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A GEOCHEMICAL CLASSIFICATION OF GROUNDWATER OF SRI LANKA

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Abstract : This paper presents a detailed geochemical classification of groundwater of Sri Lanka. In view of the fact that nearly 85% of the population of Sri Lanka use well water and other non-piped water for their drinking water supply, information on the chemistry of the groundwater is essential. Depending on its chemistry, the groundwater of Sri Lanka has been classified into 4 main types, namely, Ca,Mg,Na/K and non-dominant cation types. Each of these major groups are sub-divided into 2 or 4 sub-groups. It was revealed that the chemistry of the groundwater is markedly dependent on the underlying geology as well as the climate. The dry zone in particular is abundant in the Na/K type of water whereas the wet zone had Ca and non-dominant cation types. It is also shown that the proposed classification has useful applications in delineating areas susceptible to waterborne health hazards.

1. Introduction

The need for clean water as one of the most essential commodities for mankind can never be over-emphasized. Groundwater monitoring is one of the most important aspects of groundwater resource management and prevention of groundwater pollution. Most environmental research activities have been centered on rivers, lakes and the atmosphere of developed nations. Very few case studies have been reported from developing countries even though clean water is often a scarce commodity in such countries.

In Sri Lanka, a country of 15 million people, only 10 – 15% of the people have access to piped water, and the majority of the country's health problems are related to its aquatic environment. Most people use small, unprotected wells, and in rural settlements, reservoirs and stream and river channels are the main sources of drinking water. The proper disposal of human and other wastes through sewerage systems and latrines is also severely limited, less than a third of the population having satisfactory latrine facilities. The poor water supply and excreta disposal systems have resulted in 40% of the Sri Lankan population being affected by typhoid, amoebic and bacillary dysentery, infectious hepatitis, gastro-enteritis, colitis and worm infections. The need to carefully monitor the groundwater quality of Sri Lanka, is therefore of high priority and upto now this aspect has been neglected.

Environmental geochemistry essentially deals with the geographical distribution of elements and forms the basis for a variety of interdisciplinary studies involving human and animal health, quality of groundwater, agriculture and nutrition, soil fertility, pollution and mineral exploration. The study of the abundance and distribution of some trace elements and the resulting biological manifestations involves geochemists, public health workers, soil scientists, ecologists and nutritionists.

The chemical quality of groundwater is related to the geology of the area concerned. For example, areas underlain by acid igneous rocks such as granite or arenaceous sedimentary rocks generally contain lower levels of essential trace elements – particularly the first row transition elements – than areas underlain by ultrabasic and igneous rocks or shale. These however, may sometimes contain sufficient concentrations of potentially toxic elements.[15]

It is the aim of this paper to present a detailed chemical classification of the groundwater of Sri Lanka. It is hoped that this chemical classification would help, not only the hydrogeochemist, but also town and country planners and those engaged in the implementation of rural water supply schemes.

2. Materials and Methods

Figure 1 illustrates the general geology and climate of Sri Lanka and Figure 2, the locations of the sampling points for groundwater. All water samples were collected in acid-washed polyethylene bottles and kept cool and dark until tested. All samples were collected during the period July–December 1982. The appendix shows the details of locations. Three samples were taken from each location, for the determination of the following :

Sample 1 : Total dissolved solids, Cl^-, F^-, SO_4^-, HCO_3^-
Sample 2 : NO_3^-, NO_2^-, NH_4^+
Sample 3 : Na, K, Ca, Mg, Fe, Mn, Co, Cr, Cu, V, Zn, SiO_2

2.1 Analytical procedures

The total dissolved solids (TDS), Cl^-, F^-, SO_4^{2-} and HCO_3^- determinations were carried out using 1000 ml of well-mixed unacidified filtered samples (Sample 1). Following the methods of Brown *et. al.*,[1] TDS SO_4^{2-} Cl^- and HCO_3^- measurements were carried out by gravimetry and titrimetry respectively. The fluoride contents of the water were determined by the use of specific ion electrode.[13]

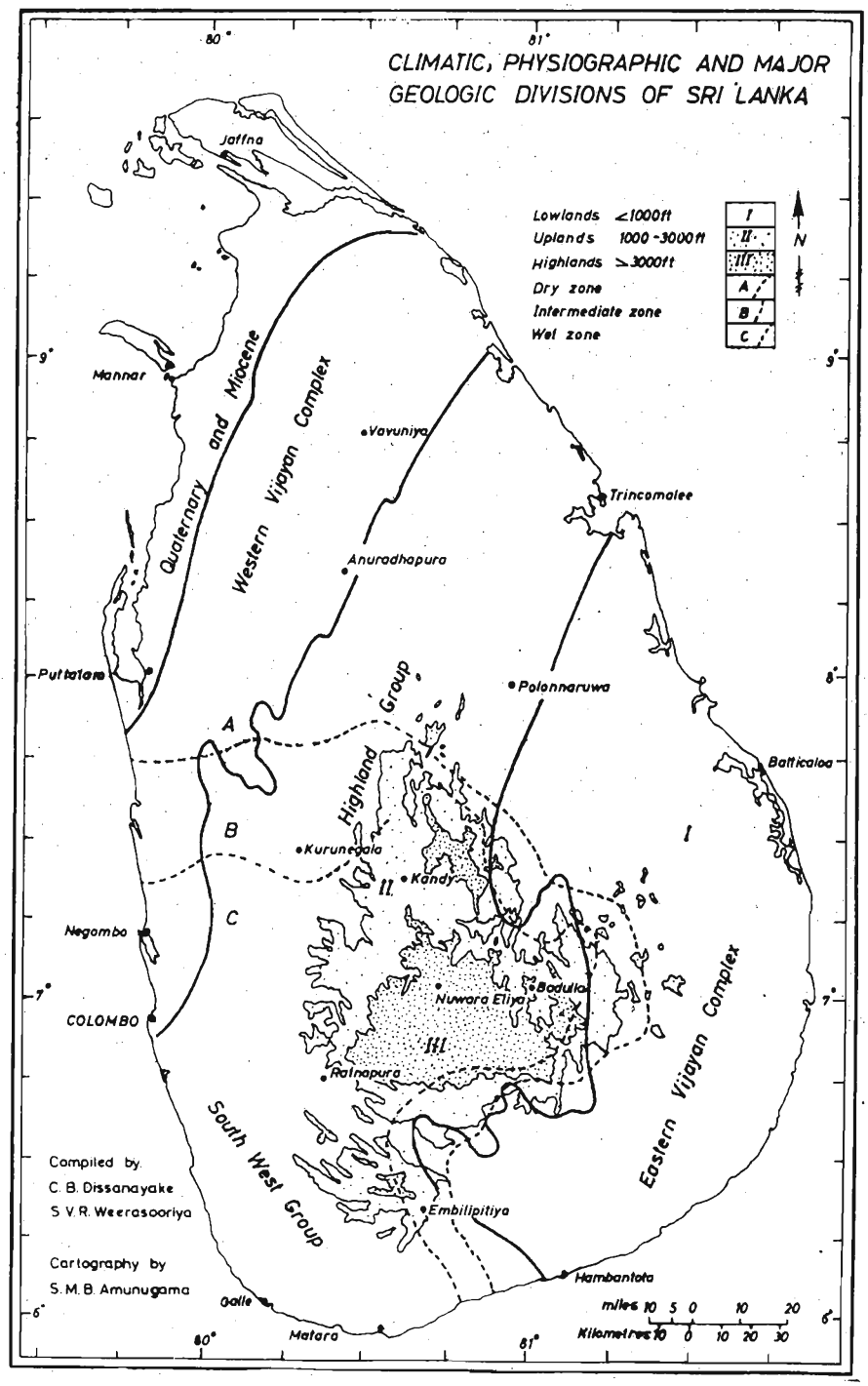


Figure 2. Map showing the locations of sampling points.

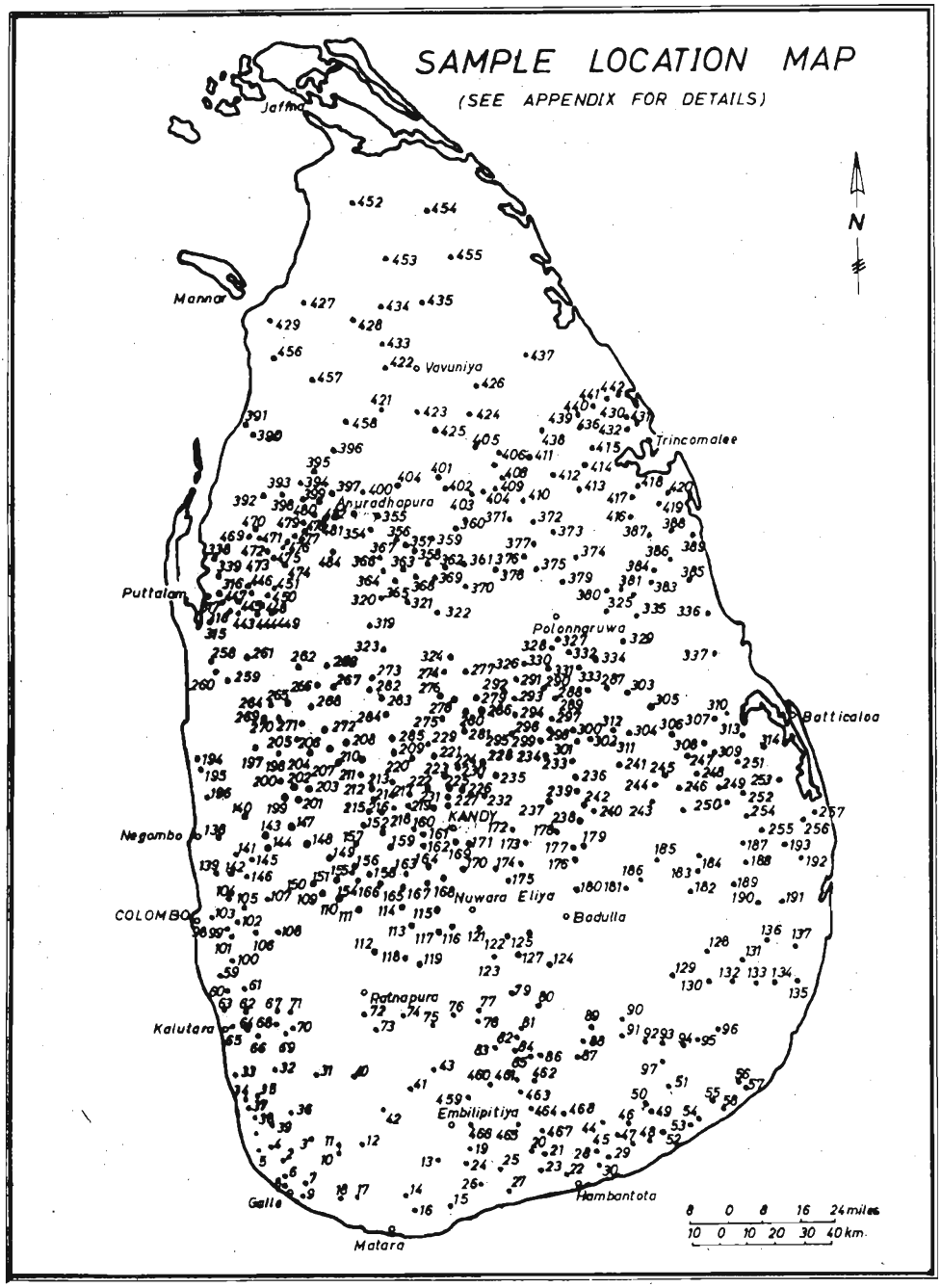


Figure 1. Map showing the climate and geology of Sri Lanka.

A 500 ml sample (Sample 2) was used in the determination of NO_3^-, NO_2^- and NH_4^+. The NO_3^- contents of the water were determined using a specific ion electrode. The NO_2^- and NH_4^+ contents were determined spectrophotometrically following the method of Brown *et al*[1].

A 2000 ml sample (Sample 3) of filtered water, acidified with 3 ml of reagent grade conc. HNO_3 was used for the determination of metal ions, and total SiO_2. The V and SiO_2 were determined spectrophotometrically following the method of Brown *et al.*[1] The metals Cu, Co, Cr and Zn were determined by atomic absorption spectrophotometry following pre-concentration using ammonium pyrrolidine dithiocarbamate (APDC)/methyl isobutyl ketone (MIBK). N, K, Ca, Mg, Fe and Mn were determined by atomic absorption spectrophotometry without pre-concentration.[7]

Replicate analyses were made for all samples and inter-laboratory comparisons made. A relative standard deviation of ± 1 – 5% was observed.

3. Results and Discussion

3.1 Plotting of data and map making

As the eye is well adapted to the recognition of patterns in spatial data, maps have the capacity to present geochemical information with great impact, and the spatial component becomes an integral part of the compilation and interpretational process. Comparison of hydrogeochemical data with topographic geologic or geochemical information is made easier when all are in map form on the same scale.

Regional geochemical maps are best suited for application in agriculture, ecology and human health investigations. Such an approach has been taken by the Applied Geochemistry Research Group (AGRG) of Imperial College, London and the British Geological Survey, and has proved to be of immense value in a large number of disciplines. Generally this type of map provides the broadest view of large portions or the totality of country. The sampling densities of these maps are below 1 km^2, over an area in excess 10,000 sq km and are usually presented as moving-average smoothed maps. Local irregularities of the sampling results often obscure rather than clarify any attempt to extract diagonostic patterns in the production of contour maps at regional scale. These irregularities need to be harmonized, first with suitable smoothing out procedures. Much of the studies in this direction had been carried out by Davis[2] and Olea.[11]

3.2 The chemical basis for the classification of groundwater

The major constituents in aquatic systems include Ca, Mg, Na, K, HCO_3^-, CO_3^{2-}, SO_4^{2-} and Cl^-. The proportions of these eight geochemically significant constituents in natural solution provides the basis for naming the water type. To provide a basis for comparison of water types and to relate them to specific environments, a graphic method of illustrating data and appropriate terminology must be adopted.

The Piper diagram[12] is a multiple trilinear diagram for graphic representation of the major chemical constituents of water, and effectively portrays analytical data. Similar analytical techniques were developed by Hill,[9] Langelier and Ludwig[10] and Romani.[14] The model used in this study is a modification by Hem.[8] Piper diagrams are used in various ways in hydrogeochemistry. The simplest application is merely to display data to represent distinctions among individual water samples. A fairly recent and promising modification of the Piper diagram involves the use of component cation and anion diagrams to classify water. The water type is generally named after the dominant cations and dominant anions – defined as constituting more than 50% of the cation or anion. This has been accomplished graphically by joining the mid-points of each side of each triangular field which divides each triangular diagram into 4 smaller triangles. Thus a water type is easily named, based on the positioning of the points in the cation and anion triangles. Unless there are non-dominant cations or anions, the water type is named after the cations (Ca, Mg, Na/K) followed by a hyphen and a similar term selected for anion possibilities (SO_4, Cl, HCO_3/CO_3). When a water type plots in the Piper diagram in the non-dominant cation or non-dominant anion fields, it indicates that on percentage epm basis, no ion is present in an amount greater than 50%. In such instances, non-dominant cation (NDC) or non-dominant anion (NDA) forms the descriptive name.

3.3 The chemistry of the groundwater of Sri Lanka

The groundwater of Sri Lanka can be classified into the following 4 main water types. The appendix shows all chemical data pertaining to this study.

1. Calcium type
2. Magnesium type
3. Sodium/potassium type
4. Non-dominant cation type

Figure 3 illustrates the distribution of these 4 major water types in Sri Lanka. Each type is further sub-divided into the Cl, SO_4, HCO_3 and NDA types. Table 1 shows the average for the elements and ionic species.

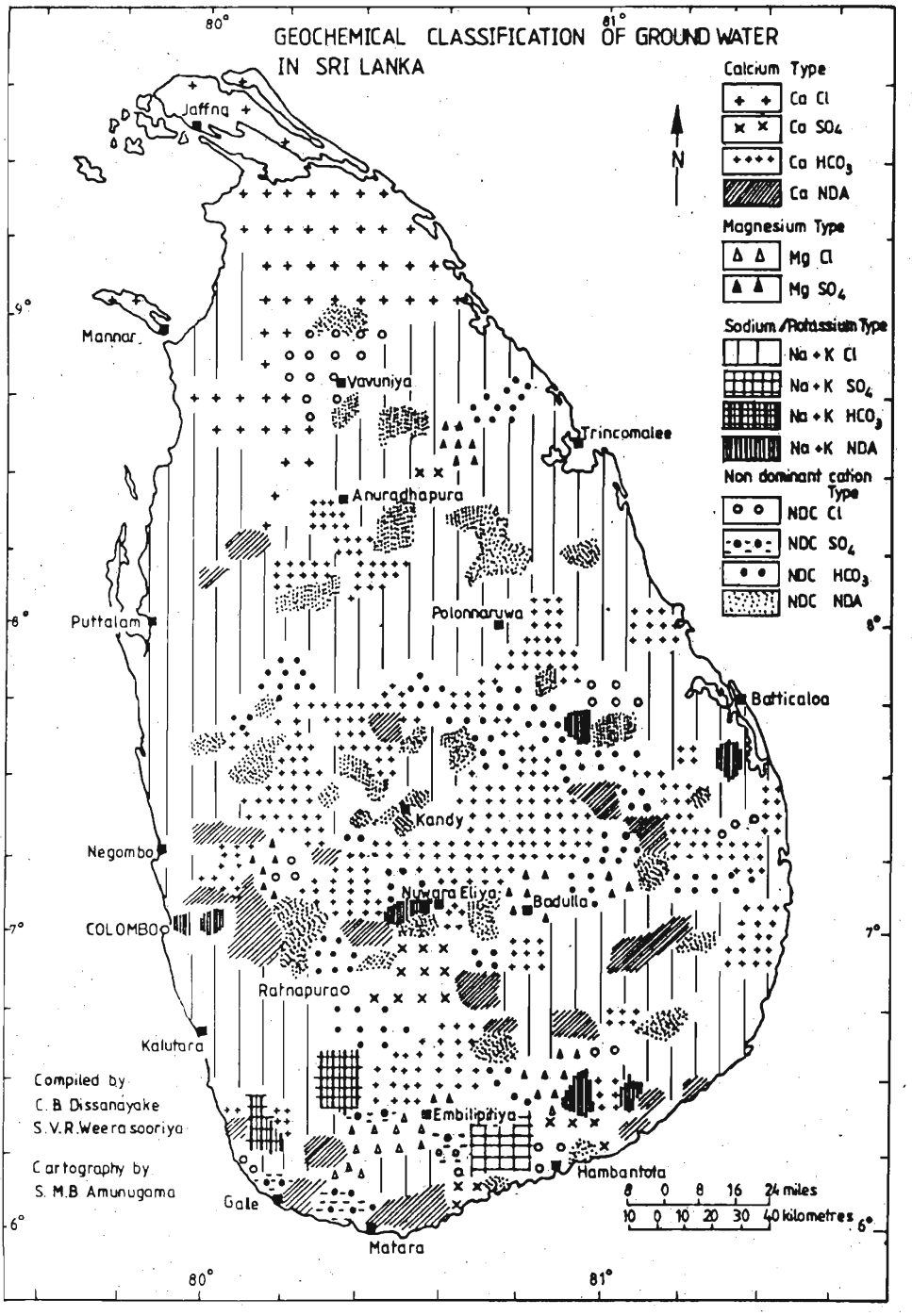


Figure 3. Map showing the distribution of the major groundwater types in Sri Lanka.

Table 1 : Elemental averages for the different water types of Sri Lanka

Water type	Na	K	Ca	Mg	HCO_3	SO_4	Cl	total Fe	Mn	Cr	Co	total V	Cu	Zn	NO_3	NO_2	NH_4	F	SiO_2	TDS	total Hardness
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppm	ppm, $CaCO_3$
Ca-type	28	15	78	13	222	41	62	1088	76	11	28	58	40	137	4657	113	229	1006	19	358	245
Mg-type	39	38	104	158	393	649	38	1457	65	13	9	38	45	84	1614	62	97	638	10	761	938
Na/K-type	345	35	82	18	253	36	589	1443	112	11	27	51	66	129	6128	114	175	1121	25	617	305
NDC-type	81	19	76	25	253	45	195	1098	79	10	18	22	52	113	3966	113	221	983	18	603	255

3.3.1 The calcium type

Figure 4 illustrates the Piper trilinear diagrams for the calcium water type. In Sri Lanka, this type of water is distributed mainly in the northern, central and in some parts of southern, eastern and north central regions. The Cl type predominates in the northern parts whereas the HCO_3 type is prevalent in the central regions. The effect of salinity and the presence of carbonate rocks in the areas could possibly be attributed to such a distribution. Table 2 shows the correlation matrix for the elements and ionic species analyzed for the calcium type of water in Sri Lanka. The total dissolved solids (TDS) show significant correlations with K, Ca, HCO_3 and Cl. The transition elements however do not show significant correlations for this type of water.

3.3.2 The magnesium type

When compared to the other types of water, the magnesium type is distributed only in relatively smaller areas, the southern parts of the country around Embilipitiya having higher concentrations. In this type of water, only the Cl and SO_4 sub-types could be found. The correlation matrix and the Piper trilinear diagram for the Mg water type are shown in Table 3 and Figure 5 respectively.

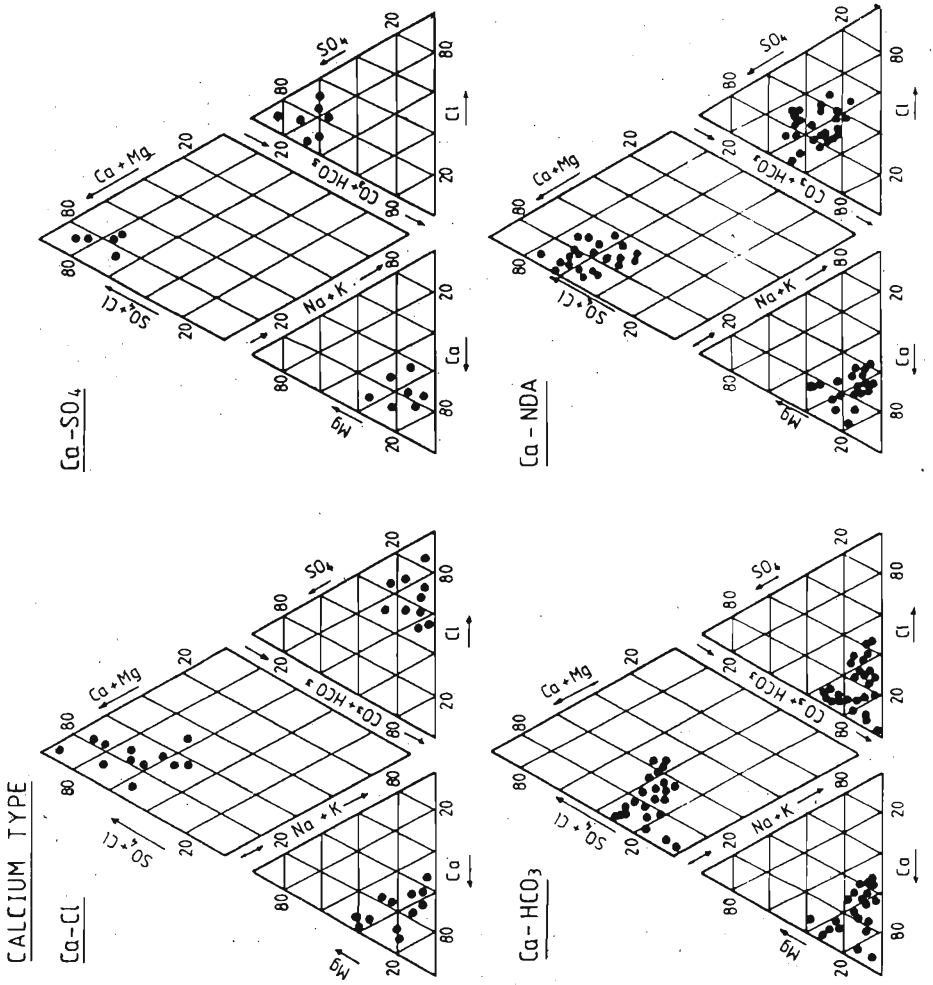


Figure 4. Piper trilinear diagrams for the calcium water type.

Table 2 : Correlation matrix for the calcium type

	Na	K	Ca	Mg	HCO_3	SO_4	Cl	Fe	Mn	Cr	Co	V	Cu	Zn	NO_3	NO_2	NH_4	F	SiO_2	TDS
Na	1.000	0.472*	0.479*	−0.021	0.344	0.028	0.737*	−0.177	0.063	−0.107	0.019	0.072	0.317	−0.006	0.004	−0.093	−0.045	0.210	0.187	0.436
K		1.000	0.448	0.021	0.290	0.012	0.728*	−0.117	0.079	−0.148	−0.037	0.040	0.074	−0.081	0.077	−0.012	0.002	0.055	0.205	0.534*
Ca			1.000	0.175	0.851*	0.312	0.593*	−0.181	0.089	−0.113	0.002	0.137	0.249	0.027	−0.159	−0.146	0.077	0.244	0.149	0.784*
Mg				1.000	0.272	0.331	−0.011	0.026	0.141	−0.043	−0.084	−0.010	0.083	0.023	0.012	0.149	0.069	−0.050	0.035	0.249
HCO_3					1.000	0.190	0.342	−0.315	0.134	−0.182	0.062	0.185	0.322	0.156	−0.288	−0.031	0.216	0.301	0.033	0.596*
SO_4						1.000	−0.003	0.171	0.188	0.134	−0.030	0.109	0.080	−0.014	−0.045	−0.054	−0.048	−0.057	0.143	0.108
Cl							1.000	−0.123	0.053	−0.103	−0.025	0.012	0.150	−0.087	0.026	−0.112	−0.021	0.160	0.248	0.654*
Fe								1.000	−0.094	0.189	−0.049	−0.100	−0.297	−0.230	0.192	−0.112	−0.155	−0.228	0.072	−0.201
Mn									1.000	0.117	−0.024	0.164	0.194	−0.041	−0.177	0.086	0.119	0.034	0.067	0.058
Cr										1.000	−0.143	−0.166	−0.120	0.083	0.074	−0.071	−0.098	0.041	−0.013	−0.074
Co											1.000	−0.007	0.100	−0.098	−0.080	−0.064	0.073	0.145	−0.078	−0.028
V												1.000	0.028	0.173	−0.198	−0.081	−0.091	0.007	0.116	−0.112
Cu													1.000	0.080	−0.197	0.185	0.395	0.294	−0.149	0.204
Zn														1.000	−0.222	−0.063	0.091	0.278	−0.071	−0.036
NO_3															1.000	−0.025	−0.216	−0.189	0.048	−0.132
NO_2																1.000	0.165	0.129	−0.152	0.099
NH_4																	1.000	−0.048	0.028	0.107
F																		1.000	−0.006	0.184
SiO_2																			1.000	0.214
TDS																				1.000

* Significant at 95% confidence level

Table 3 : Correlation matrix for the magnesium type

	Na	K	Ca	Mg	HCO_3	SO_4	Cl	Fe	Mn	Cr	Co	V	Cu	Zn	NO_3	NO_2	NH_4	F	SiO_2	TDS
Na	1.000	0.931*	0.954*	0.882*	0.834*	0.947*	−0.379	0.237	0.298	0.068	−0.306	0.003	−0.238	−0.063	0.246	−0.163	−0.111	−0.170	−0.202	−0.177
K		1.000	0.957*	0.808*	0.764*	0.919*	−0.166	0.075	0.286	−0.088	−0.099	−0.005	−0.041	−0.091	0.127	−0.137	−0.073	−0.089	−0.064	0.007
Ca			1.000	0.876*	0.828*	0.964*	−0.162	0.129	0.225	0.026	−0.081	0.014	−0.020	−0.142	0.153	−0.199	−0.115	0.137	−0.151	−0.067
Mg				1.000	0.874*	0.956*	−0.465	0.283	0.448	0.166	−0.389	0.234	−0.278	−0.197	0.081	−0.207	−0.163	−0.144	−0.362	0.082
HCO_3					1.000	0.813*	−0.251	0.032	0.239	0.048	−0.156	0.105	−0.029	−0.164	0.131	−0.115	−0.069	0.020	−0.313	−0.007
SO_4						1.000	−0.354	0.252	0.369	0.111	−0.284	0.123	−0.212	−0.148	0.126	−0.202	−0.156	−0.173	−0.228	0.009
Cl							1.000	−0.525*	−0.424	−0.305	0.977*	−0.054	0.858*	−0.034	−0.179	0.065	−0.077	0.041	0.292	0.157
Fe								1.000	0.399	0.328	−0.427	0.200	−0.631*	−0.328	0.327	−0.336	−0.597*	−0.595*	−0.345	0.067
Mn									1.000	−0.037	−0.403	0.628*	−0.459	−0.241	−0.553*	−0.326	−0.327	−0.248	−0.270	0.416
Cr										1.000	−0.229	0.330	−0.434	0.265	0.259	−0.010	−0.290	−0.540*	−0.138	−0.265
Co											1.000	−0.016	0.844*	−0.128	−0.142	−0.011	−0.150	−0.027	0.220	0.190
V												1.000	−0.155	−0.337	−0.430	−0.406	−0.467	−0.305	−0.594*	0.487
Cu													1.000	−0.131	−0.144	0.139	−0.066	0.261	0.225	0.306
Zn														1.000	0.159	0.837*	−0.077	−0.255	0.723*	−0.307
NO_3															1.000	0.239	−0.178	−0.253	−0.033	−0.370
NO_2																1.000	−0.007	−0.169	0.685*	0.080
NH_4																	1.000	0.892*	0.100	−0.410
F																		1.000	−0.912*	0.125
SiO_2																			1.000	−0.116
TDS																				1.000

* Significant at 95% confidence level

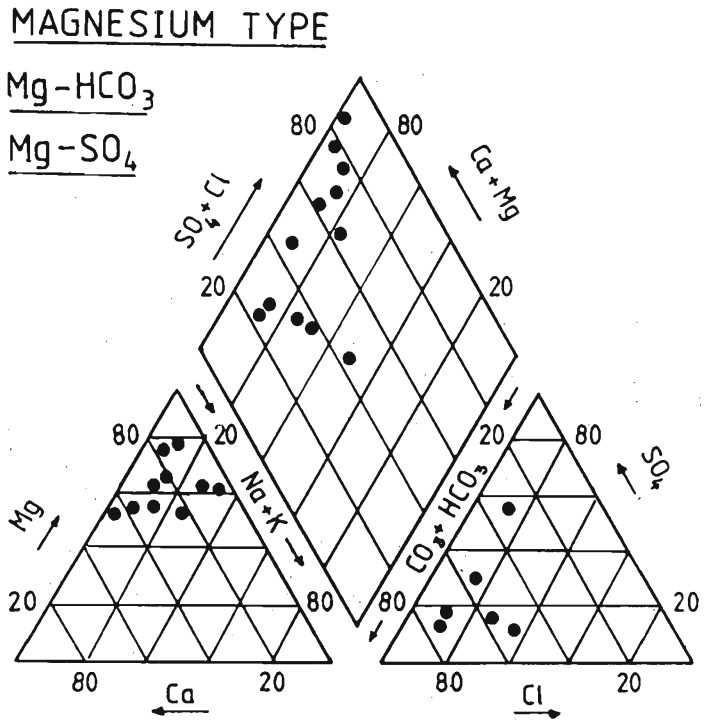


Figure 5. Piper trilinear diagrams for the magnesium water type.

3.3.3 *The sodium potassium type*

This type forms a major group and is distributed widely in Sri Lanka, particularly around the central region. The north western and north central and the south eastern dry zones mainly contain this type of groundwater. From among the sub-types, the Cl type is predominantly found in these regions. Excessive evaporation and probably influence of salinity may have contributed to the prevalence of this water type. Table 4 shows the correlation matrix for the Na/K water type and Figure 6 illustrates the Piper trilinear diagrams.

3.3.4 *The non-dominant cation type*

As illustrated in Figure 3 the non-dominant cation type of water is distributed mainly at the periphery of the central highlands and some parts of the north central and southern regions. The HCO_3 and non-dominant anion sub-types predominate in these regions. Table 5 shows the correlation matrix for the non-dominant cation water type and Figure 7 illustrates the Piper trilinear diagrams.

3.3.5 *Effect of geology and climate on the chemistry of groundwater*

A closer study of the distribution patterns of the groundwater types in Sri Lanka reveals that the underlying geology and the climate affects the chemical quality of water to a great extent. The wet zone of Sri Lanka (See Figure 1) consists for the most part of non-dominant cation types and calcium – HCO_3 and non-dominant anion types. In the dry zone however, the Na/K type predominates and in this type of water the Cl sub-type is found covering vast areas of the dry zone. Evaporation under the strong drought conditions as prevailing in the dry zone of Sri Lanka results in the accumulation of sodium salts in the soil layers and this factor is largely responsible for the abundance of the Na/K type in the dry zone. Further, the northern parts of Sri Lanka are underlain by sedimentary limestones, as a result of which the calcium type of water predominates in these parts. Increasing salinity has been observed in areas closer to the shore-lines and in the Jaffna Peninsula in particular, this is commonly seen. The predominating anion in this type of water in the dry zone is Cl.

When one considers the topography, the central highlands have groundwater of the Ca – HCO_3 type and with decreasing elevation, merges into the non-dominant cation type. In the lowlands the Na/K type predominates. Thus a Ca → NDC → Na/K type of sequence is apparent with decreasing elevations from the highlands to lowlands. This sequence could well be due to the different geochemical mobilities of the elements concerned. Further, there are numerous shallow and deep seated fractures and lineaments within the central regions of Sri Lanka and these are mainly responsible for the migration of groundwater within the hardrock terrains.

Table 4 : Correlation matrix for the sodium/potassium type

	Na	K	Ca	Mg	HCO_3	SO_4	Cl	Fe	Mn	Cr	Co	V	Cu	Zn	NO_3	NO_2	NH_4	F	SiO_2	TDS
Na	1.000	0.077	0.634*	0.472*	0.635*	0.093	0.950*	−0.045	0.206	−0.320	0.269	0.007	0.322	0.217	−0.115	−0.248	0.193	0.218	0.123	0.400*
K		1.000	0.076	0.002	0.051	0.145	0.155	−0.123	0.020	−0.161	0.005	0.028	−0.100	−0.042	−0.134	−0.165	0.076	−0.307	0.039	−0.008
Ca			1.000	0.581*	0.894*	0.176	0.686*	−0.215	0.067	−0.305	0.155	−0.007	0.265	0.156	−0.162	−0.318	0.429*	0.219	0.169	0.496*
Mg				1.000	0.677*	0.277	0.519	−0.168	−0.041	−0.262	−0.176	−0.099	0.213	0.119	−0.214	−0.222	0.156	0.127	0.184	0.297
HCO_3					1.000	0.064	0.661*	−0.213	0.012	−0.307	−0.067	−0.075	0.375	0.077	−0.131	−0.302	0.385	0.202	0.156	0.526*
SO_4						1.000	0.076	−0.206	0.092	0.184	−0.175	0.074	−0.019	−0.102	−0.132	−0.154	0.047	0.044	0.194	0.004
Cl							1.000	−0.051	0.237	−0.308	0.301	0.001	0.340	0.268	−0.193	−0.272	0.167	0.247	0.128	0.445*
Fe								1.000	0.244	0.355	0.206	−0.009	−0.061	0.142	0.225	0.144	−0.107	−0.054	−0.147	−0.154
Mn									1.000	−0.050	0.273	0.130	0.446*	0.268	0.053	−0.048	0.046	0.300	−0.103	0.002
Cr										1.000	−0.103	0.014	−0.259	0.098	0.102	0.255	−0.148	−0.114	−0.213	−0.123
Co											1.000	0.241	0.181	0.213	−0.024	−0.125	0.083	0.250	−0.050	0.072
V												1.000	0.050	0.050	0.196	−0.119	−0.029	0.155	−0.046	−0.109
Cu													1.000	0.305	0.016	−0.186	0.076*	0.493	0.084	0.236
Zn														1.000	0.002	−0.020	0.061	0.322	0.050	0.005
NO_3															1.000	0.199	0.030	−0.183	−0.024	−0.140
NO_2																1.000	−0.127	−0.210	−0.133	−0.176
NH_4																	1.000	−0.068	0.131	0.294
F																		1.000	−0.036	0.043
SiO_2																			1.000	0.093
TDS																				1.000

* Significant at 95% confidence level

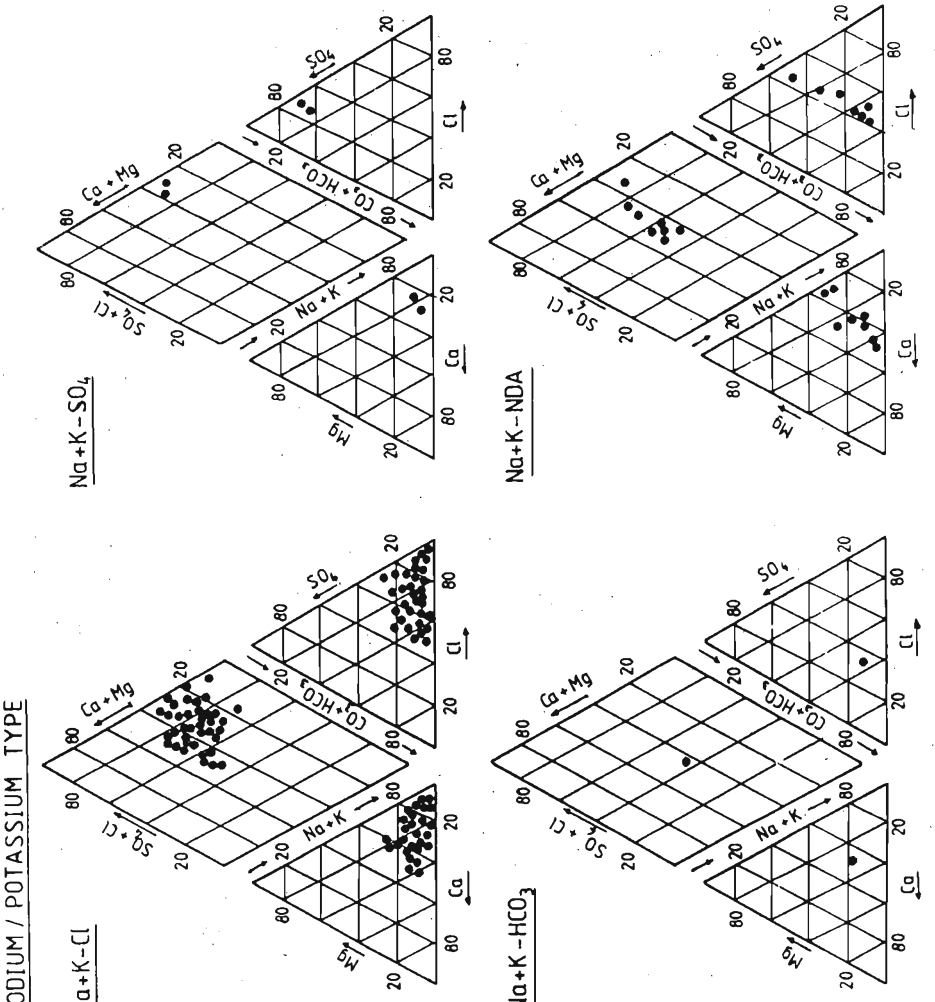
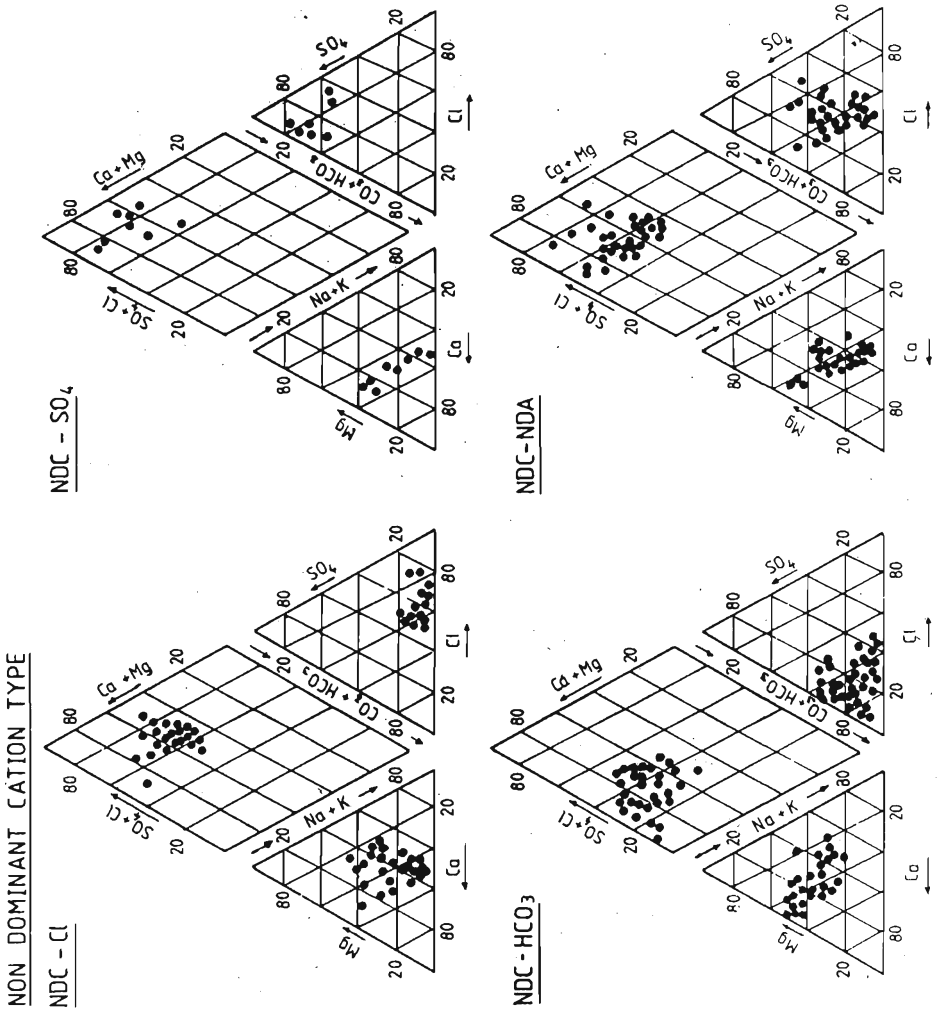


Figure 6. Piper trilinear diagrams for the sodium/potassium water type.

Table 5 : Correlation matrix for the non-dominant cation type

	Na	K	Ca	Mg	HCO_3	SO_4	Cl	Fe	Mn	Cr	Co	V	Cu	Zn	NO_3	NO_2	NH_4	F	SiO_2	TDS
Na	1.000	0.159	0.570*	0.331	0.497*	0.018	0.793*	−0.142	0.009	−0.116	0.024	−0.044	−0.001	−0.089	−0.143	−0.124	−0.042	0.103	0.140	0.307
K		1.000	0.548*	0.399	0.436	0.279	0.249	−0.096	−0.009	−0.030	0.214	0.097	0.260	−0.136	−0.039	−0.152	0.005	0.091	−0.206	0.492
Ca			1.000	0.571*	0.856*	0.215	0.586*	−0.255	−0.050	−0.172	0.109	0.026	0.323	−0.189	−0.199	−0.224	0.120	0.240	0.436	0.760
Mg				1.000	0.691*	0.472*	0.290	−0.200	−0.049	−0.133	−0.064	0.043	0.114	−0.100	−0.207	0.941*	0.209	0.183	0.328	0.509
HCO_3					1.000	0.051	0.486*	−0.333	−0.118	−0.126	0.113	0.047	0.436	−0.098	−0.204	−0.134	0.250	0.304	0.374	0.780
SO_4						1.000	0.023	0.062	+0.045	0.023	−0.055	−0.032	0.149	−0.117	−0.078	0.153	0.004	−0.047	0.190	0.072
Cl							1.000	−0.165	−0.046	−0.096	0.228	−0.045	0.044	−0.021	−0.168	−0.158	−0.045	0.167	0.168	0.326
Fe								1.000	−0.024	0.167	−0.169	−0.005	−0.314	−0.254	0.215	0.029	0.017	0.228	−0.096	−0.233
Mn									1.000	−0.003	−0.003	0.082	−0.098	−0.185	0.097	0.038	−0.204	−0.077	−0.105	−0.172
Cr										1.000	−0.149	−0.140	−0.065	0.142	0.188	−0.003	0.070	−0.027	−0.166	−0.063
Co											1.000	−0.042	0.066	−0.078	−0.168	−0.144	−0.006	0.055	0.170	0.202
V												1.000	0.199	0.001	0.174	−0.015	−0.004	0.091	0.036	−0.030
Cu													1.000	−0.065	−0.009	0.105	0.018	0.280	0.097	0.348
Zn														1.000	−0.006	−0.033	0.351	0.409	−0.290	−0.211
NO_3															1.000	0.124	−0.104	−0.234	−0.234	−0.207
NO_2																1.000	−0.187	−0.114	−0.120	−0.172
NH_4																	1.000	0.114	0.071	0.017
F																		1.000	+0.052	0.166
SiO_2																			1.000	0.452
TDS																				1.000

* Significant at 95% confidence level


NON DOMINANT CATION TYPE
NDC - Cl
NDC - SO_4
NDC-NDA
NDC-HCO_3
Ca+Mg
Na+K
SO_4+Cl
CO_3+HCO_3
Ca
Mg
Cl
SO_4

3.3.6 Application in health

The delineation of areas of different water chemistry has applications in studies pertaining to human health and epidemiology. The effect of the chemistry of the groundwater on the health of the human population in Sri Lanka is of paramount importance due to the fact that the vast majority of the people use groundwater directly for their drinking and cooking purposes.

It is apparent from Figure 3 that the effect of Na, K and Cl is more pronounced in the dry zone areas as against Ca and non-dominant cation types in the wet zone. The people living in the dry zone regions are thus subjected to a different water chemistry than those living in other parts of Sri Lanka. The effect of water chemistry on the health of the population in Sri Lanka has been highlighted by Dissanayake *et. al.*[6] and Dissanayake.[4] From these studies it was revealed that there is a correlation between water hardness and the incidence of cardiovascular diseases. Areas underlain by groundwater with high water hardness appeared to have a low incidence of cardiovascular diseases as exemplified by the Jaffna Peninsula. On the other hand, certain regions in the wet zone where water hardness was low, had a higher incidence of cardiovascular diseases. Prior information on the chemical quality of the water of different areas helps in the delineation of disease prone regions. Among the other diseases dependent on the water quality are dental diseases such as dental fluorosis and tooth decay. Earlier studies[3,5] have shown certain areas in Sri Lanka, particularly in the north central and eastern parts to contain anomalous fluoride concentrations in the groundwater. These areas coincided with a high incidence of dental fluorosis, particularly among school children.

4. Conclusions

The groundwater of Sri Lanka has been classified chemically and a map showing the distribution of the different water types prepared. The groundwater has been classified into 4 major types, namely Ca, Mg, Na/K and non-dominant cation types. The Ca–HCO_3 type is found predominantly in the wet zone of the central highlands and appear to be associated with the non-dominant cation types. In the dry zone, the Na/K type is abundant whereas in northern areas particularly in the Jaffna Peninsula, the Ca–Cl type is abundant. It is apparent that the distribution of the different groundwater types is markedly affected by the underlying geology and climatic factors. The map showing the distribution of the groundwater types has application in delineating areas susceptible to health hazards depending on the chemical composition of water.

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Chemical Results of the Sampled Well Water: Ca – Cl Subgroup

Location No.	Ca	Mg	Na	K	HCO_3	SO_4	Cl	TDS	Total Hardness	Total Fe	Mn	Total Cr	Co	Total V	Cu	Zn	NO_3	NO_2	NH_4	SiO_2	F	
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm in $CaCO_3$	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	Topographic Sheet
33	60.13	5.55	2.29	20.14	61.0	44.18	70.00	195	164	2700	100	12	2	1	10	3	21,000	28	79	21	140	Alutgama
86	6.00	1.21	2.84	3.51	12.8	3.36	11.00	112	27	110	42	17	7	8	20	217	600	111	11	14	700	Haputale
88	6.61	2.43	1.14	0.39	15.2	0.48	11.69	39	21	110	62	12	1	26	7	218	10	110	7	12	200	"
92	39.87	12.15	13.33	11.73	25.0	4.32	119.81	120	150	110	nd	2	17	4	13	217	3,000	310	12	2	2000	Buttala
100	20.04	0.04	12.85	15.64	43.9	0.43	41.99	101	52	3200	72	22	17	07	10	170	2.000	70	12	2	40	Avissawella
104	20.04	0.14	7.86	7.82	43.9	0.04	32.99	112	56	3200	73	20	1	3	12	120	6,000	122	11	8	430	"
117	20.04	8.48	1.52	0.39	19.5	0.33	41.99	103	85	1110	21	7	2	2	10	17	3,100	127	11	11	300	Hatton
197	88.07	12.10	45.98	31.68	183.0	1.53	170.00	300	270	3110	72	7	1	3	19	9	8,400	112	12	1	70	Dandagamuwa
273	100.20	12.08	45.97	5.86	128.7	5.25	210.00	850	300	70	100	12	10	7	32	22	4,600	10	312	12	40	Nalanda
404	220.00	3.68	68.96	67.26	348.9	4.80	460.00	920	700	1330	20	2	37	31	17	17	2,000	28	17	37	700	Medawachchiya
421	208.00	9.72	10.80	35.97	427.0	4.41	420.00	1700	920	170	27	3	1	7	21	28	2,000	22	627	41	750	Vavuniya
428	208.00	4.86	522.52	278.45	572.9	4.80	1200.00	1500	720	320	17	7	3	11	17	31	110	17	175	73	500	Mantai
442	260.50	11.91	183.90	28.94	616.8	47.07	412.00	1011	700	400	17	11	8	1	125	80	1200	12	137	31	2800	Padaviya
452	260.50	11.91	344.82	283.92	446.6	34.58	1000.00	2200	700	400	82	2	11	20	21	21	10,610	120	175	75	1500	Tunukkai
453	320.60	11.91	413.79	237.38	427.0	5.76	1200.00	2107	850	170	35	7	27	11	19	34	nd	72	175	60	500	Iranamadu
454	200.40	11.91	275.86	228.39	305.0	15.36	1010.00	2100	810	700	30	3	2	12	14	37	nd	90	170	75	1000	"
455	240.40	97.00	551.72	403.98	610.1	15.36	1560.00	4100	1000	170	30	2	7	1	13	32	nd	91	100	60	750	"
456	220.00	60.78	206.89	185.71	305.0	240.13	700.00	1512	800	460	17	2	1	1	20	28	200	30	17	92	500	Murunkan
457	200.40	97.00	758.62	438.40	610.1	96.06	1780.00	1500	900	640	22	2	2	3	10	45	1,000	17	27	37	750	"
458	308.01	72.93	857.58	177.12	610.1	18.25	1920.00	1600	820	820	27	1	3	7	15	27	1,200	27	21	19	1000	"
483	76.75	24.31	27.58	15.64	60.3	63.40	169.00	320	290	800	74	3	1	1	32	28	1,700	120	102	22	321	Kala Oya

Chemical Results of the Sampled Well Water: Ca – SO_4 Subgroup

26	120.08	40.08	45.97	29.33	183.0	344.75	20.00	430	400	3200	122	7	4	20	6	22	110	38	32	31	100	Ambalantota
76	60.12	6.68	28.25	7.63	60.4	144.09	27.00	272	178	870	94	10	7	17	51	100	7,000	27	11	7	400	Ratnapura
120	6.09	0.01	5.6	3.91	0.6	12.96	7.00	114	67	1100	20	7	1	1	61	280	700	900	10	22	190	Hatton
126	20.04	2.41	2.29	2.69	19.5	3.41	12.00	118	60	110	21	3	3	2	10	317	5,000	117	7	18	20	Nuwara Eliya
407	218.83	3.73	25.51	35.97	361.1	46.68	20.00	1500	700	170	24	2	122	117	10	22	210	27	32	22	700	Horowpatana

Chemical Results of the Sampled Well Water: Ca – HCO_3 Subgroup

Location No.	Ca	Mg	Na	K	HCO_3	SO_4	Cl	TDS	Total Hardness	Total Fe	Mn	Total Cr	Co	Total V	Cu	Zn	NO_3	NO_2	NH_4	SiO_2	F	Topographic Sheet
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm in $CaCO_3$	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	
34	80.16	19.97	2.29	30.73	226.9	101.34	2.00	301	250	2900	112	12	1	28	11	13	11,000	28	62	27	100	Alutgama
35	80.16	21.57	2.29	28.74	263.5	53.31	16.85		254	2710	114	18	1	27	22	12	10,000	18	76	45	110	"
36	100.20	2.70	2.29	15.17	268.4	20.17	29.00		257	2170	78	13	1	17	10	7	12,000	70	7	47	100	"
41	6.80	2.66	0.22	1.42	26.2	4.80	1.77	38	28	2000	38	14	30	3	20	9	3,700	111	2	2	200	Rakwana
43	20.04	5.31	0.22	0.39	67.4	4.80	8.99	292	72	3720	34	13	32	2	15	18	5,000	110	1	8	500	"
45	220.00	120.00	2.29	28.63	738.8	207.49	49.00	1000	850	110	128	3	1	112	12	18	780	28	96	22	770	Kataragama
46	60.12	12.34	2.29	31.59	164.7	48.51	29.00		181	700	111	1	3	122	13	22	910	28	17	37	720	"
53	81.00	12.09	0.01	1.95	189.7	83.18	10.00		254	110	75	2	1	150	10	71	100	100	92	31	720	"
78	9.41	1.32	0.24	0.39	26.2	10.08	2.00	32	17	110	90	12	7	7	7	327	3,000	18	22	8	370	Haputale
102	20.04	7.96	0.22	0.43	71.9	0.96	17.00	142	83	3160	74	30	11	22	4	210	3,000	73	12	3	510	Avissawella
114	20.04	0.02	4.33	3.91	56.7	0.86	7.00	102	51	720	45	11	1	2	60	17	3,700	413	11	11	200	Hatton
121	20.04	10.67	2.29	3.12	61.0	4.46	1.99	119	94	80	19	8	22	1	17	172	22,000	175	9	37	20	Nuwara Eliya
122	22.81	6.07	8.94	3.91	73.2	3.30	7.00	129	83	270	20	7	23	2	22	217	20,000	220	3	32	10	"
124	20.04	1.44	13.79	3.33	55.5	1.58	20.00	114	56	80	22	2	3	7	22	337	10,000	412	3	3	10	"
134	151.00	36.46	68.96	35.43	549.1	4.41	170.00	1800	541	270	81	5	22	22	92	22	110	110	60	40	220	Potuvil
137	156.00	12.15	22.98	0.46	244.0	0.52	119.85	1700	300	300	77	14	17	17	12	41	210	73	90	37	320	"
143	60.12	4.83	1.60	0.59	121.0	3.42	27.00		170	2720	12	9	2	27	2	92	22,000	41	11	2	500	Gampaha
145	60.12	12.10	0.22	0.39	141.5	4.80	17.00	203	200	2120	17	9	1	22	7	90	10,000	53	77	1	280	"
151	40.68	4.10	13.89	2.34	122.0	3.45	10.00	150	112	3000	21	22	1	1	40	27	2,100	80	7	7	700	"
154	60.12	15.68	22.98	14.66	244.0	34.19	33.99	170	215	1220	80	8	17	17	60	12	70	110	1000	17	80	Kandy
155	80.16	3.10	20.04	3.91	250.1	29.77	18.00		213	720	70	7	117	42	70	17	310	57	1750	7	20	"
157	60.12	16.97	7.40	11.73	227.9	44.18	7.00		220	2120	95	2	110	3	60	10	350	111	1200	2	70	"
158	80.16	4.81	6.89	3.71	244.0	19.02	13.99		220	820	92	3	17	2	71	12	1,320	17	780	11	80	"
159	80.16	2.38	6.43	0.08	250.1	4.61	9.99		210	710	70	5	173	7	70	17	7,480	213	172	13	90	"
160	60.12	12.10	7.58	0.35	183.0	47.83	11.99		200	810	70	12	27	1	71	81	10,000	72	370	14	90	"
161	64.00	36.46	2.29	0.50	311.1	52.53	3.99		310	820	100	1	32	27	70	22	10	120	270	3	10	"
162	60.12	7.73	2.29	2.16	183.0	32.61	3.99	190	182	700	90	6	112	48	72	22	7,000	720	470	2	100	"
163	40.08	6.04	9.19	0.74	122.0	25.02	13.99	120	125	2200	80	1	28	22	69	42	3,000	17	440	10	10	"
165	40.08	18.92	16.09	0.66	183.0	34.10	20.00	70	177	1720	60	12	22	27	72	10	310	22	121	2	100	"
166	80.16	4.80	11.49	1.56	244.0	34.97	15.00		220	720	75	9	173	10	73	17	1,320	70	127	3	100	"

168	62.32	2.43	22.98	11.63	298.9	44.18	20.99	110	256	1000	20	11	43	10	44	212	7,500	12	310	10	100	Kandy
169	40.08	7.74	9.19	1.07	122.0	32.18	13.99	180	132	2700	42	7	141	7	45	111	8.000	70	331	1	100	"
170	60.12	12.10	22.98	1.79	183.0	46.58	38.00	–	200	770	70	7	142	3	40	71	2,000	27	127	7	150	"
171	40.08	5.32	6.89	1.34	122.0	23.53	9.99	200	122	7000	90	3	17	2	42	200	1,000	78	140	8	120	"
172	20.04	9.41	1.83	0.71	61.0	39.38	1.99	122	89	2100	210	12	3	4	37	317	2,000	70	60	14	20	Hanguranketa
173	40.08	5.29	0.45	2.00	107.5	44.18	1.99		122	1700	72	12	13	14	20	410	3,000	27	128	40	170	"
175	60.12	4.82	10.12	17.20	183.0	19.06	17.58		170	2120	172	17	3	117	12	317	200	70	420	112	320	"
176	100.00	12.08	45.97	7.23	304.0	96.06	41.98		300	700	43	14	2	312	12	218	1,200	72	440	11	100	"
177	40.08	2.40	22.98	15.01	128.1	34.58	17.00	121	110	110	72	15	4	412	13	320	7,100	74	312	111	990	"
178	60.12	4.82	22.98	3.20	183.0	34.58	27.00	117	170	1100	45	10	42	1	17	327	3,000	12	127	22	120	"
179	42.08	3.61	22.98	4.25	128.1	34.58	27.99	200	120	120	43	10	42	1	20	227	700	120	320	110	320	"
187	86.16	9.10	22.98	32.05	250.7	2.79	69.99	470	238	170	70	2	4	72	173	27	800	320	1000	12	1500	Tirrukovil
188	100.00	5.30	6.62	7.82	305.0	1.59	71.99	500	272	120	112	3	2	7	42	28	920	470	2110	13	1200	"
192	120.24	24.10	22.98	6.41	427.0	4.31	37.00	540	400	130	102	12	7	38	170	72	200	227	2700	17	2300	"
200	60.12	4.80	45.98	2.74	183.0	0.81	80.00	175	170	620	77	67	40	1	12	22	9.200	22	17	1	90	Dandagamuwa
201	60.12	5.50	16.18	3.91	147.6	3.88	59.99	170	172	120	81	4	42	1	13	21	6,000	17	43	2	10	"
202	60.12	5.30	22.99	38.33	183.0	2.79	60.00	200	173	170	82	17	27	3	11	17	6,400	77	41	11	620	"
203	60.12	1.16	22.99	7.43	183.0	2.79	19.99	200	155	110	85	3	31	2	19	22	1,000	27	24	3	730	"
206	40.08	7.22	22.99	9.38	142.1	1.34	50.00	200	120	430	62	2	17	1	22	30	7,000	7	71	3	120	"
207	40.08	6.51	22.99	5.08	122.0	2.09	40.00	250	127	200	75	7	22	1	29	22	8,500	7	13	4	190	"
208	40.08	8.92	10.11	15.64	123.0	2.86	30.00	158	137	560	60	3	17	1	27	31	10,000	3	27	2	300	"
211	40.08	4.81	23.91	0.78	122.0	1.24	39.99	170	120	880	67	12	1	17	20	27	11,00	417	17	3	100	Kurunegala
214	60.12	5.28	9.88	15.64	183.0	1.63	29.99		172	720	64	7	117	20	52	34	7,200	317	127	2	200	"
221	40.08	3.13	2.29	29.21	122.0	12.39	30.00		113	770	58	7	1	22	53	28	4,000	713	31	8	40	"
230	40.08	12.12	2.29	18.77	115.9	53.31	20.00	170	97	770	43	5	7	2	72	74	10,000	22	17	11	10	"
231	40.08	4.83	2.29	29.21	122.0	19.11	30.63	170	97	750	40	5	3	2	71	75	10,000	21	22	12	10	"
232	60.42	34.31	22.98	7.23	286.7	63.40	17.00	150	266	820	41	17	3	412	13	341	300	78	141	21	20	Rangala
233	74.45	12.15	2.29	19.12	244.0	34.10	20.99	120	236	910	42	7	17	312	17	313	270	17	114	2	130	"
234	20.04	1.20	2.29	6.41	61.0	4.32	9.00	170	55	880	70	14	1	217	37	337	10	29	52	3	290	"
236	100.02	2.61	2.29	18.92	263.5	48.03	17.00		261	720	90	3	3	412	21	412	880	28	145	7	90	"
237	140.28	9.87	2.29	6.25	415.4	44.18	11.99		291	720	74	2	1	313	10	320	1,000	74	54	4	170	"
238	68.82	24.31	2.29	39.10	300.1	48.03	17.00		272	710	92	1	1	117	20	317	1,000	120	42	32	270	"
239	100.20	4.55	2.29	26.07	305.0	18.01	27.00		269	620	92	3	1	312	10	217	920	70	43	3	90	"
240	80.86	12.15	22.98	0.04	298.0	35.06	21.99		252	110	90	2	3	412	17	218	620	170	47	31	190	"
244	68.01	36.46	0.22	0.39	311.7	44.18	11.99	1200	320	770	110	8	1	17	74	115	200	920	427	27	130	Maha Oya

																						Topographic Sheet
246	40.08	24.19	0.22		302.6	20.17	21.99	720	300	150	117	13	13	62	21	113	400	470	528	4	20	Maha Oya
248	120.24	4.78	2.29	24.32	329.0	101.34	41.99	730	320	700	120	17	1	27	88	317	100	737	422	3	320	"
250	70.03	243.31	2.29	0.25	272.0	61.43	10.00	700	290	620	120	10	3	17	61	172	9,200	477	412	17	370	"
251	220.20	12.15	45.97	9.19	616.8	84.58	120.00	420	600	440	120	4	11	42	61	72	5,000	112	270	2	620	Kalmunai
257	148.11	24.31	413.79	12.90	385.0	63.40	127.00	700	470	110	70	3	2	41	120	74	5,300	140	270	27	300	"
268	80.16	4.08	22.08	23.62	250.7	61.04	20.00	412	217	630	120	15	13	7	27	10	5,000	512	18	2	570	Wariyapola
270	40.08	4.09	22.98	9.38	122.6	39.63	30.00	317	117	400	122	7	11	1	41	19	1,000	522	12	8	500	"
276	96.05	24.31	2.29	29.17	206.2	85.49	30.00	520	340	130	74	20	42	1	39	17	6,000	21	312	30	130	Nalanda
280	128.11	12.15	2.98	33.63	285.0	113.94	20.00	370	370	810	80	20	7	1	42	72	4,600	26	515	2	170	"
282	40.08	12.13	2.29	3.91	128.7	34.61	12.99	350	150	20	120	22	17	17	32	17	9,200	22	312	17	20	"
284	80.16	2.38	2.29	34.61	194.9	63.46	23.99	370	210	70	120	21	12	2	38	121	9,400	21	532	23	30	"
285	80.16	4.80	2.29	34.10	224.0	44.27	16.00	350	220	80	140	22	27	7	42	18	4,600	22	737	21	70	"
290	100.20	12.00	0.22	0.39	199.1	105.18	20.00	390	300	210	20	10	77	1	92	517	11,700	130	452	3	120	Elahera
291	88.43	24.31	2.29	0.86	305.0	59.61	10.00	420	321	610	76	20	22	1	71	417	6,000	117	132	2	230	"
292	60.12	6.03	2.29	7.27	147.0	63.46	2.00	395	175	310	73	20	27	7	71	217	700	113	437	1	270	"
293	60.12	5.30	22.98	34.33	183.0	101.44	7.00	320	172	710	75	22	12	3	78	312	10,000	122	53	1	70	"
296	96.79	24.31	2.29	25.10	305.0	87.98	27.00	400	342	270	121	22	1	7	62	320	10,000	142	123	6	7000	"
297	84.02	24.31	2.29	24.24	377.8	63.46	13.99	390	360	110	122	14	7	1	82	412	3,100	47	417	7	2320	"
298	97.66	24.31	22.98	10.55	372.7	37.50	41.99	410	341	110	100	10	8	7	61	310	2,700	52	312	1	320	"
301	40.08	24.19	2.29	3.83	226.9	101.34	27.00	342	320	170	110	15	1	1	67	325	10	67	74	12	7000	"
303	116.00	12.15	2.29	30.66	305.0	101.44	20.00	500	340	210	100	2	17	227	92	320	10	9	49	27	270	Rukam
312	140.20	12.03	68.96	13.35	433.8	47.55	119.99		400	600	120	10	22	732	97	31	430	18	27	17	3100	"
325	120.24	2.35	91.95	15.72	372.1	53.31	119.99	427	310	210	120	8	12	22	100	412	210	11	72	10	7000	Polonnaruwa
330	80.16	2.43	68.96	7.39	244.0	9.36	130.00	700	210	70	70	12	32	32	122	418	110	42	18	8	7820	"
332	120.24	2.30	68.96	35.97	366.0	34.58	118.57	600	310	110	34	2	137	30	48	320	110	38	21	1	10000	"
333	120.24	10.81	91.95	31.28	366.0	212.89	169.97	600	345	110	38	18	17	17	71	410	110	40	32	12	9780	"
334	120.24	11.30	68.96	17.98	372.7	15.70	139.98	680	347	100	20	17	20	2	93	317	210	41	31	17	9780	"
337	80.16	7.78	252.87	23.46	189.7	48.03	429.98	293	283	140	240	10	112	411	163	210	10,700	31	127	28	3720	Vakaneri
355	80.16	7.29	2.29	28.94	244.0	44.66	18.00	386	230	1720	27	1	413	212	20	22	12,000	42	127	31	3400	Anuradhapura
356	140.28	0.40	2.29	16.81	427.0	5.28	15.98	653	352	3000	23	3	27	117	18	10	270	17	237	32	3800	"
357	120.34	1.38	68.96	16.42	372.7	34.58	60.54	689	306	120	30	2	117	12	22	10	12,100	51	133	38	3200	"
358	120.24	19.32	45.97	28.94	427.0	24.49	100.00	442	380	110	21	2	27	17	21	12	6,000	22	147	31	3000	"
359	100.20	4.25	91.95	5.47	311.7	15.36	143.99	460	268	610	22	3	28	22	23	120	12,000	27	132	37	2920	"
361	140.24	23.23	68.96	14.07	488.1	13.36	139.98	657	447	70	25	17	22	28	18	720	820	17	162	17	400	"
362	100.20	13.28	68.96	9.38	366.0	34.58	39.98	608	305	1000	21	11	27	13	21	340	720	92	337	11	600	"

																					Topographic Sheet
363	60.12	9.36	22.98	14.07	183.0	34.56	39.98	474	189	2000	22	10	22	12	29	170	4,000	95	920	30	700	Anuradhapura
364	84.06	12.18	22.98	19.53	311.7	15.36	39.98	373	260	370	27	2	27	17	27	122	9,200	93	172	31	720	"
366	80.16	6.68	45.97	9.77	244.0	26.41	80.00	354	228	270	24	7	111	27	17	180	110	37	415	21	410	"
368	160.32	1.36	68.96	28.94	494.8	15.36	124.99	659	406	110	320	20	117	14	42	170	400	43	413	17	5000	"
369	160.32	2.33	45.97		494.8	15.36	66.11	753	410	420	72	21	27	17	31	720	720	47	213	21	4070	"

Chemical Results of the Sampled Well Water Ca – NDA Subgroup

Location No.	Ca	Mg	Na	K	HCO_3	SO_4	Cl	TDS	Total Hardness	Total Fe	Mn	Total Cr	Co	Total V	Cu	Zn	NO_3	NO_2	NH_4	SiO_2	F	
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm in $CaCO_3$	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	Toppgraphic Sheet
7	80.16	7.23	25.50	4.34	122.0	136.50	70.00	384	280	2730	12	21	17	7	11	18	7,000	18	81	47	40	Ambalangoda
8	63.64	12.16	21.20	4.34	122.0	29.60	22.10	298	209	3700	120	20	22	13	12	22	4,000	12	80	32	60	"
9	100.20	9.17	22.90	0.43	116.0	99.20	70.00	302	288	3000	110	23	21	2	17	23	7,000	22	78	11	80	"
10	108.07	24.31	22.90	3.56	183.0	196.10	50.00	340	370	2710	60	20	12	50	61	7	7,100	12	82	28	100	Morawaka
11	100.20	3.07	21.20	4.30	189.8	108.21	70.00	327	313	3000	63	22	12	40	36	3	7,000	21	87	27	60	"
15	88.02	36.47	22.90	0.39	128.8	187.30	90.00	410	370	7260	73	12	22	40	2	27	11,000	51	37	62	70	Matara
16	100.23	38.79	22.90	0.39	193.9	196.90	70.00	411	410	6000	70	27	17	28	17	13	70	72	17	67	20	"
37	40.08	4.76	2.30	31.36	91.5	27.41	38.00	170	112	2700	122	12	1	18	11	14	11,200	71	17	21	90	Alutgama
38	62.12	7.95	22.90	4.82	140.3	53.31	43.00	278	175	2190	160	17	1	100	11	11	11,000	27	101	77	20	"
39	62.12	8.75	2.30	3.29	104.9	34.61	44.12	180	172	3000	27	22	1	1	10	10	10,000	22	200	31	120	"
48	60.12	3.94	45.90	20.41	132.4	63.40	79.01	172	160	110	112	9	4	127	10	72	110	120	12	44	670	Kataragama
58	80.16	6.00	22.90	24.63	183.03	82.61	50.01	440	225	400	122	7	7	320	70	45	1,000	170	3	32	520	Yala
79	5.60	1.21	2.80	1.48	12.8	5.31	7.01	28	29	110	27	12	22	1	10	217	3,000	71	17	7	210	Haputale
82	8.80	1.21	5.70	1.56	12.8	10.11	13.11	40	27	110	41	2	2	17	10	218	900	21	11	1	400	"
89	8.80	0.12	1.60	0.39	12.8	0.52	11.12	47	27	80	43	20	17	21	9	417	1,000	110	10	13	560	"
108	40.08	0.65	9.10	3.91	61.0	6.11	27.02	152	127	3000	78	19	2	127	17	420	1,110	28	12	2	380	Awissawella
113	11.60	0.48	1.80	0.78	31.7	2.42	2.01	98	49	720	32	8	2	1	82	71	3,200	270	10	3	170	Hatton
128	40.08	5.31	13.70	0.42	61.0	4.43	40.01	172	122	720	72	10	42	1	27	22	820	12	11	27	220	Passara
129	40.08	3.13	22.90	0.36	104.9	4.74	27.02	153	113	110	70	20	4	1	21	13	110	70	2	37	10000	"
140	60.12	2.39	22.90	34.19	129.3	4.47	72.11	122	100	5000	42	13	3	117	10	92	10,000	122	9	2	270	Gampaha
142	40.08	4.83	2.30	1.56	61.1	4.43	22.01	117	120	1220	18	10	3	110	7	94	7,000	320	11	3	490	"
144	60.12	12.10	9.90	3.91	117.1	6.82	41.02	211	200	3110	13	12	1	17	3	95	3,200	110	78	3	210	"
146	42.28	3.48	11.71	3.91	61.0	5.81	28.11	204	120	1700	21	14	7	1	8	71	11,000	320	12	7	390	"
147	40.08	2.64	19.61	3.91	61.0	5.82	32.01	179	111	4000	71	13	8	1	10	70	17,000	73	10	1	420	"
184	60.12	11.90	22.91	5.87	122.0	4.31	72.00	170	200	70	70	3	7	2	73	77	1,000	17	922	98	1700	Nilgala
243	140.28	12.05	68.90	16.81	263.6	192.10	100.00	470	400	620	112	10	2	122	69	142	600	337	327	2	30	Maha Oya
275	100.00	36.46	0.21	0.39	196.5	101.30	100.00	500	400	410	76	18	37	2	43	120	2,600	22	718	12	230	Nalanda
288	100.00	36.46	22.91	12.90	254.4	150.11	72.00	540	400	110	111	13	22	27	87	317	4,600	117	137	14	40	Elahera
473	66.73	36.47	2.29	nd	190.3	115.75	31.97	422	317	610	142	10	118	1	19	27	3,100	7	62	11	1100	Kala Oya
477	79.36	12.16	183.90	8.21	208.6	63.40	300.00	400	248	170	72	01	13	11	31	18	3,200	11	33	31	400	"
478	91.26	12.16	45.97	27.38	253.2	34.58	119.99	353	278	270	71	12	2	17	30	27	2,100	12	37	38	100	"

Chemical Results of the Sampled Well Water Mg – SO_4 Subgroup

Location No.	Ca ppm	Mg ppm	Na ppm	K ppm	HCO_3 ppm	SO_4 ppm	Cl ppm	TDS ppm	Total Hardness ppm in $CaCO_3$	Total Fe ppb	Mn ppb	Total Cr ppb	Co ppb	Total V ppb	Cu ppb	Zn ppb	NO_3 ppb	NO_2 ppb	NH_4 ppb	SiO_2 ppm	F ppb	Topographic Sheet
12	60.12	45.63	2.52	0.39	61.0	187.50	70.00	370	320	2210	58	18	22	38	41	2	820	27	48	11	420	Morawaka
459	200.40	308.77	91.95	41.06	915.0	1200.00	1.98		1770	2000	72	12	1	30	25	50	2000	60	14	3	430	Tibulketiya
460	601.20	611.71	206.89	233.08	1220.2	3746.39	10.00		4170	1600	77	14	3	35	24	75	3000	48	92	8	460	"
462	26.37	36.46	22.98	17.43	122.0	144.09	27.00	490	216	1450	83	12	4	48	22	88	110	45	11	13	490	"
463	39.87	72.93	22.98	12.63	183.0	192.12	81.99	450	400	1250	77	12	17	75	23	80	820	45	12	2	490	"
465	36.07	253.58	22.98	13.19	732.1	480.30	7.00	1005	1044	1450	79	19	2	75	23	77	1700	60	22	3	530	"
466	85.37	243.13	22.98	14.86	274.5	960.61	10.00	1695	1214	1600	72	17	1	80	24	60	700	65	2	1	505	"
467	75.15	121.56	45.97	69.61	305.0	516.33	10.06	1712	688	2050	105	8	3	48	20	48	600	65	16	10	510	"
468	89.37	243.13	22.98	29.78	305.0	982.70	27.00	1462	1224	2000	90	7	2	30	20	30	600	65	1	14	800	"

Chemical Results of the Sampled Well Water Mg – Cl Subgroup

148	6.75	24.31	22.98	2.02	121.4	4.41	17.00	200	117	2320	17	14	3	3	12	77	7000	70	12	7	420	Gampaha
180	7.95	24.31	16.17	7.82	128.1	19.11	32.00	110	120	720	44	16	3	1	12	410	2100	127	221	30	130	Hanguranketa
186	19.92	60.50	9.19	12.51	305.0	3.57	28.00	152	300	170	42	7	3	7	70	27	270	47	792	7	3780	Nilgala
411	100.20	8.74	0.22	39.10	434.4	3.45	170.00	1510	610	120	28	7	47	27	270	70	1270	82	17	17	1000	Horowpatana

Chemical Results of the Sampled Well Water Na + K/Cl Subgroup

Location No.	Ca	Mg	Na	K	HCO_3	SO_4	Cl	TDS	Total Hardness	Total Fe	Mn	Total Cr	Co	Total V	Cu	Zn	NO_3	NO_2	NH_4	SiO_2	F	Topographic Sheet
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm in $CaCO_3$	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	
3	64.02	21.32	160.90	4.34	153.8	20.20	320.00	372	250	3710	78	17	27	17	11	21	720	72	12	32	80	Ambalangoda
4	88.07	12.16	163.50	4.97	122.0	63.40	330.00	340	270	2800	93	10	10	12	12	12	2700	18	92	37	90	"
5	69.22	24.31	296.80	39.10	61.0	381.80	370.00	371	273	2100	122	20	11	27	13	17	1820	70	17	30	70	"
23	66.03	27.90	273.60	16.03	61.0	188.00	450.00	317	365	1710	140	3	1	10	2	18	310	110	20	40	1720	Ambalantota
28	216.00	60.12	919.00	15.64	555.8	53.31	1560.00		692	110	100	1	17	2	10	50	720	70	27	14	1700	Hambantota
29	126.00	120.00	1333.00	35.19	616.8	101.34	2150.00		617	210	112	7	12	2	11	72	710	72	21	31	1800	"
31	8.39	10.4	68.96	4.47	67.7	5.28	100.00	82	46	3100	72	7	7	11	32	7	40,000	9	100	17	20	Alutgama
32	20.04	8.79	22.93	29.72	44.5	19.69	73.00	89	72	3200	63	10	3	7	12	2	41,000	17	111	22	130	"
47	60.12	10.34	114.00	23.69	61.0	96.06	217.00	137	176	200	111	8	2	17	10	71	210	72	41	27	730	Rakvana
50	60.12	5.55	712.00	18.38	128.7	5.28	1153.00	170	164	400	52	17	3	145	21	173	320	92	11	43	600	"
51	60.12	11.94	2252.00	38.32	183.0	27.37	2514.00	192	180	1200	58	1	2	142	20	232	6,000	17	7	41	610	"
52	87.99	100.00	1241.00	32.45	250.7	101.34	2091.00	478	470	300	74	3	1	140	9	60	10	111	2	31	700	"
55	83.96	60.12	183.00	17.09	311.7	101.34	298.00	375	360	170	67	1	17	127	32	71	110	20	11	42	600	"
56	20.04	40.04	114.00	5.47	61.0	53.31	178.00	501	100	700	120	2	1	200	70	25	920	100	7	71	720	Yala
59	9.88	4.86	45.98	19.98	25.6	5.30	100.00	248	42	3200	78	21	1	11	10	70	12,000	170	12	13	120	Panadura
60	40.08	4.82	68.97	15.25	85.4	48.00	120.00	399	92	3210	120	30	3	2	11	70	13,000	780	13	13	100	"
61	8.00	3.65	68.97	28.94	37.8	34.50	110.00	242	35	4000	122	35	8	7	22	20	12,000	520	7	12	10	"
62	20.04	1.93	68.97	37.04	61.0	34.50	120.00	370	58	2700	123	27	2	7	9	32	10,000	419	7	24	90	"
63	11.20	4.86	22.99	38.33	51.8	5.30	70.00	252	48	3200	123	28	12	8	7	31	12,000	229	2	1	70	"
64	10.80	1.21	56.51	4.69	1.2	4.80	97.00	257	47	2700	128	21	12	8	2	32	12,000	140	2	2	170	"
65	4.78	2.43	56.51	16.87	1.8	9.60	100.00	292	32	3700	125	21	17	7	2	17	12,000	232	7	14	200	"
66	8.39	4.86	56.51	26.63	6.1	9.60	120.00	382	22	2700	124	22	3	7	3	94	12,110	370	11	3	110	"
67	19.83	2.06	2.82	2.34	54.9	1.92	10.00	471	41	7000	77	19	2	10	22	92	21,000	170	17	42	130	"
69	10.40	3.64	28.25	9.60	1.2	3.36	70.00	274	52	3780	91	20	7	11	13	93	10,000	920	12	13	70	"
70	10.62	4.37	28.25	22.05	4.2	0.96	82.00		41	3780	92	20	8	10	14	91	20,000	720	21	31	170	"
80	2.00	1.19	5.65	1.90	26.1	0.48	12.00		19	720	22	13	1	1	10	410	110	71	10	13	700	Haputale
90	20.04	0.60	91.95	4.94	43.9	0.52	170.00		75	80	70	1	2	17	17	418	2,000	1000	2	31	270	Buttala
91	12.00	0.48	92.71	39.10	22.5	0.09	200.00		50	120	71	7	3	7	12	315	780	720	7	3	1000	"
98	2.79	0.36	68.96	25.53	61.0	2.92	88.00		22	120	100	32	21	721	7	122	20,000	40	72	2	100	Colombo
101	20.04	1.66	45.97	3.16	56.7	4.80	71.00	190	94	3200	72	36	3	17	7	140	2,000	172	17	15	520	Avissawella
106	12.00	0.24	22.98	6.22	43.3	0.52	40.00	142	35	2370	77	27	8	7	15	210	1,000	43	11	7	410	"

																						Topographic Sheet
130	20.04	1.44	68.96	38.57	61.0	3.45	120.00	143	56	330	70	13	47	2	22	27	720	131	11	48	2780	Passara
132	51.22	12.15	137.00	4.70	155.5	4.41	200.00	240	178	130	70	8	13	22	100	13	110	120	42	12	200	Puttuvil
136	27.98	12.15	91.95	36.68	83.6	5.85	170.00	270	120	440	72	10	112	18	21	42	170	71	80	42	210	"
150	40.08	4.10	5.97	20.02	18.9	9.60	90.00	290	112	2120	27	20	1	8	7	13	3,100	41	11	2	270	Gampaha
152	64.44	12.15	91.95	25.27	183.0	5.81	165.00	170	211	1800	95	10	22	12	60	42	350	530	120	3	100	Kandy
174	40.08	2.89	68.96	2.85	73.8	47.05	110.00	122	89	2100	210	12	3	4	37	317	2,000	70	60	14	20	Hanguranketa
194	60.12	12.00	250.00	387.56	176.9	3.88	720.00		200	1120	112	7	47	7	11	22	3,100	21	920	3	20	Chilaw
195	40.08	4.80	183.00	23.46	77.4	2.79	320.00		120	2000	110	2	37	21	17	27	3,000	17	1010	12	110	"
196	60.12	4.80	91.00	32.06	183.0	1.63	170.00		170	3210	112	7	37	31	22	17	3,000	12	1277	7	100	"
199	40.08	12.10	91.00	37.86	115.9	3.57	180.00		150	6820	78	7	32	2	11	10	5,000	70	22	12	170	Dandagamuwa
210	20.04	9.65	114.00	3.13	61.0	3.09	180.00		90	870	62	7	3	12	27	87	4,600	322	12	17	20	Kurunegala
213	40.08	2.88	116.00	19.95	122.0	0.78	200.00		112	120	66	17	1	22	73	37	3,200	127	118	4	170	"
216	60.12	12.82	91.00	28.70	183.0	34.58	180.00		108	190	70	8	2	27	82		4,400	422	32	11	100	"
223	40.08	4.83	160.00	2.34	122.0	19.11	250.00		120	710	70	3	17	32	51	27	14,200	320	21	12	110	"
224	20.04	6.54	45.00	10.55	61.0	25.88	80.00	127	77	120	50	16	21	37	52	26	5,800	218	27	21	200	"
225	20.04	6.54	114.00	17.98	67.7	25.93	190.00	nd	77	120	41	8	22	41	60	73	6,600	17	17	52	110	"
252	156.00	36.54	643.00	14.07	1043.9	34.58	719.00	nd	540	440	100	10	02	31	143	22	10,100	217	720	27	720	Kalmunai
256	12.81	12.15	137.00	72.39	268.0	5.30	310.00	700	370	210	80	2	3	48	170	73	10,100	157	270	22	230	"
258	40.08	5.81	137.00	32.65	26.3	101.34	240.00	640	124	720	112	18	21	7	62	10	6,000	17	420	110	500	Attulu Oya
259	40.08	6.54	137.00	19.08	122.0	25.81	230.00	700	127	610	120	5	21	2	61	20	2,700	9	572	127	700	"
260	40.08	12.12	91.00	31.20	122.0	47.64	170.00	470	150	110	111	3	21	2	73	17	3,100	7	720	21	1000	"
261	60.12	0.93	206.00	19.47	189.7	34.58	310.00	571	154	20	112	10	17	2	47	12	4,200	47	12	110	320	Wariyapola
262	20.04	2.17	252.00	11.37	67.7	44.18	370.00	1082	59	40	120	13	32	3	79	13	6,400	122	17	2	410	"
264	86.45	24.31	275.00	38.32	195.8	67.72	520.00	540	316	710	140	12	3	2	42	17	800	270	17	12	430	"
307	88.00	48.62	321.00	18.77	427.0	58.17	414.00	300	420	560	110	2	11	22	121	141	20,000	3	90	27	3200	Rukam
308	100.00	34.46	229.00	6.67	304.4	63.46	420.00	420	400	110	117	2	13	227	172	141	110	72	12	17	3100	"
309	176.00	12.15	252.00	31.67	536.3	58.17	410.00	400	490	720	122	7	17	113	170	132	10,700	20	18	21	3120	"
310	156.00	12.15	229.00	19.16	427.0	34.58	410.00	440	440	470	20	1	22	117	170	131	21,000	17	27	22	980	"
313	120.00	4.78	758.00	0.78	311.7	48.99	120.00	470	320	110	120	3	27	117	180	32	22,000	120	1142	47	670	Batticaloa
314	100.00	12.15	482.00	13.68	300.1	101.34	720.00	500	300	120	200	2	117	217	146	142	21,000	77	1224	22	700	"
316	287.00	48.62	919.00	20.72	630.8	106.14	1642.00	3137	918	360	160	10	2	3	47	71	2,000	90	1400	14	450	Puttalam
317	410.00	91.05	1149.00	18.38	1226.9	63.40	2004.00	3812	1376	320	240	11	3	2	43	82	2,000	20	1700	13	700	"
322	80.00	6.56	183.00	11.34	244.0	44.66	280.00	708	227	360	220	17	1	3	27	17	4,800	97	32	8	300	Dambulla
323	80.00	5.10	298.00	5.47	250.7	44.18	444.00	720	221	1100	170	2	7	2	24	73	7,800	92	14	2	130	"
324	100.00	5.95	252.00	37.57	305.0	15.36	430.00	700	975	760	74	3	3	27	27	72	11,000	27	17	3	400	"
326	100.00	4.74	137.00	15.55	196.4	44.18	310.00	300	320	720	20	22	117	28	72	310	110	27	22	7	8210	Polonnaruwa

																						Topographic Sheet
327	120.00	10.08	206.00	22.68	257.4	24.97	410.00	340	342	30	72	17	17	39	132	422	210	17	28	2	5020	Polonnaruwa
335	80.16	7.78	252.00	23.46	189.7	48.03	430.00		232	340	120	7	13	312	142	172	210	71	332	12	10000	Vakaneri
338	208.00	48.62	367.00	25.81	629.6	20.17	720.00	1500	720	170	71	9	7	1	19	27	1,000	27	470	27	100	Kalpitiya
339	220.00	36.46	758.00	26.59	666.2	44.18	1270.00	1400	100	370	70	12	3	1	18	32	2,100	17	137	21	500	"
354	80.00	7.78	137.00	19.16	250.7	44.66	216.00	653	332	110	18	2	42	417	19	10	22,000	32	47	13	760	Anuradhapura
365	120.00	5.03	275.00		866.0	5.28	436.00	1052	321	3110	22	5	127	22	22	170	7,000	54	317	34	400	"
370	82.00	48.62	206.00	29.87	427.0	34.58	360.00	542	406	170	77	18	22	22	32	42	610	37	415	27	5070	"
371	67.00	36.46	252.00	1.95	311.7	34.58	410.00		318	70	10	7	18	13	69	127	1,000	17	277	21	1500	Kaudulla
376	120.00	5.27	206.00	32.45	311.7	34.58	369.90		322	110	22	15	17	1	78	317	190	52	112	21	3000	"
377	80.00	24.31	183.90	10.95	304.6	39.38	300.00	348	370	110	100	16	18	1		218	2,000	54	22		1300	"
378	68.00	36.46	183.90	21.95	268.0	5.28	369.90	392	320	140	22	18	1	2	111	340	210	50	47	22	3000	"
381	83.00	14.04	459.00	11.73	263.5	39.38	719.60	400	258	2700	440	3	2	3	120		1,100	17	92	27	7000	Kathiraveli
383	96.00	48.62	206.00	39.03	372.7	39.38	419.90	987	440	1700	720	3	13	17	170	172	2,700	37	74		3270	"
385	100.00	12.15	735.00	35.19	226.9	63.40	1201.10	712	300	1700	720	1	41	1	200	440	11,200	12	60	21	3200	"
386	80.00	5.30	666.00	3.51	244.0	63.40	1000.00	700	222	2300	320	2	10	1	170	210	10,200	7	60	27	4000	"
387	88.00	24.31	597.00	23.85	250.7	34.58	1000.00	600	322	3720	320	7	20	2	320	210	700	10	70	27	4120	"
388	80.00	51.44	758.00	21.50	433.8	39.38	1201.20	622	412	1320	370	3	10	10	420	440	7,000	20	60	22	4000	"
389	66.00	36.46	712.00	28.94	250.7	5.28	1200.00	700	317	920	420	7	20	10	400	320	200	30	70	27	3200	"
390	62.00	36.46	827.00	30.50	244.6	10.08	1370.00		305	1700	20	1	3	21	22	140	170	22	1937	19	400	Marichchukkaddi
391	40.00	3.62	459.00	1.56	56.1	53.31	719.90		115	710	21	2	13	7	21	20	270	23	1127	48	500	"
392	90.00	36.42	1103.00	17.20	263.5	149.37	1720.00		376	640	40	2	22	17	31	10	110	21	1320	3	350	"
393	60.00	9.43	1195.00	30.50	108.3	34.58	1919.90		189	710	70	2	21	17	44	14	210	17	1311	7	400	"
394	84.00	12.15	1172.00	7.82	250.7	34.58			260	170	42	3	17	11	43	12		12	1402	70	700	"
395	82.00	27.96	1264.00	28.54	330.0	15.36	2000.00		321	720	17	2	22	2	18	70	10	17	1321	42	780	"
396	80.00	2.38	91.00	30.34	195.8	5.82	200.00		210	810	22	3	28	7	32	22	810	22	377	30	80	"
400	200.00	53.36	1011.00	32.06	677.8	34.58	1700.00	820	720	300	7	5	18	13	27	7	700	27	112	21	300	Madawachchiya
401	140.00	6.06	666.00	10.55	305.0	7.80	1270.00	717	600	120	2	2	117	17	22	2	2,100	32	227	31	570	"
402	100.00	7.02	1000.00	39.10	262.9	14.40	1700.00	617	540	1000	7	2	32	27	24	7	2,100	13	73	41	600	"
405	200.00	3.63	482.00	106.37	427.0	5.33	1000.00	717	620	710	8	2		27	22	120	1,700	32	100	37	600	"
408	110.00	6.07	337.00	38.71	348.9	2.01	720.00	700	540	170	20	2	273	37	72	41	110	37	17	21	800	Horowpotana
412	16.00	1.21	741.00	28.15	353.2	0.52	1200.00	7000	340	230	22	11	27	22	220	77	2,000	82	113	13	1500	"
416	168.00	2.43	321.00	35.97	305.0	4.37	720.00	620	520	3700	320	13	173	712	122	120	11,000	60	92	27	2000	Trincomalee
417	148.00	6.07	643.00	39.10	427.0	4.80	1200.00	618	820	3700	420	12	117	112	100	700	9,200	92	148	13	3750	"
418	116.00	3.64	1360.00	43.80	353.8	5.81	2200.00	512	440	3700	320	11	217	117	100	420	7,200	97	90	17	3270	"
419	102.00	4.48	1333.00	43.41	311.7	4.41	2200.00	517	440	10000	420	14	217	117	200	600	1,700	97	90	1	3700	"

																						Topographic Sheet
420	140.00	1.21	1195.00	49.92	305.0	3.45	2000.00	617	400	820	340	12	200	100	200	520	9,200	90	90	12	3100	Trincomalee
425	220	8.50	580.00	145.48	616.8	14.40	1200.00	2100	900	480	31	2	1	1	22	70	720	17	427	47	1000	Vavuniya
426	226.00	3.71	955.00	35.97	483.2	4.80	1700.00	2100	720	400	48	7	78	11	17	43	1,300	11	322	37	750	"
427	222.00	6.07	82.00	39.10	471.6	4.80	420.00	1210	800	400	27	3	2	1	27	22	610	30		181	200	Mantai
429	208.00	8.50	966.00	82.51	610.1	14.45	1720.00	1700	870	320	22	2	7	2	17	24	220	22		27	1000	"
430	148.00	8.50	992.00	43.41	556.4	4.89	1720.00	1700	720	460	22	13	42	1	110	300	12,000	28	278	92	1800	Nilaveli
431	200.00	97.01	511.00	67.26	427.6	53.31	1200.00	1300	900	640	21	14	17	3	110	1700	11,000	27	231	90	1000	"
432	300.00	60.53	1678.00	23.85	1043.9	14.88	2700.00	1250	1000	820	20	17	22	2	220	420	9,000	11	431	11	800	"
436	216.03	97.25	1057.00	34.41	1037.2	34.58	1700.00	1500	940	3800	24	12	27	12	220	21	3,200	12	122	71	1500	Padawiya
437	204.00	109.00	678.16	19.55	738.0	35.00	1270.00	1700	960	3800	72	2	1	1	17	20	100	17	327	43	1400	"
438	220.00	85.00	781.60	1.95	921.0	44.00	1270.00	2000	900	400	23	3	11	1	270	27	2,100	22	131	27	2000	"
443	160.00	3.79	643.67	8.21	488.0	15.00	1000.00	953	416		220	20	10	12	nd	24	19,000	37	17	21	100	Galgamuwa
445	87.00	24.31	206.89	10.16	372.0	20.00	320.00	1300	320	400	190	14	12	11	60	21	5,600	47	23	22	1000	"
446	94.42	36.46	114.94	28.15	439.0	24.00	203.00	1919	386			19	2	2	61	22	9,200	87	41	2	500	"
448	40.08	11.67	160.91	23.85	128.0	15.36	290.00	1480	398	720	270	21	8	17	63	71	7,200	92	117	3	1000	"
449	40.08	3.89	206.89	35.19	183.0	44.18	294.90	452	202	560		17	11			17	9,000	42	118	27	700	"
450	12.82	36.46	183.90	28.00	243.0	5.28		1012	423	2000	430	20	2	1		13	7,000	97	122	21	600	"
469	67.94	36.47	321.83	150.00	427.0	15.36	620.00	420	320	420	120	7	2	27	17	17	1,700	8	82	27	1500	Kala Oya
470	110.00	12.16	321.83	179.00	122.0	206.00	700.00	444	327	320	170	3	1	211	21	22	2,700	11	32	31	1200	"
471	88.00	12.16	344.82	195.00	427.0	48.00	622.00	443	372	110	120	2	3	2	20	18	3,000	17	37	30	1100	"
472	51.30	12.16	206.89	191.00	61.0	154.00	470.00	342	178	610	142	9	18	273	18	70	2,100	2	87	40	1000	"
475	72.00	19.94	275.86	82.00	220.0	63.00	490.00	453	332	810	75	7	27	24	32	10	1,900	9	43	21	1100	"
479	92.06	12.16	505.74	243.00	274.0	53.00	1000.00		280	110	72	2	7	12	42	22	2,100	17	32	32	400	"
481	75.23	24.31	344.82	150.00	195.0	53.00	20.00		288	1000	78	12	11	2	36	72	3,100	10	14	14	330	"
482	96.87	12.16	160.92	117.00	258.0	34.00	410.00		292	1410	75	14	2	1	41	17	2,700	12	111	18	310	"

Chemical Results of the Sampled Well Water Na + K/SO_4 Subgroup

Location No.	Ca ppm	Mg ppm	Na ppm	K ppm	HCO_3 ppm	SO_4 ppm	Cl ppm	TDS ppm	Total Hardness ppm in $CaCO_3$	Total Fe ppb	Mn ppb	Total Cr ppb	Co ppb	Total V ppb	Cu ppb	Zn ppb	NO_3 ppb	NO_2 ppb	NH_4 ppb	SiO_2 ppm	F ppb	Topographic Sheet
25	0.21	0.01	25.5	0.04	6.7	35.1	10	432	401	2000	77	7	4	12	3	21	810	71	47	28	500	Ambalantota

Chemical Results of the Samples Well Water Na + K/HCO_3 Subgroup

40	6.80	4.00	2.29	18.48	43.9	5.28	10	42	27	720	43	20	27	7	30	7	1,300	80	12	3	100	Rakwana
68	20.4	0.22	68.96	17.83	60.4	4.80	120	384	53	250	82	21	1	10	12	34	9.700	182	10	11	170	Panadura

Chemical Results of the Sampled Well Water Na + K/NDA Subgroup

44	80.00	11.02	91.95	38.32	183.0	96.06	161.00	340	328	1100	57	2	12	72	24	143	7,100	17	40	27	720	Katharagama
49	40.00	11.16	68.96	20.98	80.5	82.61	108.00	132	128	110	78	10	1	142	132	27	2,000	90	10	25	610	"
99	7.20	0.24	13.44	7.82	40.8	0.52	20.00	72	280	6220	112	30	17	222	2	712	11,000	45	70	1	500	Colombo
105	8.80	0.48	45.97	1.51	56.1	0.52	42.00	112	61	4490	70	22	7	2	12	270	1,000	17	12	10	330	Avissawella
115	20.04	0.22	22.98	4.81	57.3	4.41	10.00	112	51	910	30	2	1	1	80	80	10,000	137	11	7	30	Hatton
156	0.20	0.48	4.36	0.18	6.1	3.36	3.00	200	210	3100	90	7	111	17	67	18	3,520	210	1000	12	100	Kandy
253	156.00	12.15	206.89	29.33	475.2	82.61	320.00	420	440	440	100	7	1	30	141	21	10,300	317	770	122	400	Kalmune
281	100.00	2.36	114.94	24.24	305.0	63.46	158.00	340	360	110	82	21	7	1	47	210	6,000	17	617	27	70	Nalanda
304	87.00	48.62	183.90	17.20	433.8	101.44	270.00	420	420	210	120	3	22	17	111	42	100	17	87	2	1370	Rukam

Chemical Results of the Sampled Well Water NDC – Cl Subgroup

Location No.	Ca	Mg	Na	K	HCO_3	SO_4	Cl	TDS	Total Hardness	Total Fe	Mn	Total Cr	Co	Total V	Cu	Zn	NO_3	NO_2	NH_4	SiO_2	F	Topographic Sheet
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm in $CaCO_3$	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	
2	42.00	10.97	39.60	39.90	61.9	1.30	170.00	320	4200	2790	100	22	22	72	11	13	9,200	18	90	37	100	Ambalangoda
19	60.10	6.52	48.50	42.60	128.8	54.30	130.00	1000	1770	73	73	12	2	20	2	22	110	62	89	3	780	Ambalantota
21	80.00	36.40	48.50	0.39	61.7	37.50	280.00	470	300	2700	140	2	17	40	7	27	20	69	75	17	2000	"
22	46.40	36.47	71.50	47.32	105.0	62.70	256.00	320	216	1180	122	4	22	11	7	12	10	120	27	43	1230	"
54	60.60	60.12	91.90	30.05	199.0	3.40	266.00	320	304	210	75	7	1	157	20	73	100	11	11	32	600	Kataragama
57	60.10	12.03	68.90	20.10	122.0	5.76	190.00	502	75	500	124	3	12	217	72	35	1,000	120	7	27	520	Yala
77	2.60	1.33	2.82	2.73	0.6	0.96	10.00	43	12	920	92	10	1	2	17	217	2,000	27	20	3	200	Haputale
87	4.30	2.43	7.58	0.18	7.0	3.36	20.00	92	20	700	48	17	1	17	6	372	120	111	11	15	700	"
93	28.00	1.21	7.38	3.91	10.3	0.52	90.00	340	120	700	60	12	11	7	10	412	6,000	400	10	17	2370	Buttala
97	40.00	0.24	45.97	1.85	59.7	3.45	92.00	1200	110	120	72	12	3	7	21	318	6,000	127	7	12	980	"
103	8.80	0.48	7.22	11.73	43.3	0.04	26.00	114	42	2210	70	30	2	17	1	230	4,000	12	82	2	230	Avissawella
135	10.00	36.46	121.00	39.10	348.9	4.41	270.00	1900	400	310	85	12	110	21	117	13	100	120	74	41	230	Potuvil
139	60.10	4.83	45.00	85.32	122.0	4.80	117.00	200	170	6220	100	11	17	2	9	17	10,000	27	11	12	110	Negombo
149	40.00	4.83	45.00	0.18	56.1	6.34	92.00	211	120	3000	12	24	2	2	7	27	2,000	72	13	3	500	Gampaha
219	20.00	10.64	2.29	19.59	60.4	3.39	50.00		94	720	72	10	3	11	52	27	4,000	127	33	11	200	Kurunegala
227	20.00	5.57	2.29	18.38	7.3	5.76	40.00	170	73	710	43	7	1	31	60	73	10,000	22	14	2	110	"
255	147.00	36.46	229.00	26.20	450.2	101.34	410.00	420	520	110	120	7	8	31	120	17	10,000	132	300	17	310	Kalmune
278	80.00	16.95	68.00	36.60	195.8	63.40	170.00	270	270	110	75	12	7	8	40	170	6,000	24	612	17	170	Nalanda
305	95.00	12.15	114.00	2.73	263.5	53.36	200.00	440	300	170	112	7	17	111	122	121	820	2	27	13	2000	Rukam
318	98.30	12.15	114.00	18.38	263.5	53.31	211.00	294	296	560	220	12	1	17	31	24	1,700	21	327	2	400	Puttalam
319	100.00	4.80	91.00	38.71	196.4	19.21	340.00	616	270	480	430	7	17	2	23	10	7,200	70	47	11	720	Dambulla
321	87.00	24.31	137.00	22.68	250.7	44.18	280.00	800	318	320	270	8	27	17	37	27	6,200	62	37	4	320	"
328	120.00	10.61	137.00	33.63	366.0	5.28	270.00	700	344	110	38	12	30	42	72	500	100	42	12	7	13 130	Polonnaruwa
379	80.00	55.31	206.00	19.94	313.1	10.08	270.00	388	428	210	20	12	3	3	64	415	110	27	92	10	3000	Kaudulla
380	84.00	53.00	137.00	0.89	330.0	34.58	300.00	470	429	110	21	10	2	7	120	317	110	12	98	11	3200	"
409	107.60	6.10	165.00	27.76	355.0	5.81	400.00	1700	520	270	22	2	113	13	75	40	420	97	27	31	1000	Horowpatana
410	120.00	8.74	0.22	39.10	434.4	3.45	170.00	1500	600	170	2	3	42	71	120	22	600	92	32	37	970	"
413	204.00	2.43	183.00	67.26	433.8	5.31	500.00	2150	610	410	22	22	32	37	198	22	2,700	86	113	17	1000	"
414	220.00	12.15	114.00	105.00	682.7	5.81	500.00	2100	1200	230	24	17	42	37	240	27	7,000	82	17	32	1200	"
415	188.00	6.07	91.00	28.15	470.4	3.45	400.00	2150	720	130	27	10	32	43	220	13	9,000	82	32	37	1000	"
422	260.00	8.50	224.00	38.71	610.1	4.75	700.00	2010	1000	400	22	1	8	3	17	27	2,000	17	322	47	800	Vavuniya
433	312.00	48.62	275.00	14.47	629.6	63.40	720.00	2000	980	800	45	1	7	17	15	41	800	17	170	47	500	Puliyankulam
484	71.00	24.31	68.00	27.76	189.7	67.72	179.00		295	1120	75	7	1	1	27	27	2,000	17	117	27	310 1	Kala Oya

Chemical Results of the Sampled Well Water NDC – SO_4 Subgroup

Location No.	Ca ppm	Mg ppm	Na ppm	K ppm	HCO_3 ppm	SO_4 ppm	Cl ppm	TDS ppm	Total Hardness ppm in $CaCO_3$	Total Fe ppb	Mn ppb	Total Cr ppb	Co ppb	Total V ppb	Cu ppb	Zn ppb	NO_3 ppb	NO_2 ppb	NH_4 ppb	SiO_2 ppm	F ppb	Other Remarks
6	80.16	18.00	68.90	39.10	105.0	289.40	120.00	372	278	3100	110	22	12	23	11	21	100	120	81	17	100	Ambalangoda
17	80.16	53.87	48.50	4.30	128.8	297.40	97.00	453	422	2700	68	10	3	36	13	23	5000	10	82	68	210	Morawaka
18	86.81	48.63	30.40	8.21	128.8	339.00	25.00	437	417	3700	41	24	2	10	11	24	5210	21	80	63	10	Morawaka
24	84.81	48.63	25.50	0.39	122.0	272.20	60.00	428	412	2000	72	10	3	10	7	27	210	70	17	2	1920	Ambalantota
42	6.01	1.98	2.29	5.02	6.7	15.36	7.00	43	20	1960	42	19	11	7	10	2	2300	120	1	2	400	Rakwana
118	20.04	6.44	17.93	3.91	26.2	92.69		114	77	1010	30	3	22	1	59	80	1700	420	21	12	70	Hatton
464	55.91	97.25	26.66	156.43	305.0	470.22	40.76	200	540			12	3				900		17	1	nd	Timbolketiya
474	86.57	24.31	91.95	36.74	245.2	293.51	37.00	448	312	720	122	17	22	22	21	17	2700	3	67	24	1100	Kala Oya

Chemical Results of the Sampled Well Water NDC – HCO_3 Subgroup

Location No.	Ca ppm	Mg ppm	Na ppm	K ppm	HCO_3 ppm	SO_4 ppm	Cl ppm	TDS ppm	Total Hardness ppm in $CaCO_3$	Total Fe ppb	Mn ppb	Total Cr ppb	Co ppb	Total V ppb	Cu ppb	Zn ppb	NO_3 ppb	NO_2 ppb	NH_4 ppb	SiO_2 ppm	F ppb	Topographic Sheet
72	20.04	14.95	11.58	3.91	104.3	34.58	17.00	200	112	2920	120	2	2	7	49	22	2,100	62	20	3	380	Ratnapura
73	32.00	12.52	28.25	0.86	117.1	68.20	12.00	260	132	1980	143	3	7	1	49	17	110	51	7	2	320	"
74	26.00	12.52	22.10	3.91	122.0	34.50	18.00	270	117	2000	92	7	3	1	47	70	8,000	53	7	7	410	"
75	30.00	12.15	23.92	3.91	117.1	48.00	20.00	220	127	720	93	11	2	3	52	72	7,920	17	7	1	390	"
83	6.79	3.64	1.97	0.68	22.5	14.40	2.00	42	27	270	42	12	4	3	10	412	1,700	21	7	3	520	Haputale
107	8.00	0.36	9.45	3.91	44.5	0.81	10.99	79	35	6860	72	24	3	27	11	121	11,000	27	17	3	420	Avissawella
127	9.19	6.07	1.37	4.28	43.3	0.38	11.99	120	48	720	22	17	22	7	21	213	10,000	217	2	11	100	Nuwara Eliya
133	68.00	36.00	68.90	3.48	305.0	5.81	116.01	1750	320	110	82	7		17	12	14	210	143	50	71	270	Potuvil
164	60.00	6.76	19.99	0.39	176.9	48.00	19.00	170	178	2310	82	2	17	21	43	17	8,310	28	327	12	150	Kandy
167	60.00	5.30	13.79	3.01	190.0	20.60	20.00	120	172	1220	22	13	41	11	41	21	7,000	77	312	7	10	"
181	68.00	36.00	45.90	9.64	324.5	63.40	69.99	210	320	120	41	10	13	13	13	27	2,100	140	773	2	20	Nilgala
185	67.90	36.30	22.90	4.93	312.3	7.45	2.79	145	320	110	41	3	1	1	73	72	110	28	773	17	2900	"
190	76.00	36.30	22.90	14.08	366.0	3.18	47.00	527	340	430	114	7	2	1	150	53	1,000	412	1400	27	2300	Tirrukkovil
191	96.40	48.40	11.40	19.55	483.2	3.84	31.99	500	441	520	117	13	3	32	160	77	10	317	1700	22	2100	"
193	88.00	48.40	45.90	13.69	450.8	7.76	48.00	470	420	110	100	11	8	39	140	12	100	317	4000	18	2300	"
217	20.00	11.40	0.22	1.01	61.0	5.76	30.00	213	97	900	72	12	1	32	73	172	21,400	311	37	11	320	Kurunegala
241	120.00	72.00	91.90	4.10	609.5	130.60	120.00	500	600	780	100	10	14	120	70	110	880	227	722	21	20	Maha Oya
245	88.00	48.00	22.90	26.20	233.8	44.10	71.99	170	420	120	110	7	1	42	73	211	280	622	622	1	70	"
263	67.10	48.00	45.90	2.73	427.0	10.00	80.00	777	368	730	122	18	11	13	31	12	12,800	278	22	27	410	Wariyapola
265	61.60	36.00	22.90	9.15	309.3	53.30	40.00	400	304	720	100	18	2	7	28	22	7,200	420	18	42	410	"
267	44.80	24.00	2.29	7.12	244.0	11.30	10.00	417	212	110	110	15	21	2	31	10	3,000	417	18	1	400	"
277	68.00	36.00	2.29	17.75	366.0	18.70	20.00	400	320	120	73	18	10	7	33	210	3,200	22	718	22	170	Nalanda
279	72.00	24.00	22.90	24.63	244.0	101.40	40.00	300	280	310	77	13	2	1	41	170	6,000	25	514	3	270	"
286	43.60	12.15	22.00	5.47	193.4	34.60	16.00	540	159	810	100	18	22	12	42	170	4,600	100	332	1	270	Elahera
294	48.00	12.51	22.00	23.86	189.7	68.20	17.00	370	170	610	77	18	17	2	65	317	10,000	114	471	5	230	"
299	60.10	46.30	22.00	18.65	354.6	101.40	12.98	341	341	110	140	12	3	8	61	320	4,300	50	112	2	100	"
300	63.70	36.40	2.29	5.86	330.6	63.40	10.99	342	342	430	122	12	2	1	80	420	5,000	62	73	18	7000	"
302	97.60	48.60	2.29	30.93	477.1	63.40	21.99	4444	444	120	75	17	1	1	69	321	6,000	17	172	11	320	"
435	300.00	60.00	1678.00	23.85	1043.9	14.80	2700.00	2100	970	320	40	4	2	2	20	31	720	28	100	31	1000	Puliyankulam

																					Topographic Sheet
439	220.00	109.00	91.00	25.42	982.9	44.10	270	4000	1000	380	22	12	17	2	117	31	1,000	12	327	28	2400	Padaviya
440	208.00	97.00	160.00	22.29	1060.4	5.20	300	3000	920	700	21	12	2	7	117	32	1,100	62	427	27	3000	"
441	204.00	109.00	229.00	35.19	1036.7	44.10	420	3200	960	700	22	11	7	1	117	70	1,210	17	426	37	2600	"
447	140.00	11.54	206.00	30.50	122.0	33.00	530	630	386	360	275	21	7	7	61	25	7,500	27	42	3	1200	Galgamuwa
306	68.00	24.31	68.00	0.39	206.8	48.07	141	270	270	270	110	3	22	13	112	72	110	1	92	61	3270	Rukam
360	100.00	7.90	91.00	19.55	311.0	20.17	163	592	283	1000	17	7	117	27	17	10	720	38	751	24	780	Horowupatana
367	100.00	6.24	114.00	5.86	305.0	34.58	176	516	276	110	340	2	113	13	18	120	120	32	313	22	270	Anuradhapura
372	91.00	12.15	91.00	15.01	263.5	39.38	170	322	278	270	21	3	42	2	70	227	220	7	277	27	1200	Kaudulla
373	76.00	24.31	45.00	12.94	244.0	37.46	119	319	292	110	27	2	117	1	72	222	110	12	327	17	3000	"
374	70.00	36.46	45.00	33.47	287.9	34.58	139	342	327	430	21	13	32	2	2	413	210	17	217	14	2700	"
375	124.00	24.31	183.00	21.54	433.8	58.11	300	429	412	130	22	13	117	1	63	317	410	27	312	17	3200	"
403	140.00	8.97	27.00	28.15	427.0	8.26		890	720	2000	17	2	17	22	27	2	1000	14	17	42	1000	Medawachchiya
423	208.00	133.00	44.00	77.00	776.0	34.00		2000	1070	700	28	1	22	1	27	27	1000	20	113	41	900	Vavuniya
424	202.00	156.00	22.98	106.00	410.0	596.00		2100	1150	780	31	1	27	1	22	73	2,700	24	431	27	950	"

Chemical Results of the Sampled Well Water NDC – NDA Subgroup

Location No.	Ca	Mg	Na	K	HCO_3	SO_4	Cl	TDS	Total Hardness	Total Fe	Mn	Total Cr	Co	Total V	Cu	Zn	NO_3	NO_2	NH_4	SiO_2	F	
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm in $CaCO_3$	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	Topographic Sheet
27	84.00	80.16	2.29	27.45	319.2	101.00	60.00	442	412	1700	143	2	7	9	7	22	410	37	38	38	300	Ambalantota
30	216.00	120.24	1333.33	35.19	616.8	101.00	2150.00	712	617	210	112	7	12	2	11	72	710	72	21	21	1800	Hambantota
84	2.00	2.90	2.82	3.36	12.2	4.80	8.00	43	32	20	43	7	8	2	17	317	700	27	2	1	810	Haputale
85	6.79	2.43	2.90	2.73	19.5	5.28	10.00	47	17	120	42	8	3	4		318	6,000	100	7	10	270	"
94	28.00	1.21	9.13	3.91	43.3	4.80	41.00	500	120	110	61		3	3	7	315	110	120	1	27	3200	Buttala
95	68.00	2.43	22.94	31.51	183.0	9.60	78.00	470	270	120	70	13	2	1	9	611	210	131	2	2	1390	"
109	20.00	8.38	13.10	7.82	56.7	44.00	21.00	142	85	2700	40	1	1	82	41	112	2,000	82	21	7	270	Avissawella
110	8.01	0.38	3.91	3.91	25.0	0.48	17.00	99	36	6000	42	9	1	87	40	117	1,000	87	17	2	170	"
111	20.00	0.07	22.98	2.29	61.0	4.41	7.00	78	53	4200	42	2	3	2	71	70	1,700	120	11	13	70	Hatton
116	20.00	4.35	8.96	11.73	57.4	16.01	11.99	112	68	820	22	3	3	7	62	172	2,700	170	11	2	10	"
119	20.00	6.29	22.98	13.31	61.0	3.50	40.00	103	76	2100	27	2	1	1	60	22	7,000	890	12	11	170	"
123	8.79	4.86	18.39	3.85	37.8	2.92	18.00	114	42	10	12	12	17	1	10	320	2,100	327	4	12	10	Nuwara Eliya
125	20.00	2.65	16.09	3.51	50.0	3.41	17.00	119	61	10	20	2	2	3	13	337	10,000	118	1	27	70	"
131	100.00	16.94	68.96	29.01	305.0	1.63	170.00	2000	320	120	74	9	142	12	17	21	100	17	75	70	20	Pottuvil
138	40.00	4.83	22.98	32.98	61.0	5.81	71.00	175	120	6120	112	10	22	3	10	22	7,000	70	12	11	20	Negombo
141	60.00	6.27	68.96	5.31	183.0	8.26	71.00	275	170	3300	20	12	170	3	9	90	12,000	110	9	7	170	Gampaha
182	60.00	12.10	45.97	144	183.0	47.83	71.00	211	200	130	100	7	12	2	128	37	1,100	17	774	30	980	Nilgala
183	60.00	6.53	45.97	10.16	128.1	25.79	79.00	210	127	120	78	8	2	13	27	27	1,200	52	427	32	1320	"
198	40.00	24.20	68.97	39.09	189.7	8.57	140.00	170	200	70	70	2	117	7	14	17	7,000	112	19	1	230	Dandagamuwa
204	40.00	10.85	45.98	21.12	122.0	3.88	90.00	210	145	720	63	11	2	1	43	46	9,400	16	27	8	920	"
205	20.00	12.07	12.55	11.73	61.0	3.87	30.00	210	100	320	64	12	13	1	41	22	2,400	6	22	7	990	"
209	20.00	8.92	10.11	15.64	122.0	2.86	30.00	200	100	720	52	11	4	17	49	71	5,400	777	17	2	90	Kurunegala
212	40.00	2.63	30.57	1.96	128.1	0.46	80.00	178	111	880	64	7	2	27	49	38	6,200	312	28	8	120	"
218	20.00	10.18	2.29	5.70	56.1	15.36	30.00	112	92	1720	71	10	17	17	80	11	3,600	210	42	12	110	"
220	20.04	9.70	2.29	29.17	61.0	38.00	30.00	170		720	67	11	2	18	52	27	3,600	342	34	7	270	"
222	20.04	10.67	2.29	15.07	61.0	39.00	20.00	143	94	110	40	7		21	74	32	4,800	217	27	2	320	"
226	20.04	4.84	2.29	18.38	7.3	5.76	40.00	122	70	110	42	7	11	40	59	31	10,000	13	42	11	130	"

																						Topographic Sheet
229	40.08	4.83	22.98	30.97	122.0	22.00	61.00			170	42	7	2	7	77		9,000	27	22	17	200	Kurunegala
242	148.00	36.46	91.95	10.55	446.6	248.00	77.00	1200	520		120	12	3	77	72	14	300	1230	940	3	120	Rangala
266	44.02	24.31	45.97	6.84	194.6	58.00	70.00	427	210		124		18	1	32	21	2,600	22		31	390	Wariyapola
269	40.00	6.52	22.98	27.61	122.0	13.00	70.00	300	127	430	120		22	1	43	18	8,400	511		2	560	"
271	40.00	5.32	45.97		123.2	63.00	39.00	312	122		140		11	1	47	22	2,000	227		1	520	"
272	62.00	6.15	45.97	22.68	151.9	63.00	70.00	1317	131		122		27	3	77	21	3,000	317		1		"
283	20.00	12.13	2.29	7.89	43.3	48.00	20.00	400	100	10	170	12	22	17	37	17	6,000	27	772	3	10	Nalanda
287	96.00	24.31	68.96	24.24	311.7	154.00	72.00	500	340	170		12	77	24	84	413		120	432	12	320	Elahera
289	87.97	24.31	45.97	26.20	217.8	101.00	119.00	400	320	310	120	17	11	7	84	217		122	337	18	20	"
295	40.00	9.69	22.98	21.96	122.0	86.00	27.00	470	140	730	78	19	2	3	64	310		130	712	3	100	"

Chemical Results of the Samped Well Water (Un Classified data)

Location Number	TDS ppm	Total Hardness ppm in $CaCO_3$	Total Cr ppb	Cl ppm	Fe ppb	Mn ppb	Zn ppb	Co ppb	NO_3 ppb	NO_2 ppb	NH_4 ppb	SiO_2 ppm	Cu ppb	Total V ppb	F ppb	Topographic Sheet
13	330	317	21	135	2320	42	17	27	7,100	62	27	17	42	28	60	Morawaka
14	320	312	17	350	3000	72	18	2	10,000	28	30	62	12	20	100	"
20	1100	4170	3	465	1780	71	27	7	110	57	92	27	5	30	1000	Ambalantota
71		113	1	10	2000	98	18	11	8,000	27	62	9	43	2	170	Ratnapura
81	30	10	3	14	10	45	312	3	820	22	11	2	10	3	820	Haputale
96	1200	270	14	89	720	62	217	1	820		11	12	17	8	2070	Buttala
112	82	40	10	3	1110	40	77	7	3,700	127	62	17	51	3		Hatton
189	540	370	7	37	730	122	71	11	710	317	1270	47	160	72	2700	Tirrukkovil
215	117	211	6	80	1720	66	120	3	5,400	411	27	1	53	21	130	Kurunegala
228	173	97	2	20	110	34	120	1	8,000	17	27	8		3	100	"
235	200	44	17	10	720	42	318	2	4,000	27	522	12	14	117	130	Rangala
247	272	440	10	17	170	122	112	12	10	627	627	7	87	67	110	Maha Oya
249	270	240	17	17	600	120	170	2	11,700	322	322	5	67	320	920	"
254	700	540	1	327	620	80	132	7	10,200	127	270	2	140	32	410	Kalmunai
274	720	340	21	190	110	72	12	117	5,600	17	712	11	34	27	140	Nalanda
311	420	422	2		500	120	313	11	32		22	3	91	338	3200	Rukam
315	1512	712		188	400	160	17	1	1,100	12	4200		41	7	400	Puttalam
320	700	217	7	680	640	300	77	22	2,400	75	28	3	21	7	130	Dambulla
329	720	356	20	320	10	38	34	11		31	17	3	72	17	720	Polonnaruwa
331	670	342	12	117	120	82	522	13	610	37	27	7	70	47	10020	Polonnaruwa
336	811	268	8	1400	3400	270	210	127	200	32	114	112	162	113	2000	Vakaneri
384		361	8	100	4300	440	422	21	nd	17	73	21	198	2	3300	Kathiraweli
397															4000	Anuradhapura
398															3100	Kala Oya
399															4500	"
406	1000	620	2	72	20	nd	12	21	2,110	91	27	27	27	43	500	Horowpatana
434	2130	700	3	1720	560	40	42	1	820	22	100	27	10	3	750	Puliyankulam