

# **Short Term Measures to control Chronic Kidney Disease of Uncertain Aetiology (CKDu)**

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## **1. What is CKDu?**

Over the last two decades or so a new form of kidney disease of unknown etiology has been reported in the dry zone of Sri Lanka. The disease is mainly prevalent in North Central Province, parts of North Western, Uva, Central, Eastern and Northern provinces. In certain areas 5% to 10% of the population is affected and the disease is on increase. According to the WHO the prevalence is 12% to 15%. In Anuradhapura District alone 18,000 cases of CKDu are reported with over 200 deaths recorded annually.

The occurrence of the disease is mainly amongst males of age group of 30 – 60 years, engaged in agriculture. It is reported that 80% of these patients eventually die from kidney failure within first two years. Chronic Kidney Disease (unknown etiology) occurs without pre-existing conditions such as hypertension and diabetes. Thus, it has to be attributed to external environmental factors. The high content of fluoride in ground water, contamination of the water supply with artificial fertilizers used for paddy cultivation, use of aluminum utensils instead of clay pots for cooking and toxin released from blue green algae are some of the suspect reasons for this crises. Since most of affected population from the farming communities, they have little means to expend on medications mainly because of very low income. Hence they mainly depend on state run hospitals for their medical treatment. The cost of dialysis of CKD patients has become a severe burden on the government health authorities. CKD has become a serious issue to the affected communities and often the bread winner becomes a patient and family members affecting their livelihoods. Therefore CKDu had become an environmental, social and health issue of national concern in Sri Lanka.

## **2. Status of CKDu**

It is reported that CKDu occurs without preexisting conditions such as hypertension and diabetes. Thus it is believed that it has to be attributed to external environmental factors.

Several agencies and individuals have carried out research on CKDu and have come up with varied presumptions. It is believed that the disease has been attributed to the heavy metal cadmium, pesticides, chemical fertilizer etc. connected with agriculture. Some believe that this can be attributed to fluoride / fluoride in combination with

aluminum, mainly from cooking utensils. Since of late, arsenic, algal toxins have also been cited as possible reasons for CKDu.

An extensive study was carried out by the WHO / Ministry of Health to determine the causes of CKDu. Their latest report attributes the disease to substances such as cadmium which could be present in chemical fertilizers, weedicides and pesticides. In addition it has implicated high hardness in the drinking water.

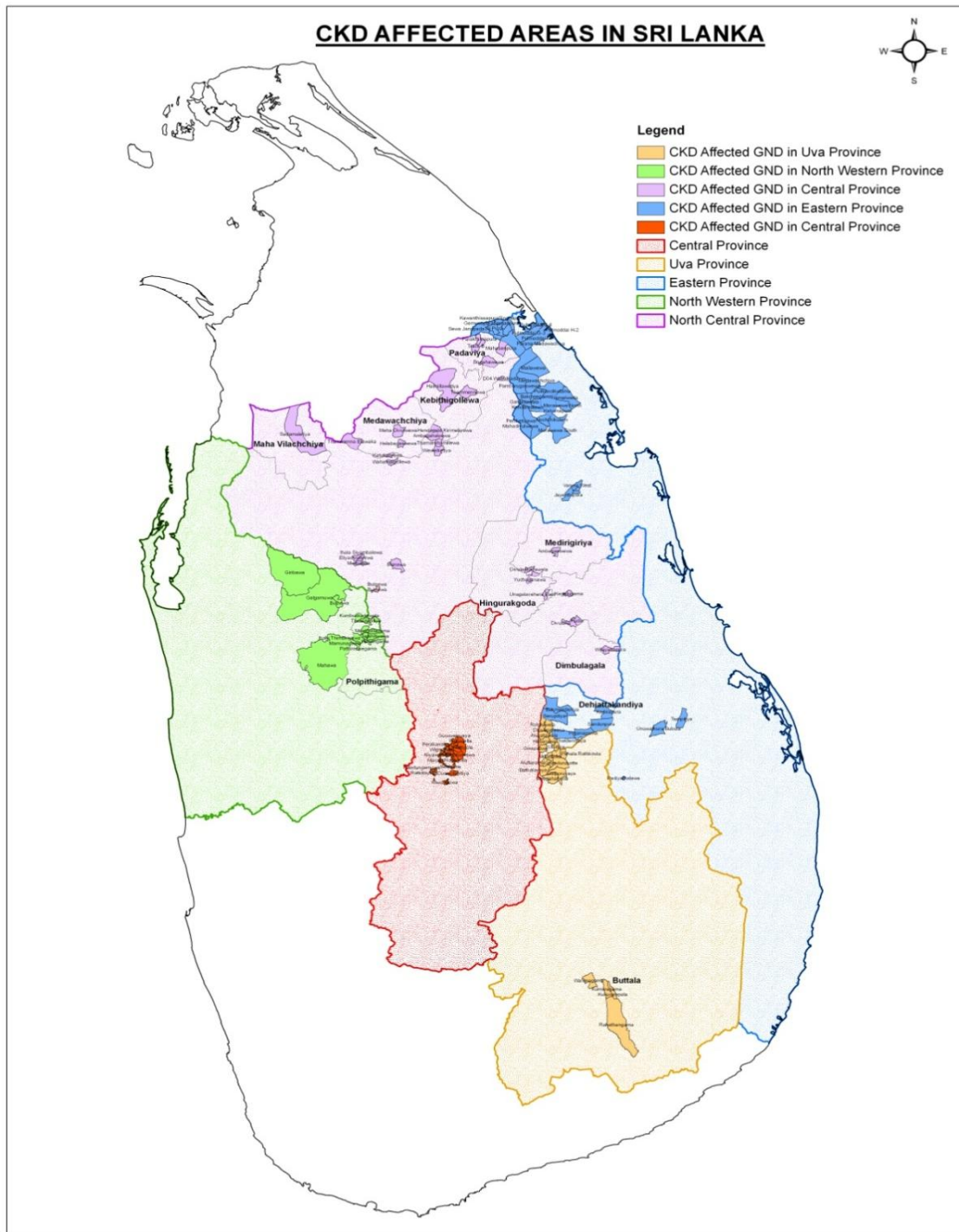


Figure 1- CKDu affected areas in Sri Lanka



Figure 2- CKDu affected patients

### 3. Interventions by Ministry of Water Supply and Drainage

Subsequent to the several studies and research carried out on Chronic Kidney Disease of unknown etiology, it has been widely accepted that supply of good quality drinking water is one of the most important interventions for controlling the disease. Accordingly, Ministry of Water Supply and Drainage together with National Water Supply and Drainage Board and National Community Water Trust developed a strategy and work plans which include short term, medium term and long term plans to provide safe drinking water to CKDu affected areas. This work plans have been endorsed by the parliamentary subcommittee for CKDu, chaired by Hon. Vidura Wickramanayaka member of parliament, of Kalutara district.

In these CKDu affected areas, majority use groundwater obtained from (delete-including) tube wells, hand pumps and dug wells which are satisfactory for general purposes such as bathing, toilet flushing, washing of cloths and utensils etc. however it may not be suitable for drinking and cooking purposes. Only few areas have surface water based piped water supply. Thus it has been decided to provide the CKDu affected areas with good quality water for their drinking and cooking purposes in which a per capita supply of 5 liters per day is considered as adequate.

## **4. Short Term Measures**

The short term programme covers the CKDu affected areas in the districts of Anuradhapura, Polonnaruwa, Badulla, Mannar, Ampara, Trincomale, Kurunegala and Mathale. Under the short term measures following strategies are adapted to control this disease.

1. Establish small treatment Reverse Osmosis (RO) plants to purify groundwater from wells or boreholes and supply the water to communities using water bowsers. These small treatment units are operated by the respective communities through Community Based Organizations (CBOs). Continuous technical support of National Water Supply and Drainage Board (NWSDB) is provided for operational and maintenance purposes.
2. Bowser supply to affected areas which are in close proximity for bowser supply from existing water supply schemes.
3. Service extensions are provided from existing piped water supply schemes to certain areas.
4. Rain water harvesting is also promoted in areas where bowser supply is uneconomical.

In providing good quality water only for cooking and drinking purposes available GND wise patient data is used in which priority is given to GNDs having higher prevalence rates.

## **5. Implementation of short term measures in Districts**

Implementation is being carried out with 2013 capital funds of Ministry of Water Supply & Drainage.

### **5.1 Anuradhapura District**

The worst affected areas in the Anuradhapura District are Padaviya, Madawachchiya, Kebetigollewa, Rambewa and Mahawillachchiya. For these affected areas, Grama Niladari Divisions wise patients data obtained from the regional health authorities is available and comprehensive implementation plans have been prepared for these areas to provide good quality water for cooking and drinking purposes.

In Padaviya DS division, one RO plant has been installed to cover Parakramapura and Track B. The RO plant for Bogahawewa and Ruwanapura is being installed. Preliminary work on water supplies to the areas Sudharshanagama, Mahasenpura, Balayawewa, Maithreepura, Abhayapura, Buddangala, Bisokotuwa and Padaviya 18<sup>th</sup> Post are underway.

In Medawachchiya DS division, three RO plants have been installed in Mahadivulwewa, Periyakulama and Karmbankulama. Rainwater harvesting is being also carried out in Thammanna Elawaka.

In Kebitigollawa DS division, rainwater harvesting is being carried out in Thammeannawa, D4 Wahalkada, Thiththagonewa, Handagala, Kirimatiyawa and Halmillawetiya. Bowser supply is operated in Eethalwiddawewa, Thimbiriwewa, Samadhigala, Ihalausgollewa, Aiyanthigewewa and Kahatagollewa. RO plants are to be installed under the proposed ADB project to cover the areas of Halmillewa, Thiriyaya and Thimbiriwewa.

In Rambewa DS division, a RO plant has been commissioned in Thambalagollewa-Wewalketiya. Preliminary work on water supplies to the areas Wahamalgollewa, Sangilikanadarawa are underway. Rainwater harvesting is being provided to Ambagahawewa, Thalghahawewa, Kandewa, Ikirigollewa, Diviyaudabandawewa. Bowser supply is operated in Kalanchiya and Nabadagaswewa.



Figure 3 - RO plant

## 5.2 Polonnaruwa District

Complete patient data is not available for Polonnaruwa District. As per the available data, the worst affected areas are Medirigiriya and Dimbulagala.

In Medirigiriya DS division, a RO plant has been commissioned in Diulankadawala. Preliminary work on water supply to Ambagaswewa is underway. Bowser supply is being operated in many other areas. Once more complete patient data is available, the appropriate plans will be prepared and implemented using 2014 funds. In addition to these, depending on the availability of funds, the works on Medirigiriya water supply scheme will be completed and water would be supplied to as many affected areas as possible.

In Dimbulagala DS division, preliminary work on water supply to the areas Vijayabapura, Jayapura, Ellewewa, Katukele are underway. Once more complete patient

data is available, the appropriate plans will be prepared and implemented using 2014 funds.

### **5.3 Badulla District**

In Mahiyanganaya DS division, bowser supply is being operated in Theldeniya, Hobariyawa, Millaththawa and Girandurukotte. The bowser supply will be expanded to several other GNDs in Mahiyanganaya DS division.

### **5.4 Moneragala District**

Patient data in Moneragala district is incomplete.

In Buttala and Wellawaya DS divisions, bowser supply is being operated in Kukurampola, Rahathangama, Kumaragama and Warunagama. In general, 1000 litres capacity tanks are placed for every three families. Bowser supply has to be expanded to cover more affected areas in these two DS divisions.



**Figure 4 - Bowsers distributed to CKDu prone areas**

### **5.5 Matale District**

A dug well screening program is being carried out in Wilgamuwa DS division. Water quality is analysed and wells that are more suitable for drinking purposes are identified. Bowser supply is also in operation in some areas and these would be extended with the procurement of additional water bowsers. A RO plant will be provided for Hettipola hospital.

### **5.6 Kurunegala District**

Rain water harvesting is being carried out in several areas in Polpithigama and Maho DS divisions. In Giribawa, two RO plants have been provided for the Solepura and Parakumpura Grama Niladari Divisions.



**Figure 5 - Rain Water Harvesting Tank**

### **5.7 Ampara District**

In Dehiattakandiya DS division, bowser supply is being operated in several areas using existing RWS schemes as the water source. In areas such as Paranagama and Serupitiya new water supplies are to be implemented. A few RO plants will also be installed once the needs are identified.

In Mahaoya DS division water supplies will be extended to areas such as Unuwathurabubula.

In Padiyatalawa DS division two RO plants will be installed in Serankada and Wahawa.

### **5.8 Trincomalee District**

In Gomarankadawala DS division, a water supply system is under construction and scheduled completion being May 2014. Bowser supply is being operated in other 08 Grama Niladari Divisions

In PadaviSripura DS division 10 Grama Niladari Divisions are covered by rural water supply schemes. In some of these areas, complaints regarding water quality have been received. These are being investigated and provision made to provide two RO plants.

**Table 2. RO Plants Installation by National Community Water Trust (NCWT) 2013**

District	DS division	GNDs with RO plants	Progress
Anuradhapura	Medawachchiya	Mahadivulwewa, Kidawarankulama Mahakubukgollawa Periyakulama	Commissioned Commissioned Commissioned Commissioned
	Rambewa	Wahamalgollewa	To be commissioned
Polonnaruwa	Medirigiriya	Diulankadawala	Commissioned
Kurunegala	Giribawa	Solepura Parakumpura	Commissioned To be commissioned

**Table 3. RO Plants Installation by National Water Supply & Drainage Board (NWS&DB)**

District	DS division	GNDs with RO plants	Progress
Anuradhapura	Padaviya	Parakramapura Tract B Bogahawewa Sudarshanagama	Commissioned To be commissioned To be commissioned
	Rambewa	Thabalagollawa Wahamalgollewe	Commissioned To be commissioned
	Kebitigollawa	Padaviya 18 <sup>th</sup> Post	To be commissioned
Polonnaruwa	Dimbulagala	Vijayabapura	To be commissioned
	Medirigiriya	Ambagaswewa	To be commissioned



**Table 4. Bowser Supply by National Water Supply & Drainage Board**

<b>District</b>	<b>DS division</b>	<b>GNDs with Bowser Supply</b>	<b>Progress</b>
Anuradhapura	Kebitigollawa	Eethalawiddawewa, Thibiriwewa	70 Community tanks placed. 90% completed
	Medawachchiya	Puhudiula, Unagaswewa	Ongoing
	Rambewa	Kalanchiya, Nabadagaswewa	70 Community tanks placed.80% completed
	Mahawilachchiya	Bilaewa, Sandamaleliya	In Operation
Polonnaruwa	Medirigiriya	Kauduluwewa, Kahambiliyawa	Procurement of PE Tanks under way
Badulla	Mahiyanganaya	Theldeniya	17 Community tanks placed.
		Hoberiyawa	On Going
Monaragala	Buttala	Kukurampola, Rahathangama, Kumaragama	21 Community tanks placed.
	Wellawaya	Warunagama	Tanks being procured
Trincomalee	Gomarankadawala	Kalyanapura, Bakmeegama	On Going
	Kanthale	Jayanthipura	On Going
	Padavisripura	Sinhapura	On Going

**Table 5. RWHS by National Water Supply & Drainage Board**

District	DS division	GNDs with RWHS	Number of households	Progress
Anuradhapura	Kebithigollawa	Thammannawa, D4 Wahalkada, Hallmillawatiya	163 30	Complete 50%
	Madawachchya	Thammannaelaweka	95	Complete60%
	Rambewa	Abagahawewa, Thalgahawewa, Kedewa	50	Procurement Underway
Kurunegala	Polpithigama	Polpithigama	153	Completed
	Maho	Maho	100	In progress

## 6. Funding

The short term program is implemented using the capital funds of Ministry of Water Supply and Drainage. The Ministry obtained Rs. 100 Mn in 2013 and that amount has been fully utilized. An additional Rs. 20 Mn has been transferred from savings of National Water Supply and Drainage Board. Private sector, NGOs have also contributed approx. Rs. 7 Mn. for the programme of safe quality drinking water for CKDu affected areas.

The work program for 2014 has been developed based on the availability of Rs.1100 Mn. In support of this strategy, His Excellency the President in his budget speech proposed to allocate Rs. 900 Mn for the year 2014 to install RO plants in the North Central province. This program will include 126 RO systems, several rainwater harvesting systems, additional bowser supplies and several service extensions. With the enhanced allocations, it will be possible to implement several small scale water supplies in the districts of Anuradhapura, Polonnaruwa, Trincomalee, Ampara, Matale etc.