

Appendix II

Technical Report on Sample Design

Technical Report on Sample Design for the National Assessment of Achievement of Grade 08 students in Sri Lanka in 2007

The sampling methodology used for the study is based on an instructional manual given by the World Bank in 2007 for evaluation purpose. It was designed by the Statistical Consultation Group, Statistics Canada in Ottawa. This sampling methodology was recommended by the World Bank after comparing it with the earlier sampling methodology used by NEREC. In the previous three studies NEREC have been used a programme call SAMDEM (Sample Design Manager, designed by the UNESCO International Institute for Educational Planning), for selecting the sample units.

The target population of the study has grade-based definition, students who have been completed eighth grade in the education system Sri Lanka in 2007. Findings of the study are to be generalized to the target population. In another way this is the population that should be the aim of the study conclusion. Sampling frame is the list of ultimate sampling entities, the list of schools. Latest updated school database available at Ministry of Education, Sri Lanka was the sampling frame used for the study. For the current study, latest school database available at MOE was prepared using the school data for year 2006, at the time of designing the sample. Therefore Grade 07 school list from the available school database was considered as the sampling frame for the study to get the school information. That means the target student population is in grade 09 at the time of test administration (students who have completed grade 08 in 2007). The school database was in Excel worksheet format, with the elements of the sampling frames as column headings.

Elements of the sampling frame:

- Unit identifications - School ID, School Name
- Communication - School address, Telephone number (not available for all schools)
- Unit identifications - School ID, School Name

- Location - Province, District, Zone, Division
- Type of schools - 1AB, 1C, Type_2
 - 1AB - Advanced Level with all streams
 - 1C - Advanced Level without "Science" stream
 - Type 2 - Up to Ordinary Level
- Whether Bi-Lingual school or not
- Location - Province, District, Zone, Division
- Number of classes in Grade 8 by medium of instruction
- Number of students in Grade 8
- Student Classification
 - Gender - Male, Female
 - Medium of instruction - Sinhala, Tamil, Bilingual Education

School Level Exclusions:

Extremely small size :

Schools consist of less than 10 students in grade 07 of the available MOE database. These schools were excluded from the sampling frame. Table-1 illustrates school level exclusions by provinces.

Table 1 : School Level Exclusions by Provinces

Province	Schools			Students		
	Population	excluded	% excluded	Population	excluded	% excluded
1. Western	1052	111	10.5	70907	594	0.8
2. Central	921	104	11.3	42291	590	1.4
3. Southern	877	122	13.9	41430	722	1.7
4. Northern	493	32	6.5	21877	248	1.1
5. Eastern	577	23	4.0	31832	175	0.5
6. North Western	977	173	17.7	38602	1040	2.7
7. North Central	519	59	11.4	21195	363	1.7
8. Uva	588	72	12.2	23904	499	2.1
9. Sabaragamuwa	739	129	17.4	29509	775	2.6
All island	6743	825	12.2	321547	5006	1.5

By the exclusion of 12.2% of extremely small schools from the desired target all island *school population*, 1.5% of desired target all island *student population* were excluded.

Private schools (also provide primary and secondary education) :

Private schools are not controlled by the government yet follow the local curriculum set up by the Ministry of Education in the local language mediums of

Sinhala or Tamil or English. There are few number of international schools (provide primary and secondary education). These schools are not included in the sampling frame. Therefore percentage of exclusion was unknown for the private schools.

After excluding schools from the desired target population, remaining schools can be defined as the "Defined Target Population". This is the population that the national assessment team can reasonably hope to cover.

Table 2 illustrates defined target population by provinces.

Table 2 : Defined Target Population by Provinces

Province	Defined Target School Population	Defined Target Student Population
1. Western	941	70313
2. Central	817	41701
3. Southern	755	40708
4. Northern	461	21629
5. Eastern	554	31657
6. North Western	804	37562
7. North Central	460	20832
8. Uva	516	23405
9. Sabaragamuwa	610	28734
	5918	316541

Figure 1 illustrates the total percentage of schools and students included in the defined target population.

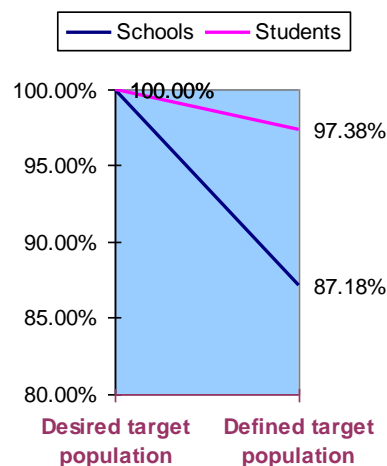


Figure 1

The sample procedure has a multi stage approach. Multi stage sampling is a strategy whereby the final sample is derived through a series of stages (steps). Also various sampling strategies are employed in these stages. In the first stage schools were selected for the sample. Schools were selected within strata with

Probability Proportional to Size, without replacements. Then in the second stage a group of students were selected from the sampled schools. Cluster sampling approach was the strategy used for selection of students from the grade 08 classes. That means, one entire grade 08 class from each sampled school was selected.

The defined target population was split in to province (explicit strata), into separate worksheets before the school sample is taken. This means the sampling frame was stratified by province. With stratification sample student size can be calculated in advance of sampling procedure so that it will meet the desired level of precision, by each stratum. This ensures that the target population is represented adequately in the sample. Medium of instructions (Sinhala, Tamil and English) and type of school have been considered as implicit strata, because in Sri Lanka it is used to report students' achievement by medium of instructions and type of school. Accordingly results will be reported for provinces. The next two topics describe the procedures of selection of school sample and student sample for the study.

School Allocation:

In the first sampling stage, first of all allocation of school sample across explicit strata (province) was calculated independently. The sample selection method (school sample) for first-sampling stage was a systematic probability-proportional to size (PPS) technique, use of average class size (Measure of size- MOS). Table 3 illustrates calculation of school allocation by province.

Table 3 : Calculation of School Allocation by Province

	Province	Calculated MOS (average class size)	Student sample (StS) at the ESS 178 per province	School sample for each province
1	WSP	33.5	1334	40
2	CTP	29.1	1207	41
3	ESP	30.1	1215	40
4	NCP	28.3	1150	41
5	NTP	31.0	1247	40
6	NWP	29.1	1173	40
7	SBP	29.0	1183	41
8	STP	29.1	1177	40
9	UVP	29.3	1196	41
			10,882	364

After identification of schools to be selected in each stratum, one class from each selected school to be selected. One entire class from each school (intact class) was selected randomly.

In the MOE database only grade size was available. The following Table 4, illustrates number of students obtained as the result of stage two:

Table 4 : Number of Students in the Sample

Province	Calculated student sample	Allocated school sample	Actual Number of students to be sit
Western	1334	40	1383
Central	1207	41	1264
Southern	1215	40	1279
North	1150	41	1194
Eastern	1247	40	1333
North_Western	1173	40	1283
North_Central	1183	41	1277
Uva	1177	40	1264
Sabaragamuwa	1196	41	1362
	10882	364	11639

Sampling Weights:

First stage weight - Selection of school, Schools non-response adjustments (no non-response schools found)

Second stage weight - Classes were selected with SRS within selected schools.

Third stage weight - Student weight

Complete weight (final weight) = first stage weight * second stage weight * third stage weight

The population weights were adjust within explicit strata before applying the calculated weights.