760	169418	16.2	6.10	35950	182189	30.6	5.07	30490	173675	19.4	5.70
1001-1500	54096	310446	29.7	5.74	53385	154378	25.9	2.89	53859	258423	28.8	4.80
1501-2000	59200	245003	23.4	4.14	32270	107542	18.1	3.33	50223	209560	23.4	4.17
2001-2500	37689	176746	16.9	4.69	47498	63555	10.7	1.34	40959	128638	14.4	3.14
2501-3000	25621	70051	6.7	2.73	28092	68004	11.4	2.42	26444	69368	7.7	2.62
above 3000	16796	74379	7.1	4.43	4894	19745	3.3	4.03	12829	56168	6.3	4.38
all classes	221162	1046042	100.0	4.73	202089	595414	100.0	2.95	214804	895833	100.0	4.17

URBAN

	State Sample				Central Sample				Pooled Sample			
MPCE CLASS	**households**	**persons**	**% persons**	**Household size**	**households**	**persons**	**% persons**	**Household size**	**households**	**persons**	**% person**	**household size**
upto 500	2070	17676	0.2	0.00	25907	117810	1.1	4.55	10016	51054	0.4	5.10
501-1000	163242	979566	8.4	6.00	338404	1830985	16.9	5.41	221629	1263372	11.1	5.70
1001-1500	501625	2618559	22.4	5.22	582006	2831097	26.1	4.86	528418	2689618	23.5	5.09
1501-2000	426567	1845758	15.8	4.33	555079	1703783	15.7	3.07	469405	1798221	15.7	3.83
2001-2500	306687	1170523	10.0	3.82	366769	1152434	10.6	3.14	326714	1164493	10.2	3.56
2501-3000	251955	996378	8.5	3.95	241431	705967	6.5	2.92	248447	901094	7.9	3.63
above 3000	1100465	4078747	34.8	3.71	807090	2507932	23.1	3.11	1002673	3553622	31.1	3.54
all classes	2752610	11707206	100.0	4.25	2916686	10850008	100.0	3.72	2807302	11421473	100.0	4.07

Statement14 : Per capita Monthly Consumer Expenditure by Sector (Rs.) Type I MRP									
Sector	**State Sample**			**Central Sample**			**Pooled Sample**		
	Food	**Non-Food**	**Total**	**Food**	**Non-Food**	**Total**	**Food**	**Non-Food**	**Total**
Rural	771.28	989.75	1761.03	793.22	921.07	1714.29	776.14	974.53	1750.67
Urban	1036.21	1868.66	2904.87	889.77	1521.92	2411.69	989.86	1758.91	2748.77
Delhi	1014.48	1796.57	2811.05	884.75	1490.66	2375.09	974.29	1701.82	2676.11

Statement 15 : Household Monthly Consumer Expenditure by Sector (Rs.) Type I MRP									
Sector	**State Sample**			**Central Sample**			**Pooled Sample**		
	Food	**Non-Food**	**Total**	**Food**	**Non-Food**	**Total**	**Food**	**Non-Food**	**Total**
Rural	3647.98	4681.27	8329.25	2337.06	2713.75	5050.80	3236.87	4064.25	7301.12
Urban	4407.12	7947.66	12354.78	3309.92	5661.50	8971.42	4027.14	7155.91	11183.05
Delhi	4350.66	7704.73	12055.40	3246.88	5470.49	8717.37	3970.97	6936.17	10907.14

Type I URP

Statement 14(B): Per capita Monthly Consumer Expenditure by Sector (Rs.)									
Sector	**State Sample**			**Central Sample**			**Pooled Sample**		
	Food	**Non-Food**	**Total**	**Food**	**Non-Food**	**Total**	**Food**	**Non-Food**	**Total**
Rural	771.28	938.35	1709.63	793.22	773.35	1566.56	776.14	869.69	1645.68
Urban	1036.21	1803.86	2840.07	889.77	1292.21	2181.98	989.84	1613.65	2603.48
Delhi	1014.48	1732.87	2747.35	884.75	1265.22	2149.96	974.29	1559.54	2533.83

Type I URP

Statement 15(B): Household Monthly Consumer Expenditure by Sector (Rs.)									
Sector	**State Sample**			**Central Sample**			**Pooled Sample**		
	Food	**Non-Food**	**Total**	**Food**	**Non-Food**	**Total**	**Food**	**Non-Food**	**Total**
Rural	3647.98	4438.17	8086.15	2337.06	2278.52	4615.58	3236.87	3626.99	6863.86
Urban	3707.12	7672.05	11379.17	3309.92	4806.99	8116.91	4027.14	6565.10	10592.24
Delhi	3702.72	7431.55	11134.27	3246.88	4643.15	7890.03	3970.97	6356.27	10327.24

Statement 16: pooled tables with RSE for Food and Non-Food items of Tpye-1

A	Estimated food _items (MPCE,MRP)			Estimated RSE_food_ items		
Sector	Central	State	pooled	Central	State	pooled
Urban	889.77	1036.21	989.86	0.0926	0.1106	0.0102
Rural	793.22	771.28	776.14	0.0821	0.0791	0.0189

B	Estimated non-food _items (MPCE,MRP)			Estimated RSE_non-food_ items		
Sector	Central	State	pooled	Central	State	pooled
Urban	1521.92	1868.66	1758.91	0.1987	0.2361	0.0210
Rural	921.07	989.75	974.53	0.1281	0.1362	0.0119

Statement 17: POOLED TABLES FOR GENERAL NO OF HOUSEHOLDS

(Sch.1.0, Tpye-1)

[A] INTERNET-

(i) *ACCESS* at home

Sector	State	Central	Pooled
Urban	475584	198776	**390946**
Rural	527	0	**527**
Total	476110	198776	**391855**

(ii) Not Access

Sector	State	Central	Pooled
Urban	2277026	2717910	**2387716**
Rural	220635	202089	**214490**
Total	2497661	2919999	**2634521**

[B]COOKING

(i) **Kerosene**

Sector	State	Central	Pooled
Urban	5704	96105	**28515**
Rural	126661	47150	**60402**
Total	132365	143255	**135751**

(ii) No cooking arrangement

Sector	State	Central	Pooled
Urban	64663	36539	**41057**
Rural	79	453037	**302051**
Total	64743	489576	**420215**

(iii)Firewood& chips

Sector	State	Central	Pooled
Urban	38524.09	47262.35	**40824**
Rural	3564.901	9133.1	**5421**
Total	42088.99	56395.45	**45991**

(iv)LPG

Sector	State	Central	Pooled
Urban	197428.1	109266.6	**173558**
Rural	2520932	2297240	**2456405**
Total	2718360	2406506	**2633581**

[C] DWELLING:- ***(i)*****Owned**

Sector	State	Central	Pooled
Urban	1709519	1526330	**1575650**
Rural	160369	138678	**145100**
Total	1869888	1665008	**1720664**

(ii) Hired

Sector	State	Central	Pooled
Urban	912395	1166626	**1006218**
Rural	60792	37472	**51876**
Total	973188	1204098	**1058514**

(iii)Others

Sector	State	Central	Pooled
urban	130695	25939	**93647**
rural	222784	222784	**222784**

total	353480	248723	**316158**

[D]Lighting :- (i) Electricity

Sector	**State**	**Central**	**Pooled**
Urban	2746238	2874194	**2785986**
Rural	221162	202089	**215144**
Total	2967399	3076283	**3001257**

[E]LITERACY RATE *:-*

Sector	**state**	**central**	**Pooled**
urban	78	71	**76**
rural	81	76	**80**
total	78	76	**78**

[F]SEX-RATIO:-

Sector	**State**	**Central**	**Pooled**
Urban	844	707	**805.6619**
Rural	859	624	**796.3285**
Total	845	719	**809.9958**

Statement 18 :RSE TABLES FOR GENERAL HOUSEHOLDS (Sch.1.0,Type-1)

[A]Cooking:- ***(i)*** **FIREWOOD & CHIPS**

Sector	State	Central	Pooled_rse
Urban	1.24458	0.70923	**0.45178**
Rural	0.713796	0.534522	**0.305643**

(ii) LPG

Sector	State	Central	Pooled_rse
Urban	0.719372	0.582556	**0.321888**
Rural	0.092815	0.044019	**0.029858**

(iii) KEROSENE

Sector	State	Central	Pooled_rse
Urban	0.274647	0.907827	**0.210856**
Rural	0.024071	0.609682	**0.023157**

(iv) NO. OF COOKING ARRANGEMENT

Sector	State	Central	Pooled_rse
Urban	1.261188	0.237335	**0.199746**
Rural	0.377964	0.031072	**0.028711**

[B]DWELLING:- ***(i)*** **OWNED**

Sector	State	Central	Pooled_rse
Urban	0.256399	0.272624	**0.132131**
Rural	0.976909	0.468038	**0.316434**

(ii) HIRED

Sector	State	Central	Pooled_rse
Urban	0.567521	0.198305	**0.146955**
Rural	0.242176	0.790827	**0.185401**

(iii) OTHERS

Sector	State	Central	Pooled_rse
Urban	0.050508	0.856675	**0.047696**
Rural	0.625291	0.566602	**0.297251**

[C]LIGHTING :- ***(i)*** **Electricity**

Sector	State	Central	Pooled_rse
Urban	0.542669	0.837581	**0.329309**
Rural	0.332945	0.89677	**0.242821**

[D]INTERNET ACCESS:- ***(i)*** **INTERNET ACCESS AT HOME**

Sector	State	Central	Pooled_rse
Urban	0.588609	0.282199	**0.190748**
Rural	0.554736	0.545249	**0.274976**

(ii) INTERNET NOT ACCESS

Sector	State	Central	Pooled_rse
Urban	0.535232	0.602093	**0.283349**
Rural	0.334973	0.422762	**0.186891**

[E]SEX-RATIO:-

Sector	State	Central	Pooled_rse
Urban	0.86068	0.6868	**0.34761**
Rural	0.768322	0.5929	**0.31916**

[F]LITERACY **RATE**

Sector	State	Central	Pooled_rse
Urban	0.860833	0.764739	**0.32367**
Rural	0.586316	0.455331	**0.29156**

Statement of Pooled Results

(Type-2)

Statement 19:- Estimated number of households and persons for each MPCE class

RURAL(Type 2)

State Sample					Central Sample				Pooled Sample			
MPCE CLASS	**households**	**persons**	**% person**	**HHD size**	**HHD**	**persons**	**% persons**	**HHD size**	**HHD**	**Persons**	**% person**	**HHD size**
upto 500		0	0.0	0.00	0	0	0.0	0.00	0	0	0.0	0.00
501-1000	7146	36708	4.2	5.14	12969	64847	12.5	3.57	9087	46088	6.1	5.07
1001-1500	78467	370882	42.3	4.73	18187	113258	21.8	1.71	58374	285007	37.6	4.88
1501-2000	52623	224867	25.7	4.27	66420	135051	26.0	3.54	57222	194929	25.7	3.41
2001-2500	27421	89837	10.3	3.28	38121	74537	14.3	2.05	30536	84737	11.2	2.78
2501-3000	26036	83083	9.5	3.19	36328	79405	15.3	2.64	29919	81857	10.8	2.74
above 3000	29469	70566	8.1	2.39	30064	52807	10.2	0.26	29667	64647	8.5	2.18
all classes	221162	875944	100.0	3.96	202089	519905	100.0	2.57	214804	757264	100.0	3.53

Statement 20:- Estimated number of households and persons for each MPCE class

URBAN(Type 2)

State Sample					Central Sample				Pooled Sample			
MPCE CLASS	**HHD**	**persons**	**% person**	**HHD size**	**HHD**	**persons**	**% persons**	**HHD size**	**HHD**	**persons**	**% person**	**HHD size**
upto 500		0	0.0	0.00	10852	69619	0.7	0.00	3617	23206	0.2	6.42
501-1000	86950	575574	4.7	3.28	121392	712395	6.7	5.87	98431	621181	5.3	6.31
1001-1500	406642	2399156	19.5	2.95	500817	2267267	21.4	4.53	438034	2355193	20.0	5.38
1501-2000	537987	2624443	21.3	2.70	531330	1969683	18.6	3.71	535768	2406190	20.5	4.49
2001-2500	306652	1319704	10.7	2.22	394532	1308714	12.4	3.32	335945	1316041	11.2	3.92
2501-3000	253019	1067547	8.7	2.28	278539	875697	8.3	3.14	261526	1003597	8.5	3.84
above 3000	1161603	4342835	35.2	2.28	1064538	3382741	32.0	3.18	1129248	4022804	34.2	3.56
all classes	2752854	12329259	100.0	4.48	2902001	10586116	100.0	3.65	2802570	11748211	100.0	4.19

Statement 21: Monthly Per Capita Expenditure (MPCE) (Rs.) by sector & broad group of food & non-food items:

RURAL(Sch.1.0,Type-2)

S.No	Items	State Sample	Central Sample	Pooled Sample
1	cereal	141.53	118.18	136.19
2	gram	4.27	2.40	3.84
3	cereal substitutes	0.00	0.00	0.00
4	pulses&pulse products	39.28	41.13	39.70
5	milk&milk products	209.79	219.50	212.01
6	sugar	36.03	20.68	32.52
7	salt	2.18	2.40	2.23
8	edible oil	48.53	49.07	48.65
9	egg. Fish & meat	23.51	61.27	32.15
10	vegetables	121.12	146.18	126.86
11	fruits(fresh)	41.47	60.04	45.72
12	fruits(dry)	4.57	3.02	4.22
13	spices	35.86	44.72	37.89
14	beverages,refreshments,etc	163.82	347.13	205.77
15	**food:total(1-14)**	**871.97**	**1115.70**	**927.75**
16	Pan,tobacco &intoxicants	41.24	45.96	42.32
17	fuel & light	161.22	157.41	160.35
18	clothing & bedding	105.96	104.36	105.59
19	footwear	22.68	22.48	22.64
20	education	82.31	93.93	84.97
21	medical(institutional)	3.69	0.11	2.87
22	medical(non-institutional)	24.36	17.89	22.88
23	entertainment	28.74	33.53	29.83
24	minor durable type goods	5.55	2.77	4.91
25	toilet articles	46.49	53.00	47.98
26	other household consumables	45.44	61.86	49.20
27	consumer services excluding conveyance	101.34	134.97	109.03
28	conveyance	115.08	107.92	113.44
29	rent	69.38	82.50	72.39
30	taxes &cesses	18.33	7.86	15.93
31	durable goods	76.81	26.22	65.33
32	**non-food total (16-31)**	**948.60**	**952.78**	**949.66**
33	**total expenditure(15+32)**	**1820.57**	**2068.49**	**1877.40**

Statement 22 : Monthly Per Capita Expenditure (MPCE) (Rs.) by sector & broad group of food & non-food items:

URBAN(Sch.1.0,Type-2)

S.No.	Items	State Sample	Central Sample	Pooled Sample
1	cereal	158.95	125.66	148.95
2	gram	5.09	2.74	4.39
3	cereal substitutes	0.07	0.00	0.05
4	pulses&pulse products	43.61	38.90	42.19
5	milk&milk products	281.27	273.22	278.85
6	sugar	35.77	31.48	34.48
7	salt	2.31	2.13	2.25
8	edible oil	63.46	49.53	59.28
9	egg. Fish & meat	70.52	48.41	63.88
10	vegetables	154.08	146.96	151.94
11	fruits(fresh)	89.59	79.85	86.66
12	fruits(dry)	20.38	11.75	17.79
13	spices	40.46	36.52	39.28
14	beverages,refreshments,etc	394.09	269.99	356.82
15	**food:total(1-14)**	1359.64	**1117.15**	1286.31
16	Pan,tobacco &intoxicants	47.95	35.06	44.08
17	fuel & light	203.47	193.46	200.46
18	clothing & bedding	153.75	141.52	150.08
19	footwear	34.28	34.39	34.31
20	education	251.32	230.72	245.13
21	medical(institutional)	24.07	30.71	26.06
22	medical(non-institutional)	47.31	33.10	43.04
23	entertainment	56.64	46.24	53.52
24	minor durable type goods	15.91	7.17	13.28
25	toilet articles	60.85	43.77	55.72
26	other household consumables	56.00	47.22	53.37
27	consumer services excluding conveyance	241.85	216.10	234.11
28	conveyance	237.36	211.37	229.55
29	rent	169.34	186.74	174.56
30	taxes &cesses	42.48	29.08	38.45
31	durable goods	126.62	50.65	103.45
32	**non-food total (16-31)**	**1769.19**	**1537.31**	**1699.19**
33	**total expenditure(15+32)**	**3128.84**	**2654.46**	**2985.51**

Statement 23: Monthly Per Capita Expenditure (MPCE) (Rs.) by sector & broad group of food & non-food items:

COMBINED(Sch.1.0,Type-2)

S.No.	Items	State Sample	Central Sample	Pooled Sample
1	cereal	157.79	126.10	148.18
2	gram	5.04	2.74	4.35
3	cereal substitutes	0.06	0.00	0.04
4	pulses&pulse products	43.32	39.25	42.04
5	milk&milk products	276.52	272.41	274.80
6	sugar	35.79	31.17	34.37
7	salt	2.30	2.16	2.25
8	edible oil	62.47	49.82	58.63
9	egg. Fish & meat	67.40	49.32	61.96
10	vegetables	151.90	147.85	150.42
11	fruits(fresh)	86.40	79.42	84.19
12	fruits(dry)	19.33	11.41	16.97
13	spices	40.16	37.14	39.20
14	beverages,refreshments,etc	378.82	275.33	347.67
15	**food:total(1-14)**	**1327.29**	**1124.13**	**1265.07**
16	Pan,tobacco &intoxicants	47.51	35.80	43.97
17	fuel & light	200.67	192.99	198.04
18	clothing & bedding	150.58	140.66	147.39
19	footwear	33.51	34.04	33.61
20	education	240.11	225.73	235.43
21	medical(institutional)	22.71	29.46	24.66
22	medical(non-institutional)	45.79	32.59	41.82
23	entertainment	54.79	45.94	52.09
24	minor durable type goods	15.22	7.01	12.78
25	toilet articles	59.90	44.48	55.25
26	other household consumables	55.30	48.21	53.11
27	consumer services excluding conveyance	232.52	213.64	226.54
28	conveyance	229.24	207.83	222.52
29	rent	162.71	183.01	168.38
30	taxes &cesses	40.88	28.26	37.09
31	durable goods	123.32	49.82	101.14
32	**non-food total (16-31)**	**1714.76**	**1519.47**	**1653.80**
33	**total expenditure(15+32)**	**3042.05**	**2643.60**	**2918.87**

Type II

Statement 24: Per capita Monthly Consumer Expenditure by Sector									
Sector	State Sample			Central Sample			Pooled Sample		
	Food	Non-Food	Total	Food	Non-Food	Total	Food	Non-Food	Total
Rural	871.97	948.60	1820.57	1115.70	952.78	2068.49	927.75	949.66	1877.40
Urban	1359.64	1769.19	3128.84	1117.15	1537.31	2654.46	1286.31	1699.19	2985.51
Delhi	1327.29	1714.76	3042.05	1124.13	1519.47	2643.60	1265.07	1653.80	2918.87

Type II

Statement 25 : Household Monthly Consumer Expenditure by Sector									
Sector	State Sample			Central Sample			Pooled Sample		
	Food	Non-Food	Total	Food	Non-Food	Total	Food	Non-Food	Total
Rural	3453.55	3757.07	7210.62	2870.32	2451.18	5321.51	3270.65	3347.90	6618.55
Urban	6089.46	7923.72	14013.18	4075.23	5607.90	9683.12	5392.15	7122.91	12515.06
Delhi	5893.44	7613.86	13507.31	3996.78	5402.38	9399.16	5241.12	6854.17	12095.30

Statement 26: POOLED TABLES FOR GENERAL HOUSEHOLDS (Sch.1.0, Type-2)

[A]Primary source of energy for cooking :

(i) LPG

	state	**central**	**Pooled**
urban	24899	2349154	662676
rural	1844	134250	40886
total	26742	2483404	704000

(ii) **Kerosene**

	state	**central**	pooled
urban	1343	35096	6317
rural	57	53400	46732
total	1399	88496	19157

(iii) **No Cooking Arrangement**

	state	**central**	pooled
urban	601	460894	356873
rural	42	14439	11560
total	643	475333	368397

(B) Source of energy for lighting:- Electricity

	state	**central**	**Pooled**
urban	2742143	2853647	2775670
rural	221162	202089	215285
total	2963305	3055736	2991142

[C]Dwelling unit : (i) Owned

	state	central	Pooled
urban	1761755	1611055.	1720689
rural	167522	117969	153739
total	1929277	1729024	1874611

(ii) **Hired**

	state	central	Pooled
urban	853220	1101559	940869
rural	53639	84119	67087
total	906860	1185679	1006231

[D]Uses of Internet: (i) Internet Access at Home

	state	central	pooled
urban	8693	549571.36	117518
rural	11	0	11
total	8703	549571	116877

(ii) **Internet Not Access**

	state	central	pooled
urban	46365	5254429	1699825
rural	4413	404177	128930
total	50777	5658607	1828707

[C]Literacy Rate

	state	**central**	**Pooled**
urban	82	83	83
rural	83	84	84
total	82	83	83

[D] Sex ratio

	state	**central**	**Pooled**
urban	836	783	825
rural	865	662	865
total	838	777	826

Chapter Four

Testing pool ability and Methodology for pooling

1 Testing poolability of central and state sample

1.1 Though the central sample and state sample are drawn independently following identical sampling design with same concepts, definitions and instructions to collect the state sample data but due to lack of adequate training of field and processing staff of State DES, unit level data in some cases are not properly validated. There is also expected agency bias in the two sets of data generated by different agencies. As such they cannot be merged for generating pooled estimate without testing that the samples are realized from identical distribution function. Since the parametric distribution of the sample mean is unknown one may adopt non-parametric tests such Run test, Median test, chi-square test etc to test that the samples are coming from identical distribution function.

1.2 Median test

1.2.1 In statistics, the median test is a special case of Pearson's Chi-square test. It tests the null hypothesis that the medians of the populations from which two samples are drawn, are identical. Observations in each sample are assigned to two groups, one consisting of data whose values are higher than the median value in the two groups combined, and the other consisting of data whose values are at the median or below. A Pearson's Chi-square test is then used to determine whether the observed frequencies in each group differ from expected frequencies derived from a distribution combining the two groups.

Let m^* be the median of the pooled sample data. Construct 2 X 2 contingency table as below and use chi-square test if State sample and Central sample have identical median.

Sample-type	**no of sample observation**		**Total**
	<= m^*	**> m^***	
State Sample	N_{11}	N_{12}	$N_{1.}$
Central Sample	N_{21}	N_{22}	$N_{2.}$
Total	$N_{.1}$	$N_{.2}$	$N_{..}$

Observed frequency of each cell $O_{ij} = N_{ij}$ where i= 1 to 2, j= 1 to 2.

Expected frequency of each cell $E_{ij} = (N_{i.} * N_{.j})/N_{..}$ where i= 1 to 2, j= 1 to 2.

χ^2 **Value =** $\sum_{i=1}^{2}\sum_{j=1}^{2}(O_{ij}-E_{ij})^2/O_{ij}$ **with degrees of freedom = (2-1)*(2-1) = 1**

The statistical power of this test may sometimes be improved by using a value other than the median to define the groups say quintile classes– that is, by using a value which divides the groups into more nearly equal groups than the median would.

1.3 Multinomial distribution test or χ^2 test

For discrete data such as status of activity, educational level and categorical variable such as land possed etc, standard tests of equality of sample proportions of two sets of data based on multinomial distributions, relevant chi-square tests may be used after grouping the attributes/categorical variables in to a suitable number of classes so that each class contains adequate number of sample observations. Construct 2 X k contingency table for k classes at the domain where two sets of data are to be pooled as below and use chi-square test if State sample and Central sample have identical distribution.

Sample-type	**no of sample observation**					**Total**
	Class-1	Class-2	…	Class-k-1	Class-k	
State Sample	N_{11}	N_{12}	…	N_{1k-1}	N_{1k}	$N_{1.}$
Central Sample	N_{21}	N_{22}	…	N_{2k-1}	N_{2k}	$N_{2.}$
Total	$N_{.1}$	$N_{.2}$	…	$N_{.k-1}$	$N_{.k}$	$N_{..}$

Observed frequency of each cell $O_{ij} = N_{ij}$ where i= 1 to 2, j= 1 to k.

Expected frequency of each cell $E_{ij} = (N_{i.} * N_{.j})/N_{..}$ where i= 1 to 2, j= 1 to k.

χ^2 **Value =** $\sum_{i=1}^{2}\sum_{j=1}^{2}(O_{ij}-E_{ij})^2/O_{ij}$ **with degrees of freedom = (2-1)*(k-1) = k-1**

1.4 Wald-Wolfowitz run test

1.4.1 Suppose X and Y are independent random samples with cumulative distribution function (CDF) as $F_s(x)$ and $F_c(y)$. Null Hypothesis to be tested is H_0: $F_s(x) = F_c(x)$ for all x against alternative Hypothesis is H_1: $F_s(x) <= F_c(x)$ for all x and $F_s(x) < F_c(x)$ for some x. Let $x_1, x_2, \ldots\ldots, x_m$ be iid observation from state sample with distributive function F_s and $y_1, y_2, \ldots\ldots, y_n$ be iid observation from central sample with distributive function F_c. Pool the data and order them with respect to comparable characteristic under consideration say monthly per capita expenditure (MPCE). In the pooled order sequence put "1" for X and "0" for Y. Let U be the total runs observed where 'run' is a sequence of adjacent equal symbols. For example, following sequence: 11110001110011111110000 is divided in six runs, three of them are made out of "1" and the others are made out of "0". The number of runs U is a random variable whose distribution for large sample can be treated as normal with:

mean: $\frac{2mn}{m+n}+1$

variance: $\frac{2mn(2mn-m-n)}{(m+n)^2(m+n-1)}$

After normalizing the variable U one may use one sided z-test for testing the Null hypothesis. In extreme case the value of U will be 2 meaning by observed characteristic of all the observation of one sample is less than the other samples.

1.4.2 One of the limitations of this test is when there is a tie between two samples in the observed value. One has to resolve ties in usual manner. However if there is large number of ties which is bound to occur specially for qualitative attributes like education level, activity status etc, this test is not recommended. This test can be well applied for a continuous variable such as MPCE which are less prone to ties. For discrete variable chi-square test is recommended.

1.5 Parametric test

1.5.1 **Aggregate estimate**: Let t_{yc} and t_{ys} be the estimate of Y at domain level of pooling based on central and state sample respectively with corresponding variances $V(t_{yc})$ and $V(t_{ys})$. For large sample, making all assumption of parametric test, one may

use Z-Statistic to test the null hypothesis H_0 $E(t_{yc}) = E(t_{ys})$ where E stands for expectation.

$$Z = \frac{(t_{yc} - t_{ys})}{\sqrt{(V(t_{yc}) + V(t_{ys}))}}$$

$V(t_{yc})$ and $V(t_{ys})$ could be estimated as

$\hat{V}(t_{yc}) = \sum_l (t_{yc1} - t_{yc2})^2/4$, $\hat{V}(t_{ys}) = \sum_l (t_{ys1} - t_{ys2})^2/4$ based on sub-sample 1 & 2 estimates where $\sum_l$ stands for summing over stratum x sub-stratum level variance at the domain of pooling.

1.5.2 Estimate of rate: Let r_c and r_s be the estimate of population rates R_c and R_s ie Y/X based on central and state sample respectively with corresponding mean square error $MSE(r_c)$ and $MSE(r_s)$. For large sample, making all assumption of parametric test, one may use Z-Statistic to test the null hypothesis H_0 $E(r_c)=E(r_s)$ where E stands for expectation.

$$Z = \frac{(r_c - r_s)}{\sqrt{(MSE(r_c) + MSE(r_s))}}$$

$MSE(r_c)$ and $MSE(r_s)$ are estimated as follows:

$mse(r_c) = (\hat{V}(t_{yc}) - 2 * r_c \hat{Cov}(t_{yc}, t_{xc}) + r_c^2 * \hat{V}(t_{xc}))/ t_{xc}^2$

$mse(r_s) = (\hat{V}(t_{ys}) - 2 * r_s \hat{Cov}(t_{ys}, t_{xs}) + r_s^2 * \hat{V}(t_{xs}))/ t_{xs}^2$

where

$\hat{V}(t_{yc}) = \sum_l (t_{yc1} - t_{yc2})^2/4$, $\hat{V}(t_{ys}) = \sum_l (t_{ys1} - t_{ys2})^2/4$

$\hat{V}(t_{xc}) = \sum_l (t_{xc1} - t_{xc2})^2/4$, $\hat{V}(t_{xs}) = \sum_l (t_{xs1} - t_{xs2})^2/4$

$\hat{Cov}$ (t_{yc}, t_{xc}) = $\sum_l (t_{yc1} - t_{yc2})(t_{xc1} - t_{xc2})/4$ based on sub-sample 1 & 2 estimates.

where $\sum_l$ stands for summing over stratum x sub-stratum level variance, covariance at the domain of pooling.

2 Methodology for pooling

2.1 Pooling by inverse weight of the variance of the estimates

2.1.1 Aggregate estimate: For any characteristic, consider the state sample [s] in the form of two independent sub- sample s1 and s2 and the central sample [c] in the form of two independent sub- sample c1 and c2. Based on this, the respective estimates for state and central can be computed as:

$t_s = \sum_l (t_{s1} + t_{s2})/2$ and $t_c = \sum_l (t_{c1} + t_{c2})/2$

Pooled estimate leading to optimum combination of these two estimates is given by weighing with inverse of the variance of the estimate. Thus the pooled estimate is given by:

$T_p = \frac{V(t_c)t_s + V(t_s)t_c}{V(t_c) + V(t_s)}$ with $V(T_p) = \frac{V(t_c)V(t_s)}{V(t_c) + V(t_s)}$

In general $V(t_c)$ and $V(t_s)$ are unknown and can be estimated as

$$\hat{V}(t_c) = \sum_l (t_{c1} - t_{c2})^2/4, \quad \hat{V}(t_s) = \sum_l (t_{s1} - t_{s2})^2/4$$

where $\sum_l$ stands for summing over stratum x sub-stratum level variance at the domain of pooling.

Thus pooled estimate and estimate of pooled variance is given by

$t_p = \frac{\hat{V}(t_c)t_s + \hat{V}(t_s)t_c}{\hat{V}(t_c) + \hat{V}(t_s)}$, $\hat{V}(t_p) = \frac{\hat{V}(t_c)\hat{V}(t_s)}{\hat{V}(t_c) + \hat{V}(t_s)}$

2.1.2 By virtue of weighing the two estimates at the domain level at which two estimates are pooled, the pooled estimate will always lie between the central and state sample estimates.

2.1.3 **Estimate of rate**: Let r_c and r_s be the estimate of R_c and R_s ie Y/X based on central and state sample respectively with corresponding estimated mean square error mse(r_c) and mse(r_s). The pooled estimate and estimate of variance of pooled ratio estimate may be given by:

$$r_p = \frac{mse(r_c)r_s + mse(r_s)r_c}{mse(r_c) + mse(r_s)} \quad , \quad mse(r_p) = \frac{mse(r_c)\,mse(r_s)}{mse(r_c) + mse(r_s)}$$

Where mse(r_c) and mse(r_s) are calculated using formula given in para 1.5.2 above. Alternatively one can generate the pooled estimate of aggregate by inverse weight of estimate of variance obtained from central and state sample using formula given in para 2.1.1 for the characteristics x as well as y and obtain the pooled estimate of ratio as ratio of pooled estimate of aggregate. This will ensure consistency between pooled estimates of aggregate and the pooled estimate of ratio.

Let t_{xp} and t_{yp} be the pooled estimate of aggregate for the parameter X and Y. The pooled estimate of R (i.e Y/X) is given by

$r_p = t_{yp} / t_{xp}$

where $t_{yp} = at_{yc} + bt_{ys}$ and $t_{xp} = ct_{xc} + dt_{xs}$ and (a, b), (c, d) are the estimated inverse variance weight pair of the characteristic x and y respectively.

The estimated mse of pooled ratio estimate r_p is given by:

$$mse(r_p) = (\hat{V}(t_{yp}) - 2\, r_p\, \hat{Cov}(t_{yp}, t_{xp}) + r_p^2\, \hat{V}(t_{xp}))/ t_{xp}^2$$

where $\hat{V}(t_{yp}) = \frac{ab}{a+b}$, $\hat{V}(t_{xp}) = \frac{cd}{c+d}$ and

$\hat{Cov}(t_{yp}, t_{xp}) = ac\,\hat{Cov}(t_{yc}, t_{xc}) + bd\,\hat{Cov}(t_{ys}, t_{xs})$.

$\hat{Cov}$ (t_{yc}, t_{xc}) = $\sum_l (t_{yc1} - t_{yc2})(t_{xc1} - t_{xc2})/4$ based on sub-sample 1 & 2 estimates.

Similarly, $\hat{Cov}$ (t_{ys}, t_{xs}) = $\sum_l (t_{ys1} - t_{ys2})(t_{xs1} - t_{xs2})/4$

where $\sum_l$ stands for summing over stratum x sub-stratum level covariance at the domain of pooling.

2.1.4 Method laid down in para 2.1.1 and 2.1.2 requires calculation of estimate of variance of the estimates before pooling them. Reliability of estimate of variance should be ascertained with due consideration of sample size. Besides the complex calculations of variances and covariances for each cell of the table, one needs to address the issue of non-additivity of the component estimates with the estimate of marginal total. For e.g. pooled estimate of MPCE of FOOD and NON-FOOD may not add up to MPCE of TOTAL. To obviate this problem one may generate the pooled estimates of components first and then derive the estimate of total as sum of estimates of components.

2.2 Pooling by simple average of the estimates

2.2.1 Many of the States are not fully equipped with complex calculation of estimate of variance especially when cells of the table contains ratio of two characteristics which is usually presented in the NSS reports. When the State's participation is equal matching of central samples, the simple average of two estimates may be a way of combining the estimates considering central and state samples as independent samples. The pooled estimate will always lie between the estimates based on central and state sample separately.

2.2.2 When the State's participation is of unequal matching of central samples, the weighted average of two estimates with weights being matching ratio of central and state sample may be a better way of combining the estimates considering central and state samples as independent samples. For any characteristic, consider the state sample [s] in the form of two independent sub-sample s1 and s2 and the central sample[c] in the form of two independent sub- sample c1 and c2. Let matching ratio of state and central sample be m : n. Based on this, the respective estimates for state and central can be computed as:

$t_s = \sum_l (t_{s1} + t_{s2})/2$ and $t_c = \sum_l (t_{c1} + t_{c2})/2$

Pooled estimate of these two estimates is given by weighing with matching participation rate m:n. Thus the pooled estimate is given by:

$t_p = \frac{mt_s + nt_c}{m+n}$ with $V(t_p) = \frac{m^2 V(t_s) + n^2 V(t_c)}{(m+n)^2}$

In general $V(t_c)$ and $V(t_s)$ can be estimated as $\hat{V}(t_c) = \sum_l (t_{c1} - t_{c2})^2/4$,

$\hat{V}(t_s) = \sum_l (t_{s1} - t_{s2})^2/4$ and thus $\hat{V}(t_p) = \frac{m^2 \hat{V}(t_s) + n^2 \hat{V}(t_c)}{(m+n)^2}$

The pooled estimate will always lie between the estimates based on central and state sample separately.

SUMMING UP

For characteristics such as MPCE (URP,MRP and MMRP) for food ,Non-food and combined , Non-parametric run test were applied. Population with household, cooking, lighting, dwelling, literacy, sex-ratio etc has been tested by run test and Median test for poolability. Rejection of poolability for food and non-food items in both type of cases of urban sector is very panic situation for pooling the data of NSS 66th round. However, pooled results are presented in this report for both the sectors and types. This is a big achievement of DES, Delhi to bring out the pooled report after testing the poolability of various parameters.

Sensitivity of Test

The acceptance or rejection of poolability test varies when be increased or decreased the significance level. It also depends on degrees of freedom involded in test variables especially on Median test. At the time of grouping for particular parameter to decide the degree of freedom to check the acceptance/rejection of test.

Divergence between the estimates of central and state sample:

Before pooling the two sets of sample at a particular domain and classification, one needs to examine the divergence of the estimates derived for the domain. For this exercise, Sector is considered as domain of pooling and the divergence is worked out as absolute percentage difference between central and state sample estimates which is irrelevant because for checking the divergence, it is better exercise for strata means substratum (District) level for getting quality of data during survey, but DES, Delhi having no such type of data in this round. Therefore, it is examined that distribution of districts by absolute percentage range of divergence of MPCE (food, nonfood and total) of central and state sample in the state for rural as well as urban sector are done on the basis of RSE calculated. At around 5-20 per cent divergence in total MPCE between rural & urban sector is observed. The divergence pattern in remaining parameters like lighting, cooking, dwelling, etc is varies between at around 10-25 percent for both the sectors in the case of type-1.

RSE of MPCE on food and non-food for Urban and Rural:

The distribution of range of RSE of MPCE of central, state and pooled sample estimates of Delhi is presented in in chapter 3. RSE of estimate of MPCE on food and non food was found to be within 8-23 per cent for both central and state sample. From the distribution of RSE level, it can be seen that the pooled estimates of MPCE on food, non-food and total have relatively lower RSE when compared to central or state sample estimate in non food group. RSE of pooled estimate of MPCE on food and non-food items was observed within 1-2 percent.

RSE for Urban and Rural:

For the remaining parameters RSE lies between 10-35 percent on averages in the case of type 1. Requirement of Improved at the time of survey for getting normal RSE levels of pooled estimates is noticed in both the sector for type 1 and type 2 . But it is observed that type-2 data is far better compared to type 1 after going through all the testing and divergence of RSE for both the sectors.

Bottleneck of report

This is the first attempted to complete the poolability report by DES, Delhi. Hence improvement of any calculation / procedure is obvious. DES, Delhi at present is not having district wise samples of NSS data. Thus the prime objective of district wise analysis by pooled estimate could not be achieved. However, district wise pooled report may be prepared as and when district wise samples are made available by SDRD,MOSPI, Govt of India. In the absence of highly expert team of statistician, it is possible that some gray areas may be found in the report. However, we have given best effort for this report with negligible chances of errors.

Improvement Required In Next Round

It is necessary to validate and remove non sampling errors at the time of unit level data collection during survey by the surveyor in NSS round. Many times, sector wise data of a particular parameter fails in poolability test due to non-sampling errors. It is observed that null hypothesis has been rejected for most of the parameters, which is not good sign for pooling the two sets of data. However, if the quality of data collected without any negligence during survey, the pooling provides better results. These errors are hard to found and rectify, once the survey is completed and the report is generated. Hence Directorate will try its level best to avoid any such negligence in future NSS rounds at the primary level.