



**-Thirst below sea level-**Sawyer Bucket Water Filtration System

**Rotary District 3211**

**Kerala India**

**Thirst below sea level: Drinking water crisis in Kuttanad, Kerala,India**

Location: Kuttandu is in the state of Kerala, The southern most state of India

## LOCATION OF KUTTANAD IN KERALA



**Kuttanadu** is a region covering the Alappuzha and Kottayam Districts, in the state of [Kerala](#), India, well known for its vast paddy fields and geographical peculiarities. The region has the lowest altitude in India, and is one of the few places in the world where farming is carried around 1.2 to 3.0 metres (4 to 10 ft) below sea level



IT'S God's Own Land, the Immodest Green of Arundhati Roy. The palm-fringed emerald islets are surrounded by vast expanses of water. The picture-perfect beauty makes Kuttanad the very essence of Kerala's backwater experience. It is a waterlogged stretch of about 1,10,000 hectares; and 50,000 ha of the region are even 60 centimetres to 220 centimetres below sea level. For the better part of the year, most of the land is submerged. It has the distinction of being one of the few areas in the world where farming is carried out below sea level. Four major rivers in the State — the Pampa, the Meenachil, the Achankovil and the Manimala — flow into the region. For about 1.8 million people of Kuttanad, it is water, water everywhere.

And yet, when it comes to drinking water, they need to wait for the call that heralds water supply twice a week, often at night. The water call sometimes comes over the telephone, too! The officials at Kuttanad Water Supply Scheme (KWSS) located 40 kilometres away in Thiruvalla will telephone the panchayat president when water comes in the pipe. He will then pass on the message to the houses

where telephones are available. Men, women and children jump into their changaadams (tiny rowboats). Across the canal, they rush to the public water tap. When the tap runs dry, they pick up their pots, sometimes half full, and return home to resume their interrupted slumber. "We get piped water only twice a week, that too for an hour often at night," says Omana, one of the inhabitants. "Though surrounded by water, we live like sparrow-hawks; always looking out for drinking water."

A boat ride will take you around the vast and beautiful stretches of backwaters. You will see women washing clothes, cleaning vessels, and collecting water for cooking and drinking — all from the same canal along which your boat speeds by. At places, toilet waste is let out into the same canal. Many households have toilets built with direct outlets into the canals and streams of the backwater system. You will also be aghast to see villagers using the dark oily water polluted by pesticides from the rice fields. Solid waste from the medical colleges at Alappuzha and Kottayam, sewage from the municipalities of Kottayam, Thiruvalla, Changanassery and Alappuzha, the oil and faecal waste from about 300 house boats which ply between Alappuzha and Kumarakom — all find an outlet in the Vembanad lake.

"We have developed immunity to all poisons," Kuttappayi, an inhabitant of the Kainakari village islet says cynically. "Even a cupful of pesticide would not kill us. Our daily intake of poison through water is much more than that." Kuttappayi's friend, Sabu, echoes him: "We are so used to the highly polluted water that if we drink pure water we may get dysentery." Kainakari is only one of 54 villages in the backwaters of Kuttanad in central Kerala that face an acute water scarcity. Kainakari, with over 6,000 households and 30,000 people, does not have even one public tap to supply safe water. Although the state government had commissioned a huge overhead tank in 1989 spending Rs. 70 lakhs, the tank has not seen a drop of water since it was built.

According to surveys by the Centre for Water Resources Development and Management (CWRDM), Kozhikode, more than 80 per cent of the people in Kuttanad rely on the contaminated canal water for their daily water requirements. About 40 per cent of them use the water without boiling it first. Interestingly, there are people who actually prefer the canal water to piped water. Says Chandramati, a housewife from a not-so-well-off family in Arayiram Kara, Kainakari, "If food is cooked in piped water, it gets spoilt by midday, but if it is cooked in canal water, it lasts till night."

Developmental interventions have, in fact, only worked to hurt Kuttanad's fragile ecosystem. For instance, the Thannermukkan bund was constructed across the Vembanad lake in 1975, constructed to obstruct saline water intrusion into the paddy fields during the dry season, and thus bolster paddy cultivation. "The natural flushing in the entire Lower Kuttanad affected by tidal movements has ceased and water levels in the upstream region have dropped," says Madhusoodana Kurup, a fisheries expert of the Indo-Dutch team that conducted a water balance study in Kuttanad during 1988-90. The result is that the waterbody tends to become stagnant, leading to pollution. Aquatic weeds have also grown to epidemic proportions.

The economic rationale of private owners of paddy fields therefore suggests that they convert their fields to non-agricultural purposes. They are not concerned about the ecological and environmental imbalances caused, the resultant societal loss of the economic functions of the wetland nor the economic value of the bio-diversity of wetland ecosystems.

The environmental and ecological crisis that Kerala faces is so acute that about two-thirds of the State's population does not have access to safe drinking water. Kerala, one of the wettest regions in India, gets an average rainfall of about 300 millimetres of rain spread over a six or seven-month period. Despite this heavy rainfall, an acute drinking water shortage is felt even in the lower areas.



During the last three decades, as many as 30 committees have studied the problems of Kuttanad and submitted their reports to the state government. But so far, no effective measures have been taken by the authorities. "All these committees comprised experts from various fields, but not a single person who really understands the peculiarities of Kuttanad," complains Prof. John Mathai, an environmentalist who lives in Melppadam, an area of Upper Kuttanad. According to him, Kuttanad is always illogically compared to Holland, which is also situated below sea level. "Those who formulate various projects for Kuttanad seem to think that what is feasible in Holland should work in Kuttanad too! This is nonsense. The climate, the vegetation, the way the rivers flow — everything is different."



Although exclusive water supply projects, like the KWSS, have been implemented, they have failed to meet the needs of the area. Water is treated and stored in tanks in Thiruvalla and Changanassery, 25 km to 40 km away from Kuttanad, and is first supplied to the residents. With the towns growing in size and population, there is an increased demand for water. Result: Kuttanad's problem worsens. And tubewells are no solution either. The groundwater is far too acidic.



Even a few years ago, most inhabitants relied on the natural ponds and tanks maintained by each household for potable water, and the canals running by the side were used for bathing and washing. However, new roads and the large-scale reclamation of paddy fields for construction purposes have led to the blockage of canals at several places. Viswambharan Nair, a retired village officer in Kaavaalam, believes that the arrival of the Kerala Water Authority's supply taps compounded the problem. "People neglected or abandoned the ponds hoping that tap water would be available through the year," he says.



The vast expanse of Kuttanad's backwaters is deceptive ... a tale of pollution and acute fresh water scarcity.

Father Thomas Peelianickal, vicar of Fathima Matha Church in Pulikunnu, believes that rainwater harvesting is the only possible solution to the drinking water scarcity in the area. "People think drinking water is a commodity that should be supplied by the government. This attitude should change first."

During the Sabarimala pilgrimage season, some four million people cross the Pamba river to reach the hill shrine, and the river turns into a cesspool of human waste, raw sewage, and domestic and commercial garbage. Because pilgrims defecate on the river banks and in the vicinity for miles together, faecal matter gets washed into the river water. "True, some temporary steps are taken to provide basic sanitary facilities to the pilgrims. But, all the waste generated reaches the river which

finally gets into the Kuttanad water system," complains N.K. Sukumaran Nair, General Secretary, Pamba Smarakshana Samiti, an NGO instrumental in getting the Pampa included in the National River Conservation Programme (NRCP).

According to Kerala State Pollution Control Board statistics, the coliform bacteria count in 100 millilitres (ml) of water in the Pampa at Sabarimala is 200,000. When the river reaches Edathwa in Kuttanad, the count is 48,700.

No wonder then, outbreaks of epidemics like rat fever and diarrhoea have seen an alarming increase. According to statistics available with the district medical officer, Alappuzha, 18 persons died of wheel's disease till October in 2002. The count for 2001 was 23. The total number of those suffering from diarrhoea in 2001 was 19,570. Statistics at the Alappuzha Medical College show an increase in filariasis, schistosomiasis, typhoid, jaundice, intestinal cancer, gastroenteritis and cholera. Says R. Visakhan, president of the Kainakari panchayat, "A few months back, ministers came visiting because of a cholera epidemic. After the epidemic passed, no one bothered at all. There is no attempt to address the root cause: the scarcity of drinking water." Over the past 10 years, diarrhoeal diseases resulting from inadequate water and sanitation have killed over 5,000 in Kuttanad.



Kuttanad is a testimony to misplaced and impractical developmental schemes. The backwaters itself are vanishing due to encroachment. The Vembanad lake has been reduced to one-third its size, with 65 per cent reclaimed by the government or people. Only 23 per cent of the backwaters remain in Kerala and a part of this is under bunds and barriers. Fish species get extinct in bunds, as there is no way for them to disperse and breed. The land of rivers and eternal monsoons is currently dependent on tankers supplying drinking water. Now, the demand for water is constant and thirsty people are willing to pay as much as they are willing to live. In the lowest income groups, people pay a wholly

disproportionate share of their income to locally run private water companies. All in all a tragedy.



Potable water has always been a precious commodity to the people of Upper Kuttanad where the well water is reddish yellow with a mire taste.



## Failure of pipe water supply

According to surveys conducted by the Center of Water Resources Development and Management (CWRDM), more than 80% of the people in Kuttanad rely on contaminated canal water for their daily water requirements. Meanwhile, governmental efforts to supply water via pipes and public taps have failed to meet the population's demand (Joseph 2003). First, the public water supply is highly irregular. In Kuttanad, the public taps supply water up to several times a week, and often for an hour during evening times (Suchitra 2003). The officials at Kuttanad Water Supply Scheme call and inform the community leaders when water is being released into the pipes. The community leaders then pass the messages to households in the villages. It is usually the women or children in a household who hurry towards the public water taps and fill their pots until the taps run dry (Suchitra 2003). As women and children are responsible for collecting sufficient water for household consumption, the insecure water provision imposes a disproportionately large social burden on them. Second, the public water supply network has limited coverage due to the difficulty of laying pipes across wetlands and paddy fields. Most pipes and public taps are also poorly maintained. Official estimates state that between 50%-70% of these rural water systems are in a state of disrepair (Singh 1993). Due to poor installation and lack of maintenance, pipes often leak, are common, wasting valuable fresh water and increasing risks of contamination to the fresh water supply. Third, the quality of the public water is highly inconsistent and unreliable. The analytical results of public tap water samples presented in the subsequent section show a disturbing picture. Five out of ten tap water samples is contaminated, the E. coli levels ranging from 40 to 460 per 100 ml of water, far exceeding the WHO Drinking water standard of 0 E. coli per 100 ml of water

## Economic burden of purchasing private vendor water

With limited to no public water supply and contaminated ground water, households located in rural areas are forced to purchase water from private vendors. According to the Kerala Water Authority (KWA), the extent of water supply coverage is 78% for the urban population and 54% for the rural population in 1991. In Kuttanad, it is reported that pipe water only reaches 25% of the population (MSSRF 2007). Most households located in rural areas are low income families involved in the agricultural sectors. On the other hand, middle-class households which reside in urban areas have proper connection to pipe water. The KWA's pipe water bill for 5,000 liters consumption is Rs 20 (or USD 0.4) per year (KWA 2008). Whereas, an average household in rural area without pipe water connection spends Rs 1,800 (or USD 36) per year to purchase water from private. The poorest households, on average, pay 900 times more money on water than the upper socioeconomic classes. The lack of clean water supply in rural areas means that the poorest households pay the most to purchase water from private vendors, further widening the income gap and quality of living. In addition, there is an inverse relationship between the cost of supply and the ability to pay (Gould 1999). Due to the cost of laying pipes over long distances and across different topographic areas, it is increasingly expensive to provide water to smaller and remoter settlements. At the same time, the economic opportunities for remote households are limited to subsistence farming or simple manufacturing activities, for example. Therefore, the water scarcity in Kuttanad is a community health hazard, women's and children's social burden and a socio-economic

## Sawyer Bucket Water Filtration System(SP180)

Using technology taken from kidney dialysis, Sawyer® water filters use Hollow Fiber Membranes. Our filters are comprised of tiny "U" shaped micro tubes that allow water to enter into their core through tiny micro pores. The PointOne Filter pores are so small (0.1 micron absolute) that no bacteria, protozoa, or cysts like E.Coli, Cholera and Typhoid can get through. At 7 log (99.99999%) the filter attains the highest level of filtration available today and yet it has a very high flow rate due to the large amount of tubes. Each filter is certified for ABSOLUTE microns. That means there will be no pore size larger than 0.1 microns in the biological filter. Simply put, it is impossible for bacteria to pass through

the 0.1 micron filter. Sawyer made it as simple as it gets. No more digging wells if there is a water source, no constructing sand filters and no more purification chemicals. Families are able to construct and adapt their filter in literally minutes to locally found containers. The kit includes everything you need to attach the filter to any plastic bucket or container. This is a US based company having office in India ( full details attached)

We wish to provide this unit with bucket supplied by the manufacturer .

Unit cost Indian Rupee Rs.3500.00

Number of units= 700

Total cost of water filter=  $3500 \times 700 = 2450000$

Cost of awareness classes= Rs75000

Cost of managing the project= 35000

Total project cost =  $2450000 + 75000 + 35000 = 256000 = \text{US\$}38209$

3211 DDF = US\$ 9000