

**Water pollution at Kodaikanal – causes and impact****Dr.N.Kala,****Professor,****Department of Economics****Mother Teresa Women's University,****Kodaikanal – 624 102****Abstract**

Kodaikanal is one among the less devastated hill stations in the country, under this severe threat of 'development'. It is one of the South India's finest Hills Station and it is also called the, The Switzerland of the East, The Emerald Set of South, The Chilled Paradise among the Hills, The 'Princess of the Hills' and so on. Kodai is situated at an altitude of about 2,133-m high and covers an area of 21.45-sq-km. Kodaikanal Lake, also known as Kodai Lake is a manmade lake located in the Kodaikanal city in Dindigul district in Tamil Nadu, India. The lake is star-shaped, centrally located in the town of Kodaikanal and is surrounded by lush green hills of the northwestern Palani Hills range, which is the main watershed for the lake. On the basis of various studies carried out, 62 lakes including the Kodaikanal Lake in Tamil Nadu have been identified as polluted and degraded requiring conservation. (Seth,S.M). Therefore this paper proposes to identify the various types of water pollution at kodaikanal and also it attempts to find out the causes for the same and provides suggestion for reducing the water pollution at kodaikanal.

**Introduction**

Over two thirds of earth's surface is covered by water, less than a third is taken up by land. As Earth's population continues to grow, people are putting ever-increasing pressure on the planet's water resources. In a sense, our oceans, rivers and other inland waters are being "squeezed" by human activities—resulting in water quality reduction. Poorer water quality means water pollution.

Water pollution is a serious problem in Kodaikanal. The various types of water pollution are as follows.

**Lake water pollution**

- **Pollution by Putrescible Material**

Putrescible water refers to foul smelling and rolling organic materials like waste from humans, paper pulp plants and canneries. Organic pollution when discharged in stream, river or lake, the organic materials decompose by using large quantities of oxygen from water - The amount of dissolved oxygen needed by decomposers to decompose organic materials in a given volume of water is called the Biochemical Oxygen Demand (BOD). Thus BOD is a measure of contamination of waste water.

- **Pollution by Toxic Wastes**

Toxic wastes are those which do not easily settle out and are non easily broken down by biological means. - Such toxic wastes like Dichloro Di-Phenyle Trichloro Elhane (DDT) and mercury are poisonous when consumed by plants and animals. The recent mercury contamination from the thermometer producing unit at Kodaikanal has added to the toxic wastes.

- **Pollution by Inert Wastes**

Inert wastes are those which enter water as solids but are not involved in Chemical reactions. Such wastes include dust metal fittings, oil films, dust and silt, form soil erosion. These materials if not removed settles to the bottom of water covers and blocks the sunlight. As a result plant life is affected which in turn cuts off the food supply of the fish and other animal populations. A large number of lorries carry away water from the polluted lake to meet the water needs of hotel industries, tourists and the local population of this hill station.

- **Zooplankton and Phytoplankton**

These are thick plants in a bush form under the water. From the field result it was found that Zooplankton and Phytoplankton were found in large number in thick form under the water. This creates lot of inconvenience to the living organism in the water and also affect the human health when used.

➤ **Mercury Pollution at Kodaikanal Hills**

Mercury used in the production of thermometers is in the metallic (elemental) form. Elemental mercury is a silver-white metal. It is a liquid at room temperature, and is reasonably volatile at ordinary temperatures. If not enclosed, metallic mercury will slowly evaporate to form mercury vapour, a colourless and odourless gas. It can subsequently be distributed over long distances, even on a global scale.

Analysis of water, sediment and fish samples from Kodai Lake showed elevated levels of mercury even 4 years after the stoppage of mercury emissions from the thermometer factory that operated for 18 years and was closed down subsequently in 2001. Only remediation of the factory site could prevent any further mercury inputs to the lake through vapour transport and drainage.

The results obtained for the samples show elevated concentrations of mercury in Kodai Lake in comparison to the farther placed lakes, Berijam and Kukkai. Kodai Lake also showed higher levels of methyl mercury, 50 ng l<sup>-1</sup> in waters, and 20 mg kg<sup>-1</sup> in sediment. – (D. Karunasagara, , M.V. Balarama Krishna a, Y. Anjaneyulu b, J. Arunachalama)

**Status of Dobby Canal Water pollution at Kodaikanal**

20 Years ago and at present- As reported by sample women, old citizens of Kodaikanal, Environmentalists etc.

S.No	Status of Dobby Anal Water 20 Years ago	Status of Dobby Canal Water at present in Kodaikanal
1	The Length and Breath of the Dobby Canal was very wide and long say about 15 feet wide	At present it is less than half of the size of the Canal. It is only 5 to 6 feet wide (breath)
2	The volume of water was high and the depth of water was deep	The volume has reduced so much that one can see the ground down easily. Only shallow water is found.
3	Earlier it was a sight to see men and women washing, Clothies all through the day. The number of hour was roughly between 10to 12 minutes	At present Dobby Women could not work for many hours, due to the pollution of water. They work between 6-8 AM and after 4.30 or 5pm for another two hours. They stop when the polluted water start entering the canal.
4	The numbers of people engaged were in large numbers. All the family members were involved in washing, drying etc.	But due to water pollution the number of family members involving in washing at Dobby canal were reduced to more than half.
5	The Time take to wash clothes as fast and they could wash and dry more clothes serving large number of people and Institutions at Kodaikanal	At present it was inferred they the time taken to wash few clothes itself is very long and they cannot wash as many clothes like earlier times. They could also serve only limited people.
6	Earlier the water was colourless, clear and pure.	At present due to heavy pollution the colour of water is dark brown in colour and it is also dirty.
7	The water earlier was odorless. It had no smell quality of water was pure.	But at present one can feel a foul smell in the waters of Kodaikanal.
8	Wastes were in visible in the water of Dobby Cannal water, Except for some leaves etc.	At present we can see water mixed with oil, greese flowing in from surrounding building. Human waste, Agricultural waste, water Treatment plant waste water, Hotel waste School waste etc. are being diverted into the Dobby cannal waters.
9	Earlier people use to drink the filtered water from Dobby Cannal and it was used for cooking also.	But at present it is found that one would die if they drink Dobby Cannal water for few days. Nobody uses this water for cooking at present.
10	The washer women (Dobby women) used only little "Soda" (Chemical) for cleaning, making the clothes look bright and clean.	At present due to water pollution, washing in that water does not make the clothes clean, they have to use more "Soda" (Chemical) to clean the clothes & make them bright.
11	After washing the clothes, they will be white Bright & ordurless	At present even after so much soda is used the clothes are not bright and they smell badly.

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➤ **SLAUGHTER HOUSE water pollution at Kodaikanal**

Before 10 years slaughter house was set at an area called Anna Nager in the town of Kodaikanal. This slaughter house was now in the control of municipality. Only municipal workers were engaged in cutting / slaughtering the cows for meat consumption. Small businessmen purchase the meat and sell to public. They sold the cow meat in a shed in the bus stand area – it was one of the profitable business at Kodaikanal. This has to be done only after certification from veterinary doctor at Kodaikanal. At least 5 to 6 cows were slaughtered per week. This slaughter house was established in the main area of Kodaikanal surrounded by many houses of people living below poverty line. Over the years it was found that people living around this area suffered from various health problems. It was later found out these health problems were due to the slaughter house, where slaughtering were done in open and the waste water along with the blood was flowing along with the water in the streets where families were living. It got mixed with other waste and polluted the place.

The first attempt against this problem was carried out by some people in that area followed by the request of the area councilor backed by some voluntary organization to remove the slaughter house from the residential area to safeguard the health of the people in Anna Nagar.

Finally as expected result from the municipality did not turn out, the consumer protection Council of Kodaikanal filed a case against this issue stating the following issues.

1. Contamination of water
2. Foul smell among the Anna Nagar
3. Air Pollution
4. The water flows from St. John's school upto Anna Nagar area polluting the entire area.

The slaughter house was shifted to a few place at Kodaikanal. But Business people now sell in different areas in the main places of Kodaikanal, causing pollution.

➤ **Market Pollution**

Vegetable market is one important place at Kodaikanal hills. Since it is a hill station people depend on the plains for most of the vegetables. Only one day in a week (Sunday) vegetable and meat market is organized at a Kodaikanal. It is set up in an open place in main junction of Kodaikanal town (7 road). Vegetable vendors from various places in the plains (around the foot hills) will open the vegetable trading in the Sunday market at Kodaikanal from 8 am to 7 pm. Majority of family in Kodaikanal buy their weekly requirement in the Sunday market.

Apart from vegetables the other items available are meat, chicken, fish for consumption. At the end of the day the waste of the market is accumulated in and around the market place. Most of

the vegetable waste collected by the municipality workers and sent to dumping yard, but part of it, is disposed behind the market place itself. The waste of the meat is also being thrown around the market area. During the rainy season this waste is being washed out and it flows in the sub canal behind the market polluting the waters and areas around the market area, It also passes through the out let of Kodai lake. This pollution is carried to further areas like Dhobi canal, Survey number.

➤ **Kodaikanal tourist places pollution**

Kodaikanal is very famous for number of tourist places. Tourist and public consume food products, cool drinks, water bottles etc... in tourist places for their own enjoyment and happiness without knowing the impact of waste on Kodai Hills. The leave behind plastic covers, food waste, plastic bottles, cool drink bottles, alcoholic bottles etc... after their trips. It has been reported that min of 15 to 20 kgs of plastic per day is being collected at Kodaikanal and Min 40 kgs per day is collected during peak season time April, May, June. This leads to huge accumulation of heaps and heaps of plastic waste which is not degradable, which leads to soil pollution, soil erosion, lack of proper water flow to the trees, landslides etc.... The animal life at Kodaikanal is endangered due to the consumption of plastic waste at Kodaikanal tourist place. Further most of the tourist uses the places around for urination and human waste. These unwanted human wastes are being carried through water to various water bodies at Kodaikanal leading to pollution. Various health problems like cold cough, diaries, skin diseases etc... are being caused due to tourist places pollution The main tourist places at Kodaikanal are..

➤ **Garbage pollution (Solid waste pollution)**

The garbage of Kodaikanal Municipality is being carried through Lorries from various areas by the municipality workers to the dumping ground at Prakasahapuram. This dumping area is located behind the tiger shola which is very dangerous for environmental conservation. All type of waste are being dumped without proper separation of compose and decompose materials. During the rain seasons the polluted water from the dumping ground flows down affecting the areas like Adukkam, , Perumalmalai, Periyakulam, Palani etc... The dumping gets heaped up day by day leading to a very foul smelling environment affecting atmosphere through air pollution. In the villages of Kodaikanal there is no separate dumping ground. The waste of the villages are just dumped at the entrance of the village. Earlier the population was limited in the village and hence the garbage level was very low. But over the years as the population is increasing the villagers, the level of garbage is also increasing without any proper arrangements being made by the local government.

➤ **Hospital/Clinic/laboratories waste at Kodaikanal**

About 25 years ago the need for medication was very limited. But at present with increasing population and with increasing varieties of health problems, the need for medication is

increasing rapidly. There is only one 'Govt Hospital at Kodaikanal and two big private hospitals, nearly about 25 private clinics around the Kodaikanal municipality limits and about 6 laboratories. The waste out these hospitals and clinics are collected by the municipality staff and are put in the sterilizers for disposal. The big sterilizers are available at Govt Hospitals and Van allen hospital at kodaikanal. The waste of private clinic and laboratories are collected by the municipality staff. They separate the materials required for sterilization and dump the general waste through lorries into the garbage yard. But unfortunately not all hospital or clinic wastages is being sterilized. Some of them are carried as it is to the dumping yard leading to dangerous pollution to human health, animal health and water bodies at Kodaikanal.

➤ **Fertilizers, pesticides, chemical pollution through agriculture (farming)**

Since Kodaikanal is a hills station no licence is sanctioned for establishing any big factories or industries. The major occupation at Kodaikanal and surrounding villagers is agriculture. The main vegetable grown at Kodaikanal are Carrot, Beans, Beetroot, butterbeans cabbage, coliflower, photos garlic, etc... fruits like plums, pears, butterfruit, oranges lime, jackfruit, papaya, custard apple, coffee, cardaman, pepper etc... are growing at the lower hills. The organic pattern of cultivation which was prevalent in the earlier times at Kodaikanal as last as significance. Today only chemical, and harmful fertilizers, pesticides are used for rising vegetation at Kodaikanal. Runoff water from agriculture fields carry with them dangerous toxic chemicals polluting the land, water and fruit orchards around this areas. This polluted water leads to health problems and spread of various diseases.

➤ **Water treatment plant pollution**

Water treatment plant is situated in the central part of Kodaikanal. The waste waters from various hotels are being treated at this plant. It operate for a minimum of 5-6 hours per day purifying the polluted water through various process. This purified water is utilized for agriculture around this area. This unit is supposed to work without emitting any smell (odor). But unfortunately one cannot escape the bad smell coming out from the treatment plant. Since it is in the heart of Kodaikanal public get easily affected by the pollution created by the treatment plant. This unhealthy entry in Kodaikanal affects the tourism industry which provides the maximum monetary benefits to municipality. It has been reported that people living around this area suffer from illness like vomiting, noisa etc...

➤ **Sewage/ drainage/ fecal pollution**

Due to lack of proper drainage and sanitation facilities at Kodaikanal, various type of pollution emerged. In most of the areas sewage water are mixed with rain water and drainage water leading to fecal contamination This affects human and children's health very badly. Apart from this, these polluted water run down the areas affecting various villagers and drinking water sources till the dams at foot hills.

➤ **School collages and other institution waste pollutions**

Very few institution have organized structure of disposing their waste. Most of the schools and collages generate food and plastic, paper waste due to lack of proper environmental knowledge. These waste are directly led to flow along with the streams and canals polluting the areas around. This affects not only the other areas, but also the students and the staff staying in the institutions. Majority of the institutions do not separate there waste into compost and non compost.

**CAUSES OF WATER POLLUTION AT KODAIKANAL**

**Some of the causes of WP at Kodaikanal are as follows:**

- Discharge of effluent directly into the lake water from Hotels/Buildings around the lake.
- Washing of vehicles, oils, wastes are discharged into lake water.
- The waste water of the shops around the lake is discharged into the lake.
- Fertilizer / Pesticides that is applied to farm fields and roadside residuals, home waste – run off into the lake water-“nitrates/phosphates.
- Sewage water runoff into lake
- Sediment pollution in water form – clear-cut, soil-sediments.
- Chemicals and laundry chemicals (Dobby Canal) Kodaikanal polluted the water
- Human waste – flows into the lake and pollutes the water.
- Mercury pollution leads to water pollution.
- Poorly designed landfills also cause water pollution.
- Pet faces and animal droppings are also causes of WP.
- Horses waste and clean water of Horses leads to water pollution.

**IMPACT OF WATER POLLUTION AT KODAIKANAL**

- Health impacts of water pollution
- Groundwater and its contamination

***Pesticides, Sewage, Nutrients, Synthetic organics, Acidification.***

- Chemicals in drinking water ***Fluoride, Arsenic, Lead***

Cause	Water-borne diseases
Bacterial infections	Typhoid Cholera Paratyphoid fever Bacillary dysentery
Viral infections	Infectious Hepatitis (jaundice) Poliomyelitis
Protozoal infections	Amoebic dysentery

### Suggestion

- The doctors in the Hospital (govt and private) should identify the water borne diseases and should reveal to the public through all India radio service etc... The government officials and other supporting groups can utilize this media to pass information about the water issues at Kodaikanal and their impacts.
- Mercury pollution at Kodaikanal and in the lake water is a very serious issue. By the efforts of the NGO's and public the HLL company producing thermometers is closed. But the mercury is still existing in the waste and it would affect the public. Hence special attention to the problem should be given by the local governments.
- A big plan need to be arrived in conserving the water and saving the water from pollution. The kodaikanal municipality with other solutions and Institution should draft out a plan for implement.
- The water treatment plant at the centre of the Kodaikanal town need to be well organized to stop the dirty smell emitting during the process. The local bodies and the hotel industry with the public should have a feed back of the function and set right this problems if any.
- The dobicanal is affected by chemical pollution by dobhis washing regularly in their areas for all the hotels. (commercial actively) and the clothes of the public.  
Special care should be taken to avoid detergent mixing in the flowing water.  
The sewage water of the toilet in the hotels flow in this stream.  
Strict rules should be passed to redirect the waste of the hotels or else their become to run the hotels / Institution in a proper manner without polluting the waters of kodaikanal.

### CONCLUSION

Water is one of the most essential natural resources for sustaining life and it is likely to become critically scarce in the coming decades, due to continuous increase in its demands, rapid increase in population and expanding economy of the country. Climate change is posing a very big problem. It is therefore essential that capacity building and awareness programmes may be organized for the users and public for encouraging their effective participation in water management practices and developing ethical concepts for making efficient use of water resources. Capacity building is also needed for the water resources managers and developers for

updating the knowledge and technology in the area of water resources management and water pollution.

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