

**THIRD NATIONAL SURVEY ON IODINE DEFICIENCY
STATUS IN SRI LANKA - 2010**

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in collaboration with
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Preface

Iodine deficiency disorders are a major public health problem in Sri Lanka and it was addressed by the universal salt iodisation programme since 1995. It is important that we monitor and assess the impacts and effects of the programme on our citizens.

This report on the assessment of iodine deficiency disorders among primary school children and pregnant women in Sri Lanka was carried out by the Department of Nutrition, Medical Research Institute, Colombo under the able direction of Dr. Renuka Jayatissa. This study was carried out island-wide to obtain Provincial estimates as a third national Iodine survey in Sri Lanka.

This is a comprehensive study that should interest not only the medical professionals responsible for the implementation and monitoring of the salt iodisation programme but also the salt producers, they have a major role with the iodisation process. The findings of this study highlight the need to streamline the salt iodisation programme for sustainability.

Whilst thanking UNICEF for the support provided, I trust the results of this survey will further improve the iodisation process to eliminate the iodine deficiency disorders in Sri Lanka.

Dr. Ravindra Ruberu
Secretary
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Last, but foremost in mind are the pivotal operators: the Provoncial Directors of Health, Regional Directors of Health, Public Health staff, the Principals of the schools, teachers, parents, and children. To one and all we wish to say we are deeply indebted to you for having been partners in this study.

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Executive Summary

Iodine deficiency disorders had been identified as a major public health problem in Sri Lanka in 1986 following a survey that revealed total goitre prevalence rate of 18.2% among school children. As a result, universal salt iodisation (USI) programme was launched in Sri Lanka in 1995. Since then, two national surveys were conducted to assess the iodine status of the population.

Current national survey was aimed to assess the iodine status of primary schoolchildren and pregnant women. A cross-sectional school and clinic based study was conducted. Thirty schools from each province, one randomly selected class from each school and, 30 randomly selected children from each class were included in the study. A total of 180 schools were included. Three antenatal clinics from each province and 30 pregnant women from each selected clinic was studied.

A total of 8060 children were studied. Among them, 49.3% were males and 50.7% were females with mean age of 8.8 (SD=1.5) years. Clinical examination for goitre in children, estimation of urinary iodine excretion, estimations of salt iodine at household level, urine iodine in pregnant women and water samples from common drinking water sources were assessed.

Overall goitre rate among children aged 6-10 years, in Sri Lanka was 4.4%, with the Northern Province having the lowest goitre rate of 1.4%. A median urinary iodine concentration of children was 163.4µg/L at national level. Highest median urinary level was observed in North Central Province (237.9µg/L). Median urinary iodine levels have gradually increased since year 2000. Overall, only 1.4% was severely iodine deficient (<20µg/L), 5.9% were moderately iodine deficient (20-49.9µg/L), 37.5% were within ideal range (100-199.9µg/L) and 22.2% (200-299.9µg/L) were having more than adequate level of iodine and 14.9% were having excessive iodine intake. Iodine content of salt samples at household level ranged between 0.0-295.5ppm. Only 68.3% of households were using adequately iodised salt. Median urinary iodine levels in pregnant women was 113.1µg/L and median iodine content of drinking water was 6.7ppm.

As recommended by WHO/UNICEF/ICCIDD, the total goitre prevalence rate of 4.4% suggested goitre is no long a public health problem in Sri Lanka. As demonstrated by median urinary iodine, proportion of urinary iodine samples below 100µg/L and proportion of urinary iodine samples below 50µg/L, currently, the iodine nutritive status is possibly adequate in Sri Lanka. Adequately iodised salt at household level was 68.2% indicated the poor quality of salt.

In conclusions, percentage of adequately iodised salt was reduced from 92% to 68% in Sri Lanka, more than excessive intake of iodine was observed in Northern and North Central Provinces, and pregnant women have an inadequate intake of iodine. It is recommended to maintain the quality of salt at production level and adequate level of iodine in salt to sustain the iodisation programme. Need to identify a programme to get an adequate amount of iodine for pregnant women.

1. Introduction

Iodine is an essential trace element that is an integral component required for the prevention of brain damage and mental retardation from an early age. Iodine deficiency is one of the world's most preventable diseases, as it is both easy and inexpensive to avert (WHO, 1994). Over two billion people around the world may be at risk for iodine deficiency, where recent research suggests 15.8 percent of people experience some degree of goiter. Over one third of school aged children, worldwide (total of 285 million), are iodine deficient, where approximately 40 percent of the burden occurred in the South East Asia Region (SEAR).

Iodine deficiency disorders had been identified as a major public health problem in Sri Lanka in 1986 following a survey that revealed a total goiter prevalence rate of 18.2% among school children. Universal Salt Iodisation (USI) programme was launched in Sri Lanka in 1995 in collaboration with UNICEF.

Sri Lanka produce salt from sea water and the average annual total production of salt is approximately 139,155 MT. Estimated annual requirement of iodised salt for human consumption in the country is approximately 75,000 MT, based on the daily consumption of 10g/person for an estimated population of 20 million. There are two types of salt consumed by people; crystal salt, which is the most popular, and table salt. There are four major salt producers in the country; Hambantota Lanka Salt, Puttalam Salt, Puttalam Salt Producers Welfare Society and Manthai Salt. About 77% of the annual requirements of iodised salt is produced by them as crystal iodised salt. Another 7% is produced by "Raigam Salt" as table iodised salt. Around 10-13% of the national requirement is imported as iodised table salt. About 5% of salt is iodised by small-scale manufacturers as crystals.

In 2005, the second national IDD survey revealed that the goitre prevalence among school children was reduced to 3.8% from 18.2% with a median urinary iodine level of 154.4µg/L and the percentage of adequately iodised salt at the household level was 91.2%. These findings confirmed that 10 years after the launching of the USI programme, Sri Lanka has achieved the required standards identified by the joint Committee of WHO/UNICEF/ICCIDD for the IDD elimination.

Various programmatic indicators were identified by the WHO/UNICEF/ICCIDD to fulfil the current status of iodine nutrition in a country. These include political commitment, appointing Director General of Health services as the Chief Food Authority and the Food Advisory Committee as the national body responsible to the government for the elimination of IDD, appointing a Director / Environmental and Occupational Health and Food Safety as the executive officer for the national programme for the elimination of IDD, passing legislation in support of successful implementation of the Universal Salt Iodisation programme by issuing a regulations on iodisation of salts in 1993, revision of the regulation in 2005 to change the level of iodine at the household level from 25ppm to 15ppm.

There are established mechanisms to assess the progress in the elimination of IDD by monitoring the impact and process by the national iodine laboratory in the Medical Research Institute (MRI) through periodic national surveys and cyclic monitoring. Therefore, the sufficient iodised salt data was available at the factory, retail and household level. Public Health Inspectors (PHI) carry out routine sampling at retail level for legal action as authorised officers under the Food Act, which is supported by the five food laboratories all over the country. Strict surveillance was maintained at ports through customs for imported salt. Four major salt producers maintain a good internal quality control programme.

Health Education Bureau has continued public education and social mobilisation programmes on the importance of consumption of iodised salt for the elimination of IDD.

After considering the achievement of programmatic indicators identified by the ICCIDD/UNICEF/WHO, in 2009, the country has requested for a desk review which was facilitated by the WHO and UNICEF.

An expert panel visited Sri Lanka in 2009 and one of the recommendations made by them was the need of recent data on iodine nutritional status. Hence, this study was conducted with the following objectives:

- To determine the goiter prevalence in children between 6-10 years
- To determine the iodine nutritional status by measuring urinary iodine levels in children and pregnant women
- To measure the iodine levels in the salt at the household level
- To measure the iodine levels in the drinking water in different sources

2 Methods

This was a cross sectional study that included 3 components:

1. School based study among children aged 6-10 years
2. Clinic based study among pregnant women
3. Estimation of iodine content in drinking water

2.1. School based study among children aged 6-10 years

This study was conducted to obtain the sub national (provincial) estimates on the prevalence of goiter. The study population was identified as school children aged 6-10 years. The required sample size for each province was calculated considering the 5% goiter rate among schoolchildren, 3% precision with design effect of 2.5. The calculated sample size was 900 children between the age of 6-10 years, giving a total sample size of 8100 for all nine provinces. The sampling method adopted was that recommended by UNICEF (1999). This was required inclusion of 30 schools from each province.

A multi-stage stratified sampling technique was used to identify the sample. Lists of schools were obtained from the Ministry of Education which was the census 2010 data. During the first stage, all the schools having grade 2-6 classes were listed out with the number of students in the school. Then, 30 schools from each province were selected using population proportion to sampling technique (PPS). During the second stage of sampling, out of the 30 schools, for each school, lots were drawn to select the grade in which the survey was to be conducted. In the collection of lots there were 5 lots each for grade 2-6. A total of five grade 2 classes, five grade 3 classes etc. were selected from 30 schools in each province. As each grade selected has a number of sub divisions referred to as 'classes'¹, one class was selected randomly for the study from each school.

Data collection: Public Health Inspectors (PHIs) were trained as interviewers. They were asked to visit the school prior to data collection between 1-5th November 2010 and to list out the series of classes in the given grade, to randomly selected one class. Thirty children from each selected class were selected from the attendance register, 15 from top, counting from top downwards and next 15 from the bottom, starting from the last child and go

¹ separate groups of students, in different class rooms

upwards. When there were girls and boys in a same class, equal numbers from each sex, were selected (15 from each group). When there were less than 30 children in the selected class remaining children were identified from the next class in the same grade or from another class within grades 2-5 from the same school.

Selected children were handed over a letter from a Principle Investigator to obtain consent from the parents and the container to collect a sample of salt was given to the child through the class teacher. Children were asked to fill half the container with the salt that they consume in the house and to bring it to the school on the following day along with the letter from the parents giving consent for the child to participate in the study. Both were handed over to the class teacher. Second visit was fixed to collect urine samples and the methods adopted to collect data are described below. All Data collection was done from November to December 2010.

2.1.1. Clinical examination for goitre

Public Health Inspectors (PHIs) were trained for goiter assessment during their basic training as a part of the training to carry out school medical inspections. A group of 90 Public Health Inspectors were specially re-trained as field investigators to assess the goitre status of the study group. Principle Investigator conducted theoretical and practical training for assessment of goitre. Thirty children in the selected classes were assessed for the presence/absence goitre.

Grading of goitre was done according to the classification given by WHO/UNICEF/ICCIDD as follows;

- Grade 0 - Thyroid not palpable, not visible,
- Grade 1 - Thyroid palpable but not visible, with neck in normal position. Moves upwards in the neck as the subject swallows.
- Grade 2 - Goitre visible with neck in normal position. Consistent with enlarged thyroid when the neck is palpated.

Ensuring validity of goitre data: To validate the assessment of goitre, one school was randomly selected from each province, each of which was studied independently by eight specially trained field investigators of MRI. All children selected from each school were examined for goitre by the trained field investigators. This led to re-examination of approximately 9% of all children from the study sample.

2.1.2. Measurement of iodine in salt

Casual urine samples were obtained from each child. A total of 900 urine samples were collected from each province. The urine samples were labelled and stored in large plastic containers and then transported for storage at 4-8°C. They were transported to the national laboratory with cold packs and stored at -20°C till taken for analysis. Modified microplate method was used in assessing urine iodine levels (Ohashi et al 2000). Internal quality control analysis was carried out throughout, by using samples with known iodine values. External quality control was carried out in collaboration with the Center of Disease Control (CDC) Laboratory in Atlanta as a partner of the Equip programme.

2.1.3. Estimation of iodine content of salt at household level

Salt samples which were brought by the selected children from their households were transported to the national laboratory. The iodine level in salt samples were assessed by titration method on a 'first arrived, first tested basis'.

2.2. Clinic based study among pregnant women

This was a clinic-based study. When the MRI field investigators visited a school in the province, they were advised to visit the closet antenatal clinic to obtain urine samples from pregnant women. Thirty pregnant women were selected using the clinic register and urine samples were obtained with the assistance of the public health staff in the respective area. It was transported to the MRI laboratory for analysis.

2.3. Estimation of iodine content in drinking water

The field investigators were instructed to collect 3 drinking water samples in the locality of the school from most common drinking water source such as taps, wells, deep wells, tube wells, streams, etc. Water samples were transported to MRI laboratory using the same procedures adopted for samples of urine.

Data analysis

The data entry and analysis was carried out using the EPI/INFO package and SPSS.

Ethical considerations

Ethical clearance was obtained from the Ethical Committee of Medical Research Institute and permission was obtained from the relevant educational and health authorities. Written consent was obtained from parents or guardian of children who participated in the study. Confidentiality of information obtained during the study was ensured.

3 Results

3.1 School based study among children aged 6-10 years

A total of 8,060 children aged 6-10 years from 9 provinces were studied. Of them, 3,971 (49.3%) were males and 4,084 (50.7%) were females (Table 1). Mean age of the children were 8.8 (SD= 1.5) years.

Table 1
Sex distribution of the children aged 6-10 years by provinces

Province	No. of Male (%)	No. of Female (%)	Total No. (%)
Western	549 (62.0)	336 (38.0)	885 (11.0)
Central	416 (46.1)	486 (53.9)	902 (11.2)
Southern	457 (52.3)	417 (47.7)	874 (10.8)
Northern	427 (47.8)	466 (52.2)	893 (11.1)
Eastern	414 (46.0)	486 (54.0)	900 (11.2)
North Western	417 (45.9)	491 (54.1)	908 (11.3)
North Central	432 (48.1)	467 (57.9)	899 (11.2)
Uva	425 (47.2)	475 (52.8)	900 (11.2)
Sabaragamuwa	439 (48.8)	460 (57.2)	899 (11.2)
Sri Lanka	3971 (49.3)	4084 (50.7)	8060 (100.0)

Prevalence of goiter

There were a total of 8,060 school children aged 6-10 years who were examined for goiter. The prevalence of goiter, by provinces is shown in **Table 2**. Majority of the provinces had a total goiter rate less than 5%, the recommended goiter rate by WHO, except for Southern, Central and North Western provinces. Sri Lanka had an overall total goiter rate of 4.4%. The North Western province had the highest total goiter rate of 7.8%, whilst the Northern province had the lowest total goiter rate of 1.5%.

Table 2
Prevalence of goitre among children aged 6-10 years by provinces

Province	Total Examined	Prevalence of goitre No. (%)			Total goitre rate (Grade 1+2)	Confidence interval
		Grade 0	Grade 1	Grade 2		
Western	885	852 (96.3)	27 (3.1)	6 (0.7)	33 (3.7)	6.3-12.4
Central	902	840 (93.1)	51 (5.7)	11 (1.2)	62 (6.9)	13.6-21.5
Southern	874	814 (93.1)	48 (5.5)	12 (1.4)	60 (6.9)	13.1-20.9
Northern	893	880 (98.5)	9 (1.0)	4 (0.4)	13 (1.5)	1.7-5.6
Eastern	900	883 (98.1)	17 (1.9)	0 (0.0)	17 (1.9)	2.6-7.1
North Western	908	837 (92.2)	47 (5.2)	24 (2.6)	71 (7.8)	15.9-24.3
North Central	899	867 (96.4)	29 (3.2)	3 (0.3)	32 (3.6)	6.1-12.1
Uva	900	867 (96.3)	30 (3.3)	3 (0.3)	33 (3.7)	6.3-12.4
Sabaragamuwa	899	867 (96.4)	32 (3.6)	0 (0.0)	32 (3.6)	6.1-12.1
Sri Lanka	8060	7707 (95.6)	290 (3.6)	63 (0.8)	353 (4.4)	3.9-4.8

Prevalence of goitre by sex

Table 3 shows the goitre prevalence in children by sex and provinces. Overall, 96.6% of males had Grade 0 goitre with a total goitre rate of 3.4%. Similarly, 94.6% of females had Grade 0 goitre with a total goitre rate of 5.4%.

Table 3
Goitre prevalence in children of 6-10 years by sex and provinces

Province	Total Examined		Prevalence of goitre (%)						Total goitre rate (Grade 1+2) (%)	
			Grade 0		Grade 1		Grade 2			
	M*	F**	M*	F**	M*	F**	M*	F**	M*	F**
Western	548	335	98.2	93.1	1.6	5.4	0.2	1.5	1.8	6.9
Central	416	484	92.5	93.6	6.3	5.2	1.2	1.2	7.5	6.4
Southern	457	417	96.1	89.9	3.1	8.2	0.9	1.9	3.9	10.1
Northern	427	466	99.1	98.1	0.7	1.3	0.2	0.6	0.9	1.9
Eastern	414	486	98.3	97.9	1.7	2.1	0.0	0.0	1.7	2.1
North Western	416	486	94.2	90.3	3.8	6.4	1.9	3.3	5.8	9.7
North Central	432	464	97.0	95.9	2.5	3.9	0.5	0.2	3.0	4.1
Uva	425	475	96.9	95.8	2.8	3.8	0.2	0.4	3.1	4.2
Sabaragamuwa	437	460	96.6	96.3	3.4	3.7	0.0	0.0	3.4	3.7
Sri Lanka	3972	4013	96.6	94.6	2.8	4.3	0.6	1.0	3.4	5.4

(M* = Male children, F** = Female children)

Urinary iodine levels by province

Table 4 describes the levels of urine iodine levels of children aged 6-10 years by province. It can be seen that all nine provinces had a median urinary iodine level above the cut-off point of 100µg/L of urinary iodine. North Central and Northern provinces had the highest levels of urinary iodine; 237.9µg/L and 203.7µg/L, respectively. The lowest urinary iodine concentration was in Sabaragamuwa with 121.1µg/L. Overall, Sri Lanka had a median urinary iodine concentration of 163.4µg/L with a range between 0.0 – 949.4 among children aged 6-10 years.

Table 4
The levels of urine iodine of children 6-10 years by provinces

Province*	Total examined	Median urinary iodine concentration (µg/L)	Minimum and maximum urinary iodine values (µg/L)
Western	795	168.4	4.4 – 673.9
Central	826	123.3	4.4 – 680.8
Southern	847	168.2	1.3 – 737.7
Northern	792	203.7	0.4 – 719.5
Eastern	863	173.2	1.5 – 807.9
North Western	729	151.6	0.0 – 626.3
North Central	830	237.9	14.2 – 860.4
Uva	874	129.3	3.6 – 596.4
Sabaragamuwa	847	121.1	3.5 – 949.4
Sri Lanka	7403	163.4	0.0 – 949.4

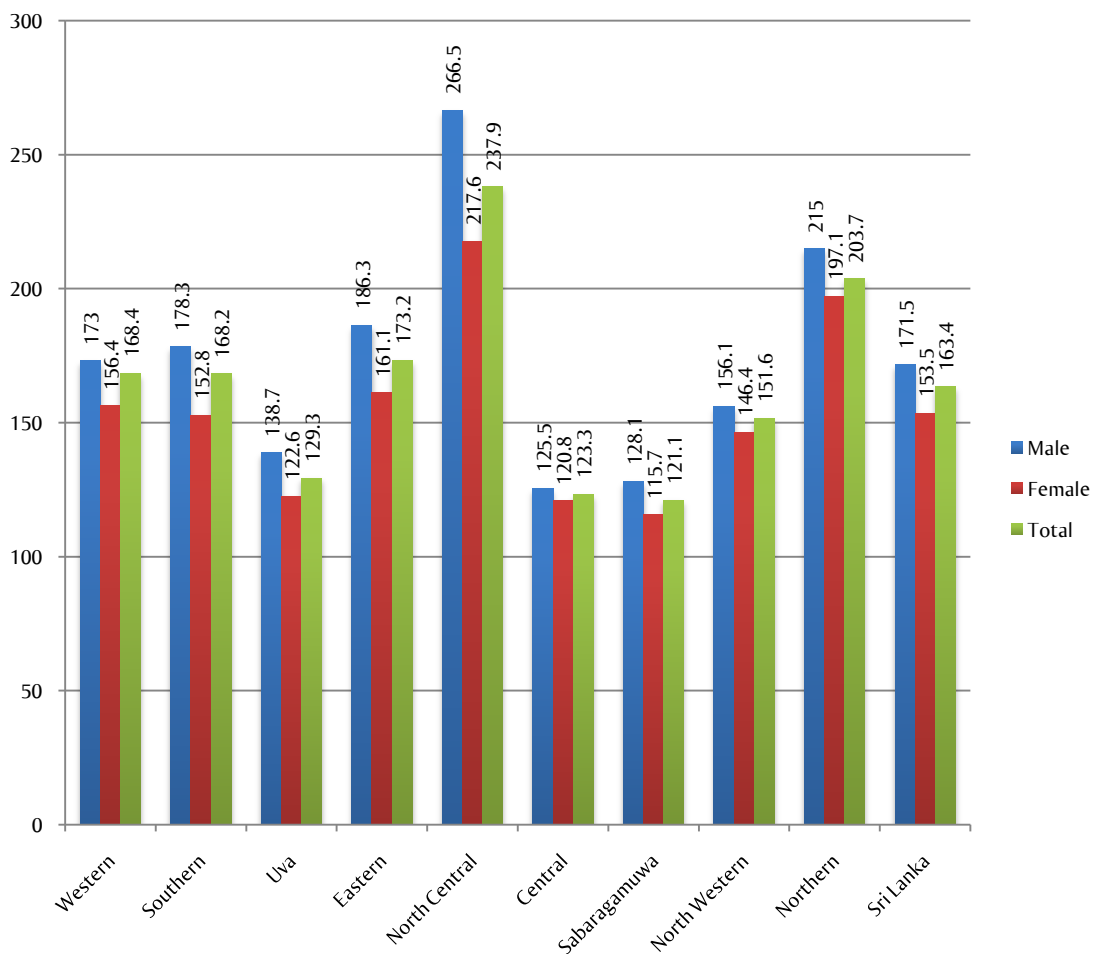
Table 5 describes the frequency distribution of urine iodine levels of children aged 6-10 years by provinces. It shows that overall, 37.5% had urine iodine levels in the ideal range (100-199.9 $\mu\text{g/L}$ urine iodine), which suggests no deficiency. Of the total, 25.5% were below to ideal range (<100 $\mu\text{g/L}$ urine iodine) and 7.3% had severe to moderate iodine deficiency (<50 $\mu\text{g/L}$ urine iodine). A total of 14.9% indicated high iodine levels ($\geq 300\mu\text{g/L}$ urine iodine). Amongst the high iodine group, 23.6% were from the Northern Province. In Western province, 45.8% had their urine iodine levels within the ideal range. Overall, only 1.4% indicated severe iodine deficiency (<20 $\mu\text{g/L}$ urine iodine) with the Sabaragamuwa province having the highest rate of severe deficiency (2.8%).

Table 5
Frequency distribution of urine iodine levels of children aged 6-10 years by provinces

Province	Total examined	Percentage of urine iodine levels ($\mu\text{g/L}$)					
		Deficiency			No deficiency		
		< 20	20-49.9	50-99.9	100-199.9	200-299.9	≥ 300
		Severe	Moderate	Mild	Ideal	More than adequate	Excessive iodine intake
Western	795	1.0	3.8	14.2	45.8	24.3	10.9
Central	826	2.2	10.7	25.0	36.4	15.5	10.3
Southern	847	1.0	5.6	16.9	38.1	22.5	15.9
Northern	792	1.3	3.5	11.5	33.1	27.0	23.6
Eastern	863	1.1	3.9	15.8	41.8	25.1	12.2
North Western	729	1.3	3.8	23.5	38.1	20.1	13.3
North Central	830	0.2	2.2	6.5	27.2	33.1	3.7
Uva	874	1.4	8.4	25.9	39.9	16.2	8.3
Sabaragamuwa	847	2.8	12.0	24.9	38.3	14.6	7.3
Sri Lanka	7403	1.4	5.9	18.2	37.5	22.2	14.9

The median urinary iodine levels by sex and by province are shown in Figure 1. It can be seen that males had a median urinary iodine level of $171.5\mu\text{g/L}$ while females, this value was $153.5\mu\text{g/L}$. North Central province had the highest median urinary iodine levels of $266.5\mu\text{g/L}$ in males and $217.6\mu\text{g/L}$ in females. On the contrary, Central province had the lowest median urinary iodine levels of $125.5\mu\text{g/L}$ in males whilst Sabaragamuwa province had $115.7\mu\text{g/L}$ median urinary iodine levels in females.

Figure 1
Median urinary iodine levels children aged 6-10 years
by sex and by provinces



Iodine content of salt

Iodine content of salt samples at the household level, measured by titration method is shown in Table 6. There was an overall median of 21.2 ppm of iodine content in salt at the household level, with a range between 0.0 to 295.5ppm. Northern Province had the lowest level of iodine content in salt with a median of 14.8ppm, whilst both Uva and Eastern provinces had the highest levels of median iodine content in salt (23.3ppm). Wide variations of iodine levels in salt were observed in the Uva and Sabaragamuwa Provinces.

Table 6
Iodine content of salt samples at household level by provinces

Province	No.	Median iodine content (ppm)	Range
Western	756	21.2	0.0 – 55.0
Central	848	21.2	0.0-107.9
Southern	818	22.2	0.0-69.8
Northern	821	14.8	0.0-105.8
Eastern	815	23.3	2.1-70.0
North Western	865	19.0	1.1-79.4
North Central	849	21.2	1.1-85.6
Uva	872	23.3	0.0-137.5
Sabaragamuwa	834	22.2	1.1-295.5
Sri Lanka	7478	21.2	0.0-295.5

Table 7 shows the frequency distribution of iodine level in salt at the household level, by provinces. Overall; 31.7% of the households had inadequate or less than 15ppm of iodine in salt, 52.1% had adequate salt iodisation (15-29.9ppm) and 3.9% had excess levels of salt iodisation at the household level (≥ 40 ppm). Eastern province had 61.2% of households using adequately iodised salt, on the contrary, Northern province accounted for 50.7% of households with inadequate or less than 15ppm of iodine in salt.

Table 7
Frequency distribution of iodine level in salt at household levels by provinces

Province	Total examined	Frequency distribution of samples exposure as % according to salt iodisation level (ppm)					
		< 5	5-9.9	10-14.9	15-29.9	30-39.9	≥ 40
Western	756	4.4	14.6	10.3	54.5	13.6	2.6
Central	848	2.9	17.5	11.6	53.7	11.7	2.7
Southern	818	2.8	11.7	10.9	58.3	13.8	2.4
Northern	821	6.5	31.8	12.4	39.2	5.5	4.6
Eastern	815	5.5	7.7	8.0	61.2	14.6	2.9
North Western	865	8.9	19.8	10.5	47.7	9.7	3.4
North Central	849	3.5	14.7	13.7	51.6	12.4	4.1
Uva	872	3.6	10.9	12.3	54.8	13.8	4.7
Sabaragamuwa	834	3.5	12.9	12.2	48.4	15.8	7.1
Sri Lanka	7478	4.6	15.7	11.3	52.1	12.3	3.9

Comparison of goitre rates from 1986 – 2010

Goitre rates were compared from 1986 – 2010. A decline in the goitre rates is seen in all provinces from 1986 to 2005 with this pattern being continues up to 2010 in the Western, Uva, Eastern, Central and Sabaragamuwa provinces, with some increase in the other provinces. The increase of goitre rates in 2010 is most marked in the Southern and North western provinces (Figure 2). There is a slight increase of goitre rates at national level from 3.8% to 4.4%.

Figure 2
Comparison of goitre rates in Provinces from 1986 – 2010

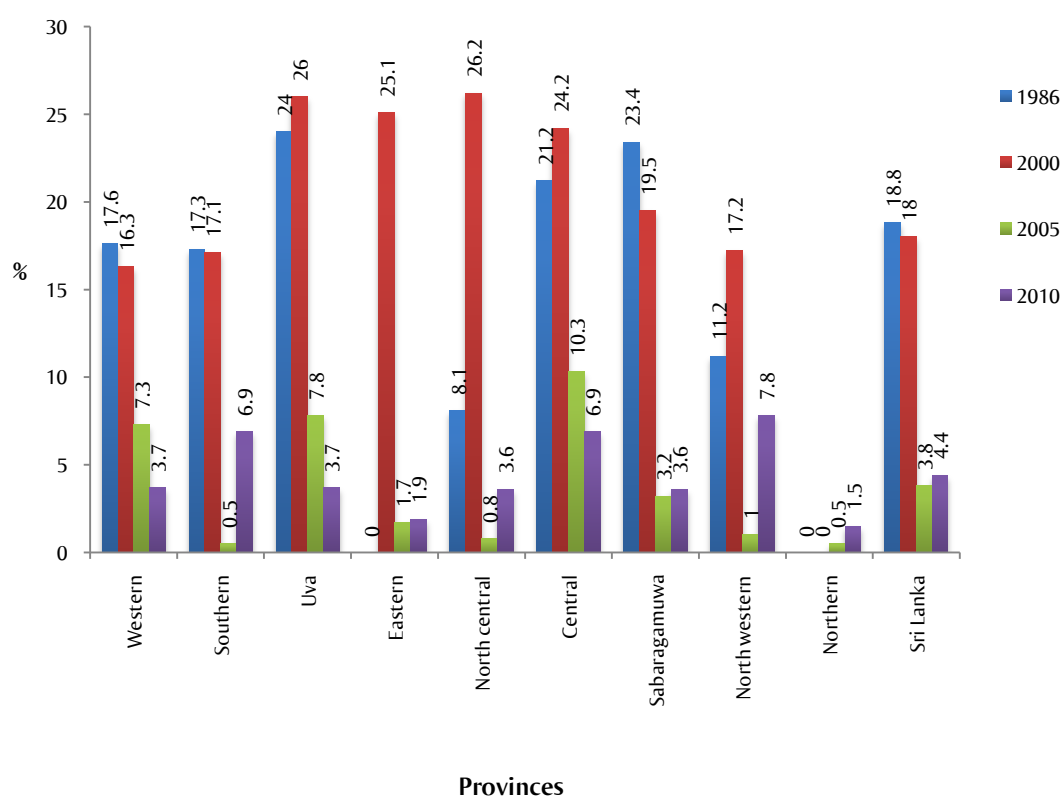


Figure 3 show that almost all the Provinces have been maintaining an adequate level of urine iodine since 2000. It is interesting to note that North Central Province is maintaining a high iodine level throughout last 10 years which clearly indicates that they consume more iodine than their counterparts living in other Provinces. A similar observation was made in Northern Province in 2005, but the levels had dropped in the current survey, may be due to low median iodine level in the salt. There is a gradual increase of median urinary levels in Uva province.

Figure 3
Comparison of urinary iodine levels from 2000 – 2010

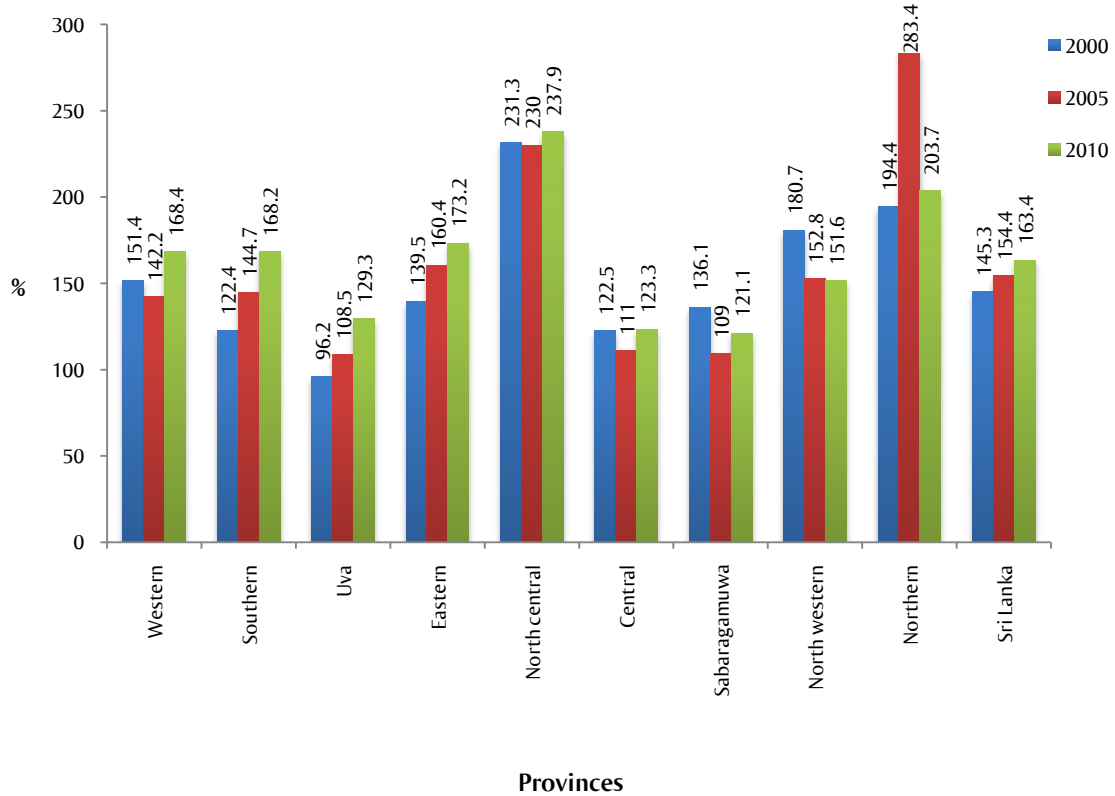


Figure 4 indicates the decrease of iodine levels in salt consumed at the household level from the year 2000 in all provinces. Northern Province showed the lowest percentage of iodine levels in salt compared to the other Provinces

Figure 4
Comparison of iodine levels in salt at household level from 2000–2010

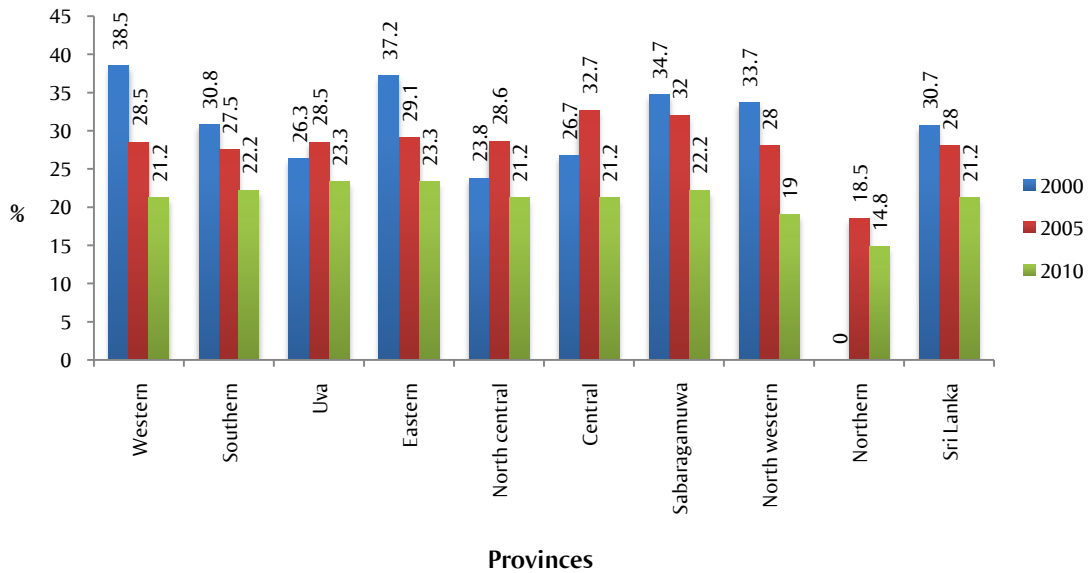
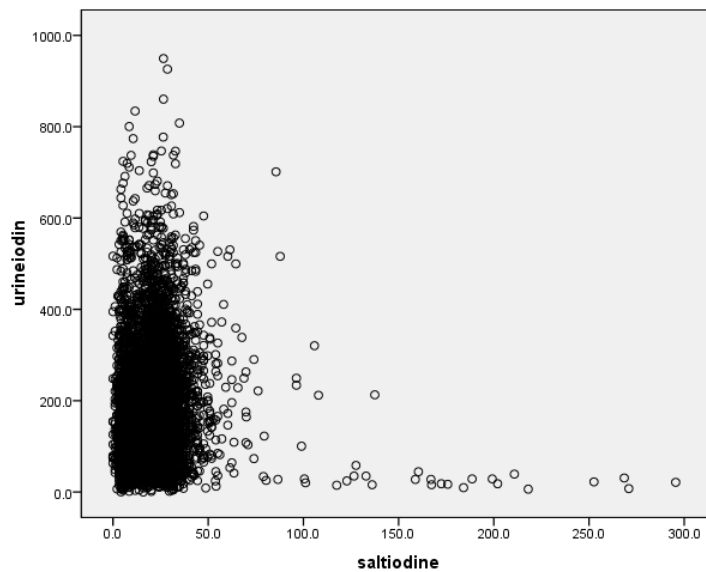


Figure 5 presents the correlation of urinary iodine levels with salt iodine levels indicating positive correlation with increasing level of iodine in salt.

Figure 5
Comparison between urinary iodine and salt iodine levels



3.2 CLINIC BASED STUDY AMONG PREGNANT WOMEN

Table 8 describes the levels of urine iodine of pregnant women, by provinces. It can be seen that in most provinces, the median urinary iodine level is below the cut-off point of 150 μ g/L except in Northern, Eastern and North Central provinces. It is interesting to note that decreasing pattern of the median urinary iodine levels with the increasing period of amenorrhoea.

Table 8
Median urinary iodine levels of pregnant women by provinces in relation to the period of amenorrhoea

Province	Total examined	Median urinary iodine concentration (Minimum and maximum) (μ g/L)			
		Period of amenorrhoea			
		1-12 weeks	12.1-28 weeks	>28 weeks	Total
Western	86	154.9 (126.7-259.9)	118.7 (18.6-350.7)	148.2 (24.3-530.9)	128.5 (18.6-530.9)
Central	56	149.4 (70.5-197.2)	71.6 (19.4-358.8)	82.7 (10.3-508.6)	85.4 (10.3-508.6)
Northern	58	201.8 (97.2-306.4)	122.6 (53.9-526.5)	176.2 (33.4-406.4)	160.7 (33.4-526.5)
Eastern	66	300.0 (38.2-578.7)	163.9 (17.5-720.2)	146.9 (11.3-569.2)	163.9 (11.3-720.2)
North Western	58	150.2 (50.2-407.4)	136.7 (41.4-441.1)	105.4 (32.5-283.2)	133.4 (32.5-441.1)
North Central	31	167.2 (84.9-400.4)	188.3 (23.5-472.9)	106.2 (86.8-151.1)	168.6 (23.5-472.9)
Uva	58	74.3 (6.5-676.5)	61.8 (10.0-241.7)	86.8 (16.5-645.5)	83.7 (6.5-676.5)
Sabaragamuwa	174	151.0 (10.6-694.0)	82.8 (5.5-426.5)	71.3 (3.5-232.8)	83.4 (3.5-694.0)
Sri Lanka	587	149.4 (6.5-694.0)	110.9 (5.5-720.2)	101.4 (3.5-645.5)	113.1 (3.5-720.2)

Table 9 shows the frequency distribution of urine iodine levels of pregnant women by provinces. It shows that overall, 21.1% of pregnant women had urine iodine levels in the adequate level (150-249 $\mu\text{g/L}$ urine iodine), which suggests that there is no deficiency. Of the total, 62.5% pregnant women had inadequate iodine level to control iodine deficiency (<150 $\mu\text{g/L}$ urine iodine) and 14.5% had above the requirement of urinary iodine levels (250-499 $\mu\text{g/L}$). There are 1.9% indicated excessive iodine intake (\geq 500 $\mu\text{g/L}$ urine iodine).

Table 9
Frequency distribution of urine iodine levels by provinces

Province	Total examined	Percentage of urine iodine levels ($\mu\text{g/L}$)			
		< 150	150-249	250-499	\geq 500
		Insufficient	Adequate	Above requirement	Excessive
Western	86	55.8	22.1	18.6	3.5
Central	56	75.0	14.3	8.9	1.8
Northern	58	46.6	25.9	25.9	1.7
Eastern	66	47.0	21.2	27.3	4.5
North Western	58	56.9	27.6	15.5	0.0
North Central	31	41.9	29.0	29.0	0.0
Uva	58	69.0	22.4	5.2	3.4
Sabaragamuwa	174	76.4	17.2	5.7	0.6
Sri Lanka	587	62.5	21.1	14.5	1.9

3.3. IODINE CONTENT OF DRINKING WATER

The iodine content in drinking water samples by provinces is shown in Table 10. The median iodine content for Sri Lanka was 6.7ppm with a range of 0-457.1ppm. North Central province had the highest iodine content of 34.7ppm in water, whilst Sabaragamuwa and Northern provinces had the lowest median level of iodine in drinking water (0.0-457.1ppm).

Table 10
Level of iodine in drinking water by provinces

Province	No.	Median iodine levels ($\mu\text{g/L}$)	Range ($\mu\text{g/L}$)
Western	51	1.2	0.0-219.2
Central	55	9.4	0.0-197.6
Southern	69	10.3	0.0-448.7
Northern	72	0.0	0.0-457.1
North Western	28	1.3	0.0-142.3
North Central	87	34.7	0.0-304.7
Uva	55	6.7	0.0-391.0
Sabaragamuwa	67	0.0	0.0-76.3
Sri Lanka	484	6.7	0.0-457.1

4 Conclusions and recommendations

There is a reduction of salt iodine levels in the country from 92% to 68% with the increase of goitre rate from 3.8% to 4.4% when compared to the 2005 survey data. This should be considered very seriously with achieving the goal in eliminating IDD as a public health problem. Adequate urinary iodine levels were maintained in all provinces. When compared with the previous two surveys, all provinces in Sri Lanka continuously maintained adequate level of urinary iodine levels for last 10 years.

There is an inadequate level of iodine intake in pregnant women to be considered as a priority.

There is a consistently high urinary iodine levels in the North Central and Northern provinces. But the levels are in decreasing pattern.

It is recommended that following action to be considered:

- Legislation should be adopted to include the maximum level of iodine at production level. All salt produces must be informed of the maximum iodine level at the time of salt production and the need to abide by these levels. Most suitable level will be 20-30ppm at production level to minimize the excess iodine intake.
- Improve the quality of salt by periodically monitoring of salt at production and retail level by the field staff as well as by the laboratory and there is need to communicate with salt producers by providing a feedback. Especially with 4 major producers in the (*) country.
- Suitable programmes to be adopted to achieve the adequate level of iodine in pregnant women.
- Periodic monitoring of iodine levels of urine, water and salt in North Central Province in relation to the prevalence of goitres irrespective to the age and sex.
- Explore the causes of high level of urinary iodine in North Central Province and Northern Province.

5 References

1. World Health Organisation, 1994. Iodine and health eliminating iodine deficiency disorders safely through salt iodisation, WHO/NUT/94.4, Geneva
2. Medical Research Institute, 2001. Iodine nutrition status in Sri Lanka 2000-2001. UNICEF.
3. Medical Research Institute, 2006. Iodine nutrition status in Sri Lanka 2005. UNICEF.
4. Anderson M, Takkovche B, Egli I, Allen HE and De Benosit B. Current global iodine status and progress over the last decades towards the elimination of iodine deficiency. Bulletin of the World Health Organisation. 2005; 83:518-525.
5. Sullivan KM, May S. Urinary Iodine Assessment: A Manual on survey and laboratory methods. UNICEF. October 1999; 1-20
6. Ohashi T, Yamaki M, Pandav CS, Karmarkar, Irie M. Simple microplate method for determination of urinary iodine. Clinical Chemistry 2000; 46(4):529-36

Annexures

Annex -1: List of schools studied

Western Province-Colombo District

DIVISION	NAME/ADDRESS
Colombo – North	St.Mary's V. Mattakkuliya, Col-15
Borella	Ananda College Kularathne Mw., Col-10
Borella	Asoka V. Vipulasena Mw., Col-10
Dehiwala	S.De S.Jayasinghe M.M.V.(Navodya) Karagampitiya, Dehiwela.
Kolonnawa	Gothatuwa M.V Gothatuwa , Angoda.
Nugegoda	President's College Sri Jayawardhanapura, Kotte.
Colombo – Central	Darussalam M.V. 281,Jumma Masjid Road,Colombo 10.
Colombo – South	Kollupitiya Methodist G.T.M.V. 59,Hudson Road,Col-03.
Hanwella	St Mary's M.V. Avissawella.
Homagama	Jalthara M.V. Jalthara, Hanwella.
Maharagama	Ananda Maha Vidyalyaya Kottawa Pannipitiya.
Kesbewa	No 01 K.V. Piliyandala.

Western Province-Kalutara District

DIVISION	NAME/ADDRESS
Panadura	Sri Sumangala M.V. Wekada. Panadura.
Bandaragama	Saralankara M.V. Kindelpitiya, Welmilla Junction, Bandaragama.
Horana	Rajakeeya Vidyalyaya Horana.
Matugama	Ovitigala M.V. Matugama.
Kalutara	Diyagama M.V.
Beruwala	Beruwala P.V. Beruwala.
Beruwala	Maligahena Muslim M.V. Old Road Beruwala.

Western Province-Gampaha District

DIVISION	NAME/ADDRESS
Wattala	Mattumagala R.C.K.V. Mattumagala, Ragama.
Attanagalla	Nittambuwa Buddhist M.V. Nittambuwa.
Gampaha	Sri Siddhartha Kumara M.V. Sri Wijaysri Mw,Gampaha.
Mahara	Kirillawala M.V. Kadawatha.
Dompe (Weke)	Meriland K.V. Wathurugama.
Kelaniya	Sri Darmaloka M.M.V. Waragoda Road, Kelaniya.
Attanagalla	Al-Badriya M.V. Kahatowita.
Katana	Seeduwa R.C.P.V. Seeduwa.
Divulapitiya	Badalgama Sri Saranathissa K.V. Badalgama.
Minuwangoda	Sri Rahula Maha Vidyalaya Kotugoda.
Ja-ela	Basilica M.V. Kadawatha Road, Ragama.

Central Province-Kandy District

DIVISION	NAME/ADDRESS
Tumpane	Meegahahena Ashoka K.V. Kahapathwala
Harispattuwa	Nugawela Boy's M.V. Nugawela
Ududumbara	Udadumbara M.V. Udadumbara.
Medadumbara	Dunuwila Mahabodi V. Sandasiri Dunuvila, Madamahanuwara.
Kundasale	Alhikma Muslim M V Kumbukkandura, Rajawella
Akurana	Lukmaniya Mu.M.V. Pangollamada, Rathukohodeegala.
Patha Hewaheta	Nawaneliya Primary School Kolabissa
Gangawata Korale	Siddhartha Maha Vidyalaya Siddhartha Maha Vidyalaya Ampitiya
Gangawata Korale	St.Sylvester's College,Kandy Kandy
Gangawata Korale	Viharamahadevi Balika Vidyalaya Kandy
Uda Nuwara	Wattappola M.M.V Wattappola,Pilimalawa
Uda Palatha	Jinaraja Balika Maha Vidyalaya Weegulawatte Road, Gampola

Pasbage Korale	Kanishta Balika Vidyalaya Nawalapitiya
Pasbage Korale	Kathiresan Hindu Ladies College Nawalapitiya
Uda Palatha	Andiyakadawatte Muslim Maha Vidyalaya Andiyakadawatte Gampola

Matale District

DIVISION	NAME/ADDRESS
Dambulla	Pelwehera J.S. Dambulla
Galewela	Tholambugolla M.V. Galewela
Wilgamuwa	Cp/Wil Guruwelayaya Vidyalaya Dewagiriya Matale
Matale	Chcrist Church College (Ns) Matale.
Matale	Pakkiyam M.V.(Ns) Dharmapala Mawatha, Matale
Matale	Sirimavo Bandaranayake Model School. Matale.

N'Elliya Distrct

DIVISION	NAME/ADDRESS
Ambagamuwa	Cp/Ht/Morahenegama Maha Vidyalaya Morahenegama, Hatton
Walapane	Keerthibandara M.V. Kumbalgamuwa
Nuwara Eliya Tamil - III	N.Holbrook T.M.V Agrapatana
Nuwara Eliya Tamil - II	Troup T.V Talawakelle
Hatton Tamil - II	Cp/Hz/Tientsin Tamil Maha Vidyalayam Bogawantalawa
Walapane	Amherst T.V Udapussellawa
Nuwara Eliya Tamil - I	Holy Trinity Central College Nuwara Eliya
Udahewaheta	Pallebowala M V Pallebowala
Hatton Tamil - III	Cp/Hz/Deeside T.V Upcot

Southern Province-Galle District

DIVISION	NAME/ADDRESS
Ambalangoda	Sri Devananda M.V. Ambalangoda
Ambalangoda	Ronnaduwa K.V. Meetiyaigoda
Ambalangoda	P.De S. Kularathne M.V. Ambalangoda

Bentota	Gamini M. V. Bentota
Elpitiya	Delpona K.V. Pitigala
Tawalama	Thalangalla K.V. Malgalla Thalangalla Galle
Baddegama	Wanduramba M.M.V Wanduramba
Udugama	Karagoda Dharmaraja K.V. Karagoda Yakkalamulla
Hikkaduwa	Madampa M.M.V. Kuleegoda
Galle	Sangamitta Balika M.V. Wakwella Road, Galle.
Galle	All Sants V Fort, Galle
Akmeemana	Ihalagoda Sumangala M.K.V. Ihalagoda , Akmeemana
Habaraduwa	Welhengoda Sri Gunarathna M.V. Welhengoda, Ahangama
Karandeniya	Densil Kobbakaduwa V. Uragasmanhandiya

Matara District

DIVISION	NAME/ADDRESS
Morawaka	Morawaka Baudda M.V. Weliwa Morawaka
Kotapola	Hand Ford Tamil K.V. Hand Ford,Deniyaya
Akuressa	Akuressa M.V Akuressa
Kamburupitiya	Kamburupitiya M.V Kamburupitiya
Hakmana	Koongala K.V Hakmana
Weligama	Sri Sanghananda Vidyalaya Kapparatota ,Weligama
Matara	Rahula College Akuressa Road,Matara
Matara	Nupe Sri Medananda K V Nupe Matara
Dikwella	Godauda M.V. Godauda Kottagoda

Hambantota District

DIVISION	NAME/ADDRESS
Katuwana	Katuwana M.M.V. Katuwana.
Katuwana	Ritigahayaya M.V. Katuwana.
Tangalle	Tangalle Mode P.V. Tangalle

Ambalantota	Hadawinna K.V. Mamadala,Ambalantota
Walasmulla	Nathuwala. K.V. Walasmulla.
Tissamaharama	Debarawawa Primary School Polgahawelana,Debarawewa,Tissamaharamaya
Hambantota	Darmathilaka K.V. Siyabalagaswila,Ruhunu Ridiyagama,Ambalantota
Beliatta	Ruhunu Vijayaba Vidyalaya Sitina,Aluwa,Beliatta

Uva Province-Badulla District

DIVISION	NAME/ADDRESS
Ridimaliyedda	Gurumada Kanishta Vidyalaya Diyakobala Bibile
Mahiyanganaya	B/Girandurukotte M.M.V Girandurukotte
Mahiyanganaya	B/Meegahahena K.Vidyalaya Galporuyaya.Girandurukotte
Meegahakivula	Bathalawaththa Primary School Bathalawaththa,Thaldena,Badulla
Passara	Medawelagama M.V. Medawelagama Passara.
Badulla	Kendagolla Navodya .M.V. Kendagolla. Badulla.
Badulla	Viharamahadevi.Girls School Badulla.
Haliela	Welikemulla Maha Vidyalaya. Welikemulla,Badulla.
Ella	Halpe M.M.V Hela Halpe, Bandarawela
Bandarawela	Dharmashoka M.M.V Kkinigama, Bandarawela
Haldummulla	Haldummulla K.V. Haldummulla
Welimada	B/Sri Punghasara M.V Hewanakumbura
Uva-Paranagama	B/Medawela M.V Uva Paranagama
Uva-Paranagama	B/Udaperuwa Vidyalaya Lunuwayya
Welimada	B/Padinawela Muslim Vidyalaya Boragas
Haldummulla	Ampitikandha T.V. Poonagala Bandarawela
Haliela	Chelse Tamil Vidyalaya. Bandara.
Soranatota	Sarnia Tamil Maha Vidyalaya Kandegedara, Badulla
Passara	Thirumahal Tamil Vidyalaya, Adawatte, Lunugala
Uva-Paranagama	B/Yahalaarawa Tamil Vidyalaya Welimada

Monaragala District

DIVISION	NAME/ADDRESS
Bibile	Mo/Bi/Dharmapradeepa M.V. Bibile
Medagama	Mo/Bakinigahawela Muslim M.V. Bakinigahawela
Siyambalanduwa	Kotiyagala K.V. Kotiyagala.Ethimale Wawa
Monaragala	Thenagallanda M.V. Marawa Monaragala
Badalkumbura	Muthukeliyawa M.V. Buththala
Wellawaya	Ethiliwewa M V Ethiliwewa
Wellawaya	Randeniwela K.V. Randeniya ,Wellawaya
Wellawaya	Balaharuwa K.V. Balaharuwa K'v'
Wellawaya	Kithulkote K V Kithulkote Thanamalvila
Siyambalanduwa	Hatharekanuwa K.V. 4 Kanuwa,Ampara Rd, Siyambalanduwa

Sabaragamuwa Province-Ratnapura District

DIVISION	NAME/ADDRESS
Eheliyagoda	Eheliyagoda M.M.V Eheliyagoda
Kuruwita	Pathberiya Narada M.M.V Pathberiya,Parakaduwa
Ratnapura 1	Ferguson High School Ratnapura
Ratnapura 2	Gilimale Samanala Maha Vidyalaya. Gilimale
Kuruwita	Thunandahena Vidyalaya Thunandahena,Dodampe,Kuruwita
Pelmadulla	Mahinda Vidyalaya Pelmadulla
Imbulpe	Hatharabage V. Hatharabage, Balangoda
Balangoda	Wikiliya M.V. Wikiliya, Balangoda
Godakawela	Agaregama V. Kahawatta
Kahawatta	Madalagama M.V. Kahawatta
Kahawatta	Horaheenella Sumana V. Kahawatta
Kalawana	Rambuka Maha Vidyalaya Pothupitiya Kalawana
Embilipitiya	Mullendiyawala M.V. Mullendiyawala
Embilipitiya	Pallebedda M.V. Pallebedda

Ratnapura 2	Dehenakanda Tamil Vidyalaya Happugasthenna, Gallalla
Godakawela	Madampe No 2 T.V Rakwana
Kuruwita	Vijaya Kumarathunga Vidyalaya Paradise, Kuruvita

Kegalle District

DIVISION	NAME/ADDRESS
Kitulgala	Gamini K.V Amanawala, Berannawa
Dehiowita	Sapumalkanda T.V. Deraniyagala
Deraniyagala	Deraniyagala K.V. Deraniyagala
Dedigama	Kinivita.K.V Mahapallegama
Yatiantota	Pannala M.V. Pannala, Ampagala
Rambukkana	Ashoka M.V Kiriwallapitiya. Rambukkana
Rambukkana	Beddewela P.V Makehelwala
Mawanella	Mayurapada M.M.V Mawanella
Mawanella	Weragoda P.V. Hemmathagama
Kegalle	Udabogala.P.V Udabogala, Undugoda
Kegalle	Swarnajayanthi.M.V Kegalle
Galigamuwa	Palapoluwa.K.V Yattogoda
Warakapola	Mahena.K.V Warakapola

Nothern Province-Jaffna District

DIVISION	NAME/ADDRESS
Kayts	St.Mary's R.C.G.S. Kayts
Sandilipay	J/Pandateruppu Jasintha R.C.T.M.S Pandateruppu
Tellipalai	J/Mallakam Maha Vidyalayam Mallakam
Uduvil	J/Mylany Saiva M.V. Chunnakam
Uduvil	J/Kandarodai Tamil Kandia Vidyasalai Kandarodai Chunnakam
Kopay	J/Avarangal Nadarajaramalinga Vid. Puttur
Karaveddy	J/Uduppidy Girl's College Valvettiturai

Point Pedro	J/Kerudavil H.T.M.School Thondaimanaru
Karaveddy	J/Vathiry North M.M.T.M.School Alvai
Chavakachcheri	Kaithady Kalaivani V. Kaithady
Nallur	J/Ariyalai Sribarwathy Vid. Jaffna
Nallur	J/Kokuvil Hindu Primary School Kokuvil
Jaffna	J.St.Mary's R.C.T.M.School Jaffna

North Province-Mannar District

DIVISION	NAME/ADDRESS
Mannar	St Xavier's Boys M M V Sinnakadai Mannar
Mannar	St Mary's Girls Vidyalayam Ward No.08, Pesalai
Manthai West	Mn/Periyamadhu Mv Periyamadhu , Mannar
Nanattan	Madhukkarai G T M S Nanattan

North Province-Vavuniya District

DIVISION	NAME/ADDRESS
Vavuniya South (Tamil)	Vavuniya Hindu College Kovilputhukulam Vavuniya
Vavuniya South (Tamil)	Saivapragasa Ladies College Vavuniya
Vavuniya North	Maraviluppai Gtms Maraviluppai Nedunkerny
Vavuniya South (Sinhala)	Gamini Maha Vidyalayam Mannar Road Vavuniya
Vavuniya South (Tamil)	Sivapuram Primary School Fourth Mile Post, Mannar Road, Vavuniya

North Province-Mullaitivu District

DIVISION	NAME/ADDRESS
Maritime Pattu	Mu/Mathalan R.C.Government T.M.S Mathalan, Mulliwaikkal, Mullaitivu.
Oddusudan	Mu/Periyakulam G.T.M.S Oddusuddan
Manthai East	Mu/Palinagar M.V Vavunikkulam
Puthukkudiyiruppu	Mu/Sri Murugananda Vidyalayam Venavil, Puthukkudiyiruppu, Mullaitivu.

Nothern Province-Kilinochchi District

DIVISION	NAME/ADDRESS
Karachchi	Kn/Akkarayan M.V Akkarayankulam, Kilinochchi
Karachchi	Kn/Kilinochchi M.V Wilsan Road, Kilinochchi
Kandawalai	Kn/Paranthan H.M.V Kumarapuram, Paranthan
Karachchi	Kn/Bharathy Vidyalayam Bharathypuram, Kilinochchi

Eastern Province-Ampara District

DIVISION	NAME/ADDRESS
Mahaoya	Dambadeniya Vidyalaya Mahaoya
Ampara	Am/D.S.Senanayaka National School Ampara
Damana	Am/Hindakalugama Vidyalaya Pahalalanda, Ampara
Dehiattakandiya	Am/Dehi/Dehiattakandiya National School Dehiattakandiya
Dehiattakandiya	Am/Dehi/Maldeniya Primary School Kekuluwela, Dehiattakandiya

Estern Province-Kalmunai District

DIVISION	NAME/ADDRESS
Navithanveli	Str/Holy Cross Maha Vidyalaya Sorikalmunai, Sammanthurai
Kalmunai	Mahmud Ladies College Mahmud Ladies College Kalmunai
Sainthamaruthu	Al-Kamaroon Vidyalaya 1068, Main Street, Sainthamaruthu
Addalachchenai	Addalaichenai Mmv Main Street Addalaichenai
Karaithivu	Ramakrishna Mission Girls Vidyalayam Central Road, Karaitivu-05
Tirukkovil	Akkarai pattu/Vinayapuram Maha Vidyalayam Vinayapuram Thirukkovil
Potuvil	Munawwara Vidyalayam Pottuvil

Estern Province-Batticaloa District

DIVISION	NAME/ADDRESS
Koralapattu West	Bt/Meeravodai Al Hithaya Maha Vidyalaya Meeravodai
Koralaipattu	Bt/Santhively Sithy Vinayagar Vid. Santhively, Murakkoddancheani.
Eravurpattu	Bt/Eravur Tamil Maha Vidyalayam Eravur-4, Chenkalady

Eravur	Bt/Al-Azhar Vidyalayam Kattuppalli Road , Eravur
Manmunai - North	Bt/Methodist Central College Batticaloa
Kaththankudi	Bt/Methaipalli Vidyalaya Kattankudy
Manmunai - West	Bt/Kothiapullai Kalaivani Vidiyalayam Kothiapulai Kanankudah Batticaloa
M.S.E Pattu	Btmahiloormunai Sakthy Vidyalayam Mahiloormunai Kaluwanchikudy
Porativupattu	Thikkodai Ganesha Periyaporativu
Koralapattu West	Bt/Oddamavady Fathima Balika Maha Vidyalaya Mpcs Road, Oddamavady

Estern Province-Trincomalee District

DIVISION	NAME/ADDRESS
Padavi Sripura	Padavi Tract 10 Tissa Vidyalaya Padavi-Sri Tissapura
Trincomalee Town	Srishanmuga Hindu Ladies'college Vidyalayam Road, Trincomalee
Trincomalee Town	Barathy Tamil Vidyalayam Varothaya Nagar,Sampaltheevu,Trincomalee
Thampalakamam	Aathi Koneswara Maha Vidyalayam Kovilady Thampalakamam
Mutur	T/Mengamam.G.T.M.S. Killiveddy.
Mutur	T/Al-Mina Vid Periyavelly
Kinniya	T/Al-Mina Maha Vidyalayam Poovarasanthivu,Kinniya
Mutur	Jaya Vid Jaya Streed Muthur

North Western Province-Kurunegala District

DIVISION	NAME/ADDRESS
Polgahawela	Ku/Parackramabahu M.M.V (National School) Polgahawela
Ridigama	Gonigoda.M.V. Pihibuwa
Mawathagama	Watareka M.V. Inguruwaththa
Wariyapola	Sri Gnanodaya M.M.V. Wariyapola
Ibbagamuwa	Ibbagamuwa Model Maha Vidyalaya Ibbagamuwa
Alawwa	Dambadeniya M M V Dambadeniya
Kurunegala	St Annes College Kurunegala
Kurunegala	Sri.Nissanka.M.V Circularrd South Kurunegala

Mawathagama	Saraswathi Tamil V. Muwankanda Mawathagama
Bingiriya	Ihala Horagas Agara M V Hiruwalpola
Udubaddawa	Horathepola M.M.V. Welipennagahamulla
Kuliyapitiya - West	Holy Angls B.M.V. Kuliyapitiya
Pannala	Pannala M.M.V. Pannala
Dahanekgedara	Kirimetiya Sri Sumanasara Nawodya M V Kirimetiya
Kuliyapitiya - East	Thoranege-dara Al-Irshad Mus V Kekunagolla
Maho	Yapahuwa M V Maho
Galgamuwa	Nwp/Ma/Buduruwakanda M.V. Buduruwakanda Galgamuwa
Galgamuwa	Nw/Ma/Gal/Mahawelithenna P.V. Mahawelithenna Meegalewa
Kotavehera	Girilla M.M.V. Mahagirilla
Ridigama	Kavisigamuwa P.V. Kavisigamuwa Morathihe

North Western Province-Puttalam District

DIVISION	NAME/ADDRESS
Puttalam North	Nagamaduwa K.V. Wanathawilluwa
Kalpitiya	Mudalaippali Mus.K.V. Pallivasalthurai
Kalpitiya	Thethapola R.C.T.K.V. Mampuriya
Puttalam South	Udappuwa Tam.M.V. Udappuwa
Chilaw	Ambakandawila St.Roches K.V. Ambakandawila, Chilaw
Chilaw	St.Benadict K.V Kanjukkuliya,Mugunuwatawana
Wennappuwa	Holy Family Balika P.V. Wennappuwa
Wennappuwa	Anuruddha M.M.V. Lunuwila
Nattandiya	Dammissara M.M.V. Nattandiya
Wennappuwa	Dankotuwa Balika M.V. Dankotuwa

North Central Province-Anuradhapura District

DIVISION	NAME/ADDRESS
Medawachchiya	Maithiripala Senanayaka Madya Maha Vidyalaya Medawachchiya
Medawachchiya	Yakawewa Viduhala Yakawewa,Medawachchiya
Padaviya	Buddangala Central College Padavi Parakkramapura
Kahatagasdigiliya	Rathmalgahawewa M.V. Rathmalgahawewa
Kahatagasdigiliya	Pandula M V Mahapothana
Nuwara Palatha East	A/Swarnapali Balika M.V Anuradhapura
Nuwara Palatha East	A/Walisinghe Harischandra M.V Anuradhapura
Nuwara Palatha East	A/D.S.Senanayaka Model Primary School Anuradhapura
Nuwara Palatha East	A/Mahinda Maha Vidyalaya Nuwarawewa,Anuradhapura.
Wilachchiya	A/Saliyamala Maha Vidyalaya Pemaduwa,Anuradhapura
Nochchiyagama	Sri Dutugemunu M.V. Pahalalahalnmillwa, Nochchiyagama
Rajanganaya	Rajanganaya Yaya 13/14 Mahasen Maha Vidyalaya Rajanganaya Yaya 13/14 Kalaoy
Rajanganaya	Rajanganaya Tract 8 V Rajanganaya,Angamuwa
Galnewa	Ihala Bulnewa V Galnewa
Talawa	Sri Siddhartha Central College Eppawala
Mihintale	Maradankalla Sri Bidhi K V Maradankalla,Mihintale
Palagala	Kiridiwaththa Maha Vidyalaya Kiridiwaththa-Palagala
Palugaswewa	Palugaswewa Maha Vidyalaya Habarana Road- Palugaswewa
Palagala	A.Nelliyagama Muslim Vidyalaya Nelliyagama Palagala
Horowpathana	Horowpothana Muslim Maha Vidylaya Horowpothana
Horowpathana	Galkandawa Muslim Vidylaya Parangiyawadiya Horowpothana

North Central Province-Polonnaruwa District

DIVISION	NAME/ADDRESS
Dimbulagala	Mudunkadawala P.V Siripura
Aralaganwila	Vilayaya M M V Aralaganvila
Hingurakgoda	Yodha Ela M.V. Yodha Ela Hingurakgoda
Medirigiriya	Medirigiriya M.M.V. Medirigiriya
Medirigiriya	Pangurana Muslim K.V. Pangurana, Mahathalokolawewa, Medirigiriya
Medirigiriya	Viharagama K.V. Viharagama, Divulankadawala
Tamankaduwa	Kaduruwela Nagara Maha Vidyalaya Kaduruwela , Polonnaruwa
Tamankaduwa	Sinharajapura Vidyalaya Onegama Polonnaruwa
Elahera	Radavigeoya K V, Aththanakadawala Polonnaruwa