



**Government of Puducherry**

**District Environment Plan  
Puducherry District**



**Department of Revenue And  
Disaster Management  
&**

**Department of Science  
Technology & Environment**

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## DISTRICT ENVIRONMENT PLAN - PUDUCHERRY DISTRICT

### 1. Introduction

Puducherry District consists of three region viz. Puducherry, Mahe and Yanam. Puducherry region is located on the coast of Bay of Bengal to an extent of 292 Sq.Km. It consists of two Municipalities viz. Puducherry and Oulgaret and five Commune Panchyats. The details are given below:

**Table 1: Geography and Demography of Puducherry District**

Sl. No	Name of the Municipalities / Commune Panchayats	Area(sq.km)	Population
1.	Puducherry Municipality	19.55	2,44,377
2.	Oulgaret Municipality	34.55	3,00,104
3.	Ariyankuppam Commune Panchayat	24.38	72,055
4.	Bahour Commune Panchayat	54.82	68,757
5.	Mannadipet Commune Panchayat	64.33	86,500
6.	Nettapakkam Commune Panchayat	30.62	51,718
7.	Villianur Commune Panchayat	65.99	1,26,778
	<b>Total</b>	294.24	279,030

Puducherry District also consists of two Regions viz. Mahe and Yanam. Mahe is located adjacent to Kerala State and Yanam is located nearer to Andhrapradesh.

Sl.No	Region	Area Sq.Km	Population
1	Mahe	8.69	41,816
2	Yanam	20	55,626

## 2. Water Resource Management

### a. Surface Water

In Pondicherry region, there are 59 system tanks (i.e. tanks that are connected to river systems) and 25 non-system (rain fed) tanks which irrigate about 6600 hectares of land. The system tanks receive supply from the two rivers and three major tributaries. Water from the rivers and tributaries are conveyed to the tanks through feeder channels. Apart from the 25 non-system tanks there are nearly 609 ponds that can hold rainwater. Much of the rainfall runoff can be stored in the 84 tanks. The annual water availability of the Puducherry district is assessed to be 184.975 MCM, out of which share of surface water is 60.905 MCM (32.92%) and ground water is 124.07 MCM (67.08%).

The main source of irrigation prior to 1987 was 84 no's of tanks and lakes which were supplemented by 3,000 numbers of shallow tube wells. The practice of conjunctive usage of surface and ground water was neglected since middle of the 1980's and thereafter the entire requirement of water is being met out from groundwater leading to neglect of surface water resources.

Inspired by the Hon'ble Prime Minister's impetus on Jal Sanchay, Government of India has launched the Jal Shakti Abhiyan (JSA) to revive India back to a sustained system of water conservation. In line with this, Hon'ble Chief Minister of Puducherry launched the "Neerum Oorum" project on 05.09.2019 to protect and restore the water bodies and augment the ground water resources of Puducherry on mission mode. The project aims to revive Puducherry district back to a sustained system of water conservation by the following five aspects with the leadership of District Collector: -

- i. Water Conservation and rain water harvesting,
- ii. Renovation of traditional and other water bodies,
- iii. Reuse of water and recharging of structures,
- iv. Water shed Development and
- v. Intensive afforestation.

The following tasks have so far been carried out under the project.

**Taking inventory:** The number of water bodies in the district is available in the Revenue Records. To help them to make an inventory, a team was sent to survey the water bodies, document the same and provide a unique number to every pond based on its location – village, panchayat and sub-division. At present, about 454 Ponds (Kulam/Kuttai) and 84 Tanks (Lakes) are identified and available in Pondicherry district. The Standard Operating Procedures (SOPs) have been prepared by the 2 municipalities and 5 Commune Panchayats for rejuvenation of these ponds.

**Corporate Social Responsibility, Convergence:** Through convergence with MGNREGA Scheme, PWD, Local bodies and with CSR support of many companies, banks and NGOs including Lions and Rotary Clubs, desilting of 120 ponds have been completed to date. Further, work for another 80 ponds is in progress, including 30 temple ponds. About 200 Kms of canals were cleaned.

**De-silting of canals:** De-silting of canals, was undertaken with support from local leaders and officials from the district administration, as a part of Neerum Oorum. The project received vital support from the offices of the Lieutenant Governor and Chief Minister.

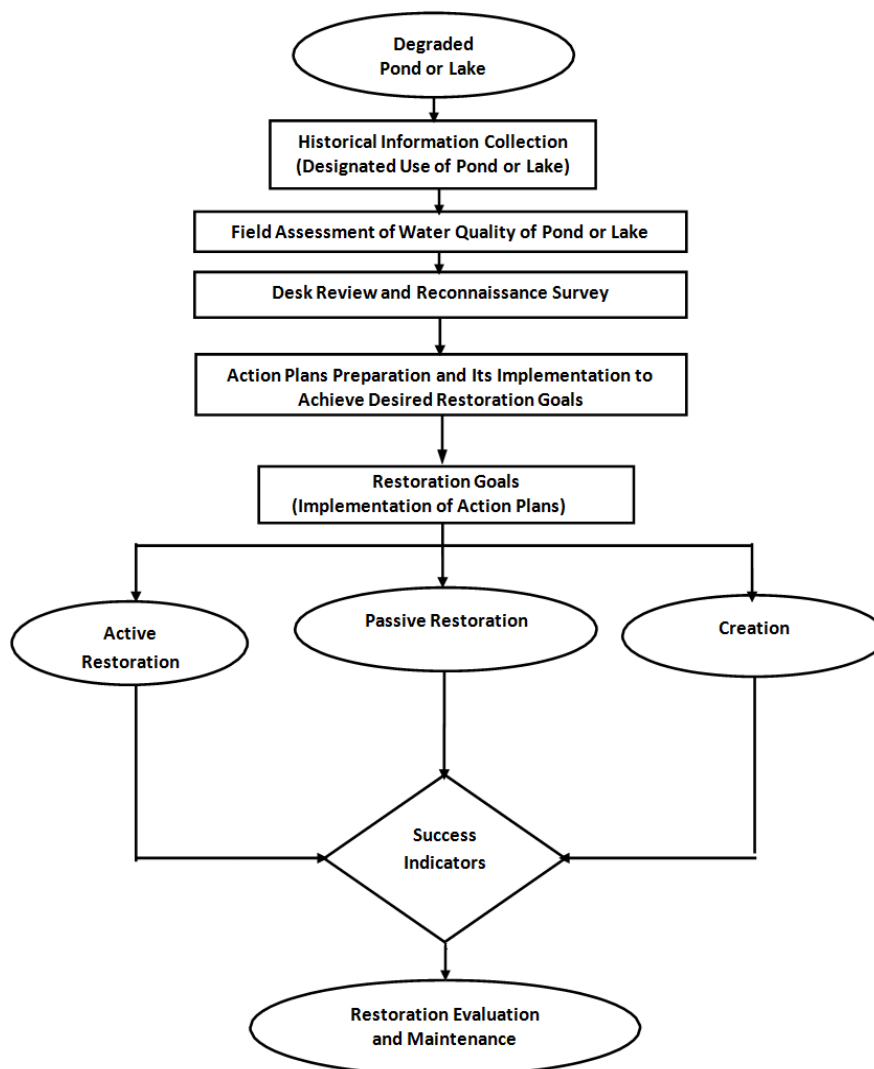
**Neerum Oorum:** The tagline for the water bodies rejuvenation programme was “Neerum Oorum”. Advertisements were given in local newspapers, appealing for support from the public, corporate sector and institutions. More than a dozen companies provided free services.

**Geo-tagging of water bodies:** Government of Puducherry in association with the council of Scientific and Industrial Research (CSIR) – National Environmental Engineering Research Institute (NEERI), Nagpur, has developed an Android-based mobile application called ‘NeerPadhivu-Jal Abhilekha’ to digitize all water bodies in Puducherry and monitor change in the use of land in and around the water bodies using remote sensing and GIS-based geotagging techniques. The application would also provide a platform for public participation through crowdsourcing of the water body information system of Puducherry made available on the internet. The application, a first of its kind in the country, was launched on 15 November 2019.



**Impact:** Many of the ponds that were rejuvenated over the past few months now have water, increasing the water storage capacity of the district. This will also help increase the groundwater table. Care will also be taken to ensure that the ponds will be retained as water bodies. Plans are in the pipeline to improve the appearance and approach to the water bodies by building pavements around them and if space permits make a park near them that could have a picnic area or open air gym.

**Fig.1: Model Flow Chart for Restoration of Pond or Lake**



## **River**

Sankaraparani river originates from Ginge in Tamil Nadu, hence it is also called Ginge river. It enters Puducherry at Suthukeney and flows into Puducherry for 34 Kms before reaching Bay of Bengal. It is a seasonal river and its flow depends on the rainfall of Ginge region. Based on the value of BOD, Chunnambar river (Tail end of Sankaraparani) has been categorized as Polluted water stretches in Priority V (BOD: 6 mg/l) class by Central Pollution Control Board.

In compliance with the Hon'ble National Green Tribunal (NGT) direction in O.A.No. 673 of 2018, Govt. Of Puducherry has formulated an Action Plan with ten components for the restoration of Chunnambar, which has been identified as one of the polluted river stretches. The action plan consists of provision of sewage treatment plant in Villiyanur, and boat house, eradication of open defecation on the river bank by providing community toilets, periodical river water quality monitoring, curbing illegal sand mining, improving biodiversity and developing green belt on both sides of the river.

Villiyanur is one of the urban agglomerations located on the bank of Sankaraparani river. Approximately 15,000 households and commercial establishments are located. It is estimated that around 0.6 MLD of sewage is being generated. Public Work Department (PWD) has initiated action to install 1 MLD Sewage Treatment Plant (STP).

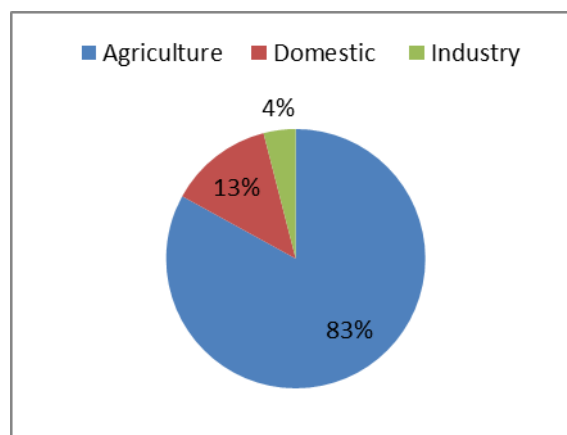
There are 23 Revenue villages present on the bank of Sankaraparani River. Open Defecation is common phenomenon on the river bank. 1836 toilets have been completed by DRDA for the Households located on the river bank.

## **b. Ground Water Resource**

Ground water potential of Puducherry Region has been estimated as 140 million cubic meter. (Central Ground Water Board Report, 2016). Agriculture is the major ground water consumption sector (116 mm<sup>3</sup>) followed by Domestic (18.5 mm<sup>3</sup>) and Industrial Sector (5.4 mm<sup>3</sup>) (Fig.1).

The source of the water for the various activities including Domestic, Industrial and Commercial usage is met from the ground water as a result of which there is depletion in the underground water resources. 30% of over draws of ground water is reported and thus Puducherry has been categorized as Over Exploited Zone. On an average, there is a drop in water level by 1 -1.5 mt per year.

**Fig.2: Sector wise Ground Water Usage**



### **Ground water quality**

Ground water in Puducherry was historically famous for its taste and quality. But recently due to rapid urbanization and industrialisation, intrusion of sea water in the aquifer has changed the situation. Puducherry Pollution Control Committee has been periodically monitoring ground water quality in many places. The analysis report revealed that the value of Conductivity, TDS and Chloride are higher level in many places. This is due to salt water intrusion in the coastal aquifer. There is urgent need to conserve ground water resource and initiate various measures to improve ground water table level.

**Fig.3: Status of Ground Water Quality**



In order to augment the ground water resources, suitable and appropriate rain water harvesting systems have been designed taking into consideration the hydrogeology, soil condition, rainfall and run off. All the public buildings will be provided with roof top rain water harvesting systems. With respect to roof top rain harvesting system and reuse of waste water, necessary amendments in the Puducherry Building Bye-laws and Zoning regulations have already been made by issuing Government Order. Compliance of rain water harvesting structures in the occupancy certificate is to be ensured.

Puducherry Planning Authority will examine the possibility of amending the Government Order for non-compliance of rain water harvesting for making it as a compoundable offence. Fiscal and tariff policy interventions will be made to encourage the individuals and Institutions for construction of such systems in their own premises. The old dug wells will be utilized for the purpose of harvesting rain water and recharging the ground water through appropriate schemes. In selected areas, erection of farm ponds to store the rain water and use at the time of scarcity will be encouraged by way of financial assistance.

### **Rain Water Harvesting**

In addition to conservation and restoration of Tanks and Ponds, rain water harvesting by the individuals and organizations is encouraged and has been made mandatory through Building Byelaws and regulations. Rain water harvesting in commercial, industrial and agricultural sector is proposed to be improved and strengthened by implementing year wise monitorable targets by Puducherry Planning Authority and Agriculture Department.

In view of the necessity of rainwater harvesting in the present time, a detailed commitment has been made in the “Water Policy of Puducherry”. According to this policy, all efforts will be made to store the surplus rain water in the canals, ravines and rivers by way of constructing small bed dams or regulators. In order to increase the utilizable water resources, traditional water conservation practices of rain water harvesting including roof top rain water harvesting will be mandated through appropriate regulations and be practiced. Periodic awareness campaign will be carried out by all the related Departments and Statutory Bodies.

Puducherry Ground Water Authority mandated installation of Rain Water Harvesting structures while issuing permission to the industry for withdrawal of ground water. 123 units were installed around 649 rainwater harvesting structure so far. (Annexure – I)

### 3. Air Quality Improvement

Status of Ambient Air Quality of Puducherry is being continuously monitored in 3 locations in Puducherry under National Air Quality Monitoring Programme. (NAMP). Annual averages of Pm10, SO2 and NO2 for the last year are given in the Table 2.

**Table 2: Status of Air Quality in 2018**

S.No.	Location	Pollutant in $\mu\text{g}/\text{m}^3$		
		PM10	SO2	NO2
1	LAD	38	3.5	10.4
2	DSTE	46	4.1	12.9
3	PIPDIC	45	4.1	12.1

The values of three pollutants are within the prescribed standard limits in all the locations. Values of PM<sub>10</sub> ranges from 34 $\mu\text{g}/\text{m}^3$  to 46 $\mu\text{g}/\text{m}^3$ , SO<sub>2</sub> is in the range of 3.5 $\mu\text{g}/\text{m}^3$  to 6.3 $\mu\text{g}/\text{m}^3$  and NO<sub>x</sub> is in the range of 10.4 $\mu\text{g}/\text{m}^3$  to 14.9 $\mu\text{g}/\text{m}^3$  in Puducherry. Except PM<sub>10</sub>, all the other pollutants values are very meagre when compared to National Ambient Air Quality Standards.

Puducherry is not figured in the 106 non-attainment cities notified by the Central Pollution Control Board (CPCB) and also not classified as Critically Polluted Area (CPAs) or Severely Polluted Area (SPAs) based on the Comprehensive Environmental Pollution Index (CEPI) developed by CPCB.

#### **Special drive to compact air pollution during Diwali**

As per the directions of Hon'ble Supreme Court of India, Order u/s. 144 Cr.Pc has been imposed during Diwali time to restrict the indiscriminate use of firecrackers, which leads to very peak air pollution. Instructions have also been issued to the firework

manufacturers with regard to ingredients used for firecrackers for strict compliance. Penal action u/s. 188 of IPC has been contemplated against the violators.

### **Industrial Fuel usage Scenario in Puducherry**

Industrial units located in the U.T. of Puducherry uses various types of Fuels. Furnace Oil, HSD, LDO, Briquettes, Wood, husk and gassified coal are the major fuel used by the industries located in Puducherry. Raw coal is not permitted as fuel. There are 2 units viz. M/s. Hindustan Glass Container and M/s. Athiappa Chemicals are using Pet Coke as fuel and feed stock respectively. Around 60 units are using furnace oil as fuel.

Pet Coke and Furnace oil contains higher sulphur content of 3.5% and 4% respectively. Industries are permitted to use furnace oil with required pollution control devices like scrubber etc. connected with minimum of 15 mt stack. Stack emission of the industries which use furnace oil as fuel revealed that all the parameters are within the prescribed standards. Properties of various fuels used in Puducherry are given in Table – 3.

**Table 3: Properties of Various Fuels**

<b>Fuel Types</b>	<b>Ash Content (%)</b>	<b>Sulphur Content (%)</b>	<b>Moisture (%)</b>	<b>Gross Calorific Value (Kcal/Kg)</b>
<b>Coal</b>	38	0.5 to 0.8	5.98 %	4000
<b>Furnace Oil</b>	0.03 – 0.07%	2 to 4	<1 %	10,500
<b>LDO</b>	0.03 – 0.07%	0.5 – 1.8	<1 %	10,700
<b>LSHS</b>	0.03 – 0.07%	<0.5	<1 %	10,600
<b>Diesel</b>	0.03 – 0.07%	0.05 – 0.25	<1 %	10,800
<b>Kerosene</b>	0.03 – 0.07%	0.05 – 0.2	<1 %	11,100
<b>Wood</b>	0.03 – 0.07%	0.1	13	3000
<b>Pet Coke</b>	1	3.5	1.11	7981

**Table 4: Emission level of various fuels**

<b>Boiler Capacity: 10 TPH</b>						
<b>Pollutant</b>	<b>Pet coke</b>	<b>Coal</b>	<b>Natural gas</b>	<b>FO</b>	<b>LSHS</b>	<b>LDO</b>
<b>Fuel consumption</b>	24.8	49.6	-	19.85	18.85	18.54
<b>Uncontrolled Emission</b>						
<b>SO<sub>2</sub> emission</b>	3.30	0.47	NM	1.70	0.43	0.64
<b>Secondary Particulate emission as (NH<sub>4</sub>) 2SO<sub>4</sub></b>	6.79	0.97	NM	3.49	0.90	1.32
<b>Primary PM emission</b>	0.19	15.87	NM	0.13	0.005	0.004
<b>Total PM emission load (Primary + Secondary)</b>	6.98	16.84	NM	3.62	0.905	1.324
<b>Controlled Emission</b>						
<b>Scenario 1: Assuming 50% removal efficiency of control system for SO<sub>2</sub> and 70% for PM (coal &amp; petcoke)</b>						
<b>SO<sub>2</sub> emission</b>	1.65	0.24	NM	0.85	0.22	0.32
<b>Secondary Particulate emission as (NH<sub>4</sub>) 2SO<sub>4</sub></b>	3.40	0.49	NM	1.75	0.45	0.66
<b>PM emission</b>	0.06	4.76	NM	0.04	0.002	0.001
<b>Total PM emission load (Primary + Secondary)</b>	3.46	5.25	NM	1.79	0.452	0.661
<b>Scenario 2: Assuming 90% removal efficiency of control system for SO<sub>2</sub> and 70% for PM (coal &amp; petcoke)</b>						
<b>SO<sub>2</sub> emission</b>	0.33	0.047	NM	0.17	0.043	0.064
<b>Secondary Particulate emission as (NH<sub>4</sub>) 2SO<sub>4</sub></b>	0.68	0.10	NM	0.35	0.09	0.13
<b>PM emission</b>	0.06	4.76	NM	0.04	0.002	0.001
<b>Total PM emission load (Primary + Secondary)</b>	0.74	4.86	NM	0.39	0.092	0.131

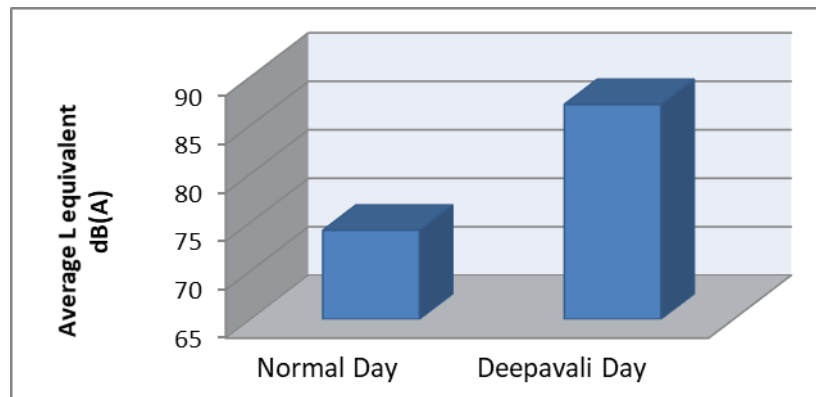
The above table indicates that SO<sub>2</sub> emission is more in Pet Coke and Furnace Oil and Particulate Matter is higher in coal.



## 4. Noise Pollution Control Measures

Noise pollution is one of the proven potential factor cause various health implications. Particularly it is harmful to senior citizen, cardiac patients and children. Nevertheless it is one of the neglected areas of environmental sector. Though Noise Pollution (Regulation and Control) Rules, was notified in the year, 2000, no remarkable action has been taken in this field. Under the provision of the Rules, designated authority has been notified under the chairmanship of Superintendent of Police. During Diwali festival time, increased noise level has been reported.

**Fig.4: Noise Level during Diwali**



## 5. Sewage Treatment Plan

### Sewage Generation

#### a. Domestic Sector

Puducherry has Urban Population of 5.45 Lakhs. The Public Work Department (PWD) is providing the Drinking water supply and implementing Under Ground Severage System (UGSS) i.e. collection of sewage, and its treatment. The sewerage network of Puducherry is 447 Km. Sewage generated in the urban area is estimated as 58 MLD. However, the realized sewage generation is about 40 MLD, since 100% households connectivity to the sewer system is yet to be achieved.

## b. Industrial Sector

There are 20 major sewage generation units in Puducherry (Fig.2). Around 3062 KLD of sewage is being generated of which 1943 KLD is utilized insitu. Thus the remaining 1119 KLD is available for other usage (Annexure – II).

### Treated Sewage Water

Utilization of Treated Sewage Water is one of the promising fields to conserve ground water resource. There are three numbers of 17 MLD capacity Sequence Batch Reactor (SBR) based Sewage Treatment Plants (STP) and 2 numbers of Upflow Anaerobic Sludge Blanket Reactor (UASB) based 2.5 MLD STP in operation. Details of available Treated Sewage Water are given in Table-5.

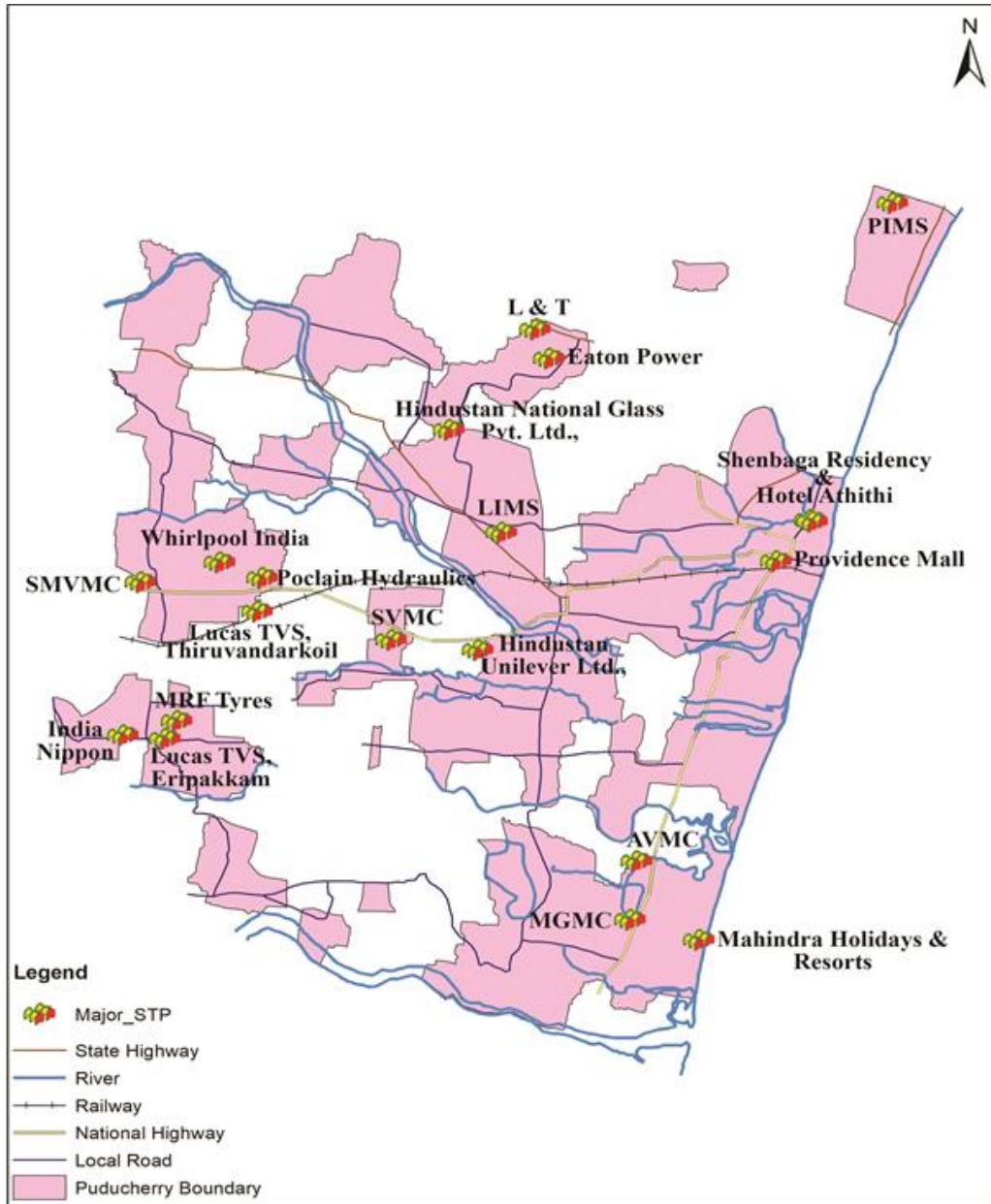
**Table 5: Availability of Treated Sewage water**

Sl. No.	STP Location	Capacity of Plant (MLD)	Quantity of Treated Sewage available (MLD)
1	Lawspet	17 (SBR) 2.5 (UASB)	16 2.5
2	Dubrayapet	17 (SBR) 2.5 (UASB)	5 2.5
3	Kanaganeri	17	5
<b>Total</b>		<b>56</b>	<b>31</b>

### Scope of Utilization of Treated Sewage Water

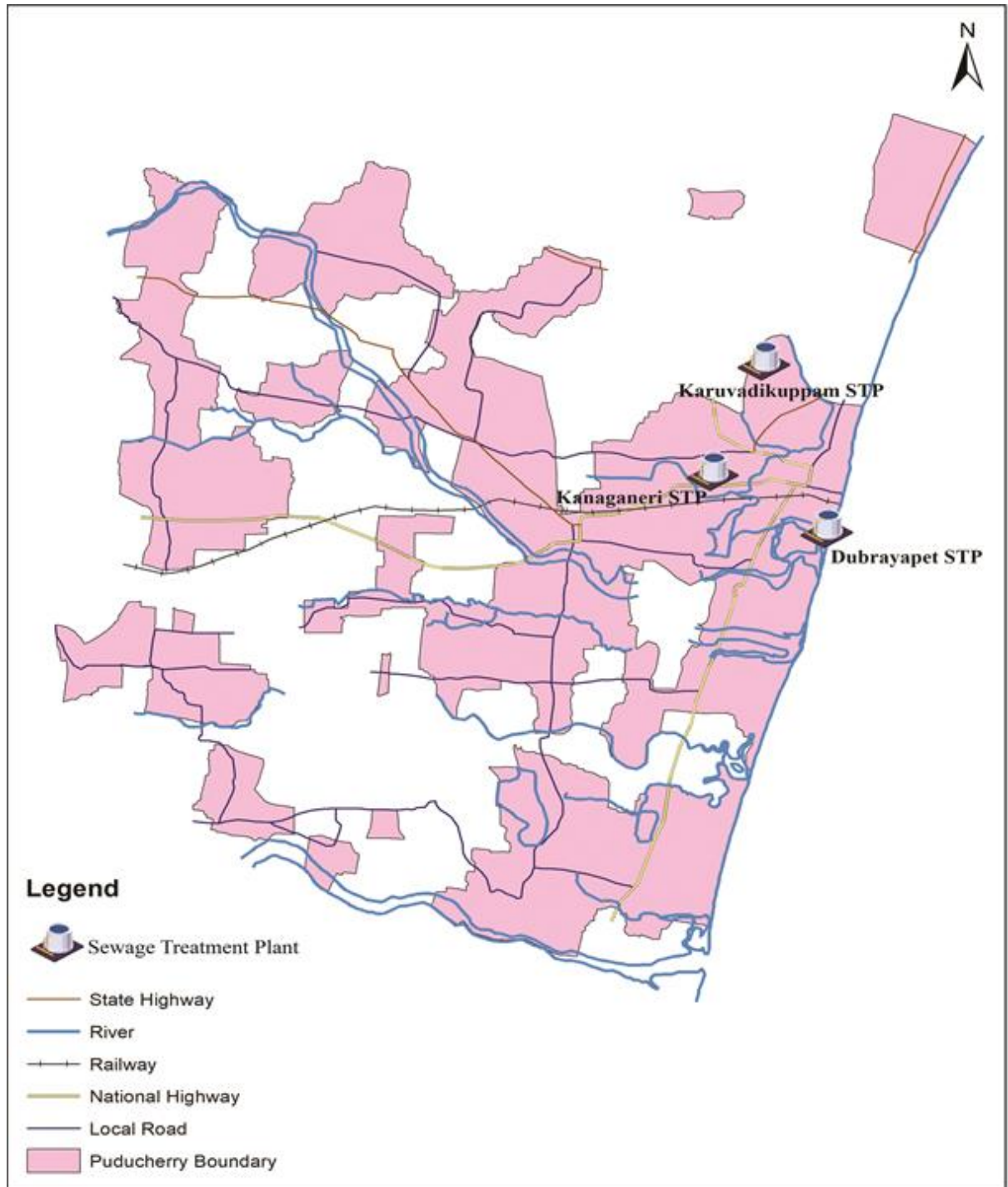
Sewage is treated in Sequence Batch Reactor (SBR) and UASB. These are State of the art technologies and yield good quality water. It meets Central Pollution Control Board, (CPCB) prescribed standards for irrigation. Treated Sewage quality is given in Table- 5.

**Fig. 5: Location of major Sewage Treatment Plants**



Government of Puducherry has constituted a Committee vide G.O. Ms. No. 1 dt. 19.01.2016 for sale of Secondary Treated Effluent Water. Currently one unit is purchasing 0.8 MLD treated sewage water at the rate of Rs. 13.99 / KL.

**Fig.6: Location of major Sewage Treatment Plants**



**Table 6: Quality of Treated Sewage**

Sl. No.	Parameters/Pollutants	Range
1	p <sup>H</sup>	7-9
2	Biochemical Oxygen Demand	7.7 mg/lit
3	Chemical Oxygen Demand	15 mg/lit
4	Total Suspended Solids	10 mg/lit
5	Total Kjeldahl Nitrogen	9.6 mg/lit
6	Nitrate Nitrogen	8.8 mg/lit
7	Ammonical Nitrogen	9.0 mg/lit
8	Total Phosphate	2 mg/lit
9	Faecal Coliform	Nil
10	Total Coliform	≤ 200 Mpn/100 ml
11	Oil & Grease	5mg/lit

Currently 15.3 MLD of treated sewage is utilized for various purpose. Details are given in Table.7

**Table 7: Usage of Treated Sewage**

Lawspet STP	Industrial usage	0.8 MLD
	Fodder Grass raising	3 MLD
	Coconut Plantation	
	Silk cotton trees	
	Natural recharging through impounding reservoir	9 MLD
<b>Dubrayapet STP</b>	Watering the road side plantation by Municipality	0.015 MLD
	Construction activities	
<b>Kanaganeri STP</b>	Boating Operations in Kanaganeri	2.5 MLD
		15.3 MLD

**Fig. 7: Utilization of treated Sewage for fodder cultivation**



**SILK COTTON TREES**



**FODDER CROPS**

It is estimated that utilized treated sewage of 15.7 MLD from PWD owned STP's and 1 MLD from various industries and Institutes STP's are readily available for utilization.

## **6. Industrial Effluent Management**

Discharge of untreated effluent/ partially treated effluent play havoc on surface water and ground water quality besides contaminating land resource. Thus effective treatment is paramount importance in environment management. It involve state of the art treatment technology vis-à-vis capacity of the treatment plant and discharge point. As Pondicherry has no perennial river flow, discharge of treated effluent has been strictly prohibited. Only marine discharge is allowed. There are 78 effluent generating units are in operation. It generates approximately, 4504 KLD effluent (Annexure-III). No industry is allowed to discharge untreated effluent. Treatment system is mainly consists of Sequence Batch Reactor (SBR), Up flow Anaerobic Sludge Blanket (UASB), Activated Sludge Process and Membrane separation etc.

Outlet of ETP is periodically monitored by PPCC and NABL accredited laboratories. Any unit is found to violating the discharge standards, severe action is being initiated against the unit, including disconnection of power supply and launching of prosecution. 3 cases were

filed against 2 hospitals and one unit under Section 19 of the Environment (Protection) Act, 1986 before the Chief Judicial Magistrate, Puducherry.

In order to conserve ground water resource, industries are insisted to reduce effluent generation by way of process improvement and recycle treated effluent into their process, boiler, washing and green belt development.

### **Maintaining Zero Liquid Discharge (ZLD)**

Providing conventional treatment system for high pollution loaded effluent is not feasible. 6 such types of units are provided ZLD. Besides , avoiding discharge pollution , these ZLDS are generating 228 KLD of fresh water and used for process. 6 industries are maintaining ZLD. (Annexure-IV)

## **7. Integrated Waste Management**

### **a. SOLID WASTE MANAGEMENT**

Solid Waste Management is being implemented by the Local bodies in Puducherry District. 60 % of the total population is in urban. Among the five Municipalities, Pondicherry and Oulgaret Municipalities are adjoining each other and hence these two municipal areas along with certain urbanized pockets of Ariyankuppam and Villianur Commune Panchayats are called Puducherry Urban Agglomeration area (PUAA). There are 4 Urban Local bodies in Puducherry District generating approximately 400 TPD.(Table-8)

**Table 8: Details of Solid waste generation in ULBs in Puducherry**

<b>Municipality</b>	<b>Number of Wards</b>	<b>Population</b>	<b>Solid Waste Generated</b>
<b>Pondicherry Municipality</b>	42	2.4 Lakh	175 TPD
<b>Oulgaret Municipality</b>	37	3 Lakh	175 TPD
<b>Mahe Municipality</b>	15	0.4 Lakh	3 TPD
<b>Yanam Municipality</b>	10	0.6 Lakh	16 TPD
<b>Total</b>	122	7.3 lakh	409 TPD

**Table 9: Details of Solid waste generated in Rural Local Bodies**

Sl.No	Name of Commune Panchayat	Solid Waste Generate (TPD)
1	Ariyankuppam Commune Panchayat	25
2	Bahour Commune Panchayat	40
3	Mannadipet Commune Panchayat	25
4	Nettapakkam Commune Panchayat	10
5	Villianur Commune Panchayat	10
	<b>Total</b>	<b>110</b>

**Table 10: Physical composition of solid waste generated**

S.No	Category of Waste	Proportional Rate (%)
1	Kitchen Waste	11.1
2	Green Matter	23.0
3	PVC	1.2
4	Plastics	7.6
5	Textiles	7.6
6	Rubber & Leathers	0.8
7	Paper	3.1
8	Metals	0.2
9	Glasses	0.9
10	Ceramics and Others	0.1
11	Stones/Bricks/Concrete	1.6
12	Sand/Soil/Earth	29.9
13	Batteries	0.0
14	Coconut Shell/Straw/Hay/Stalk/Wooden	12.9
15	Dead Animals	0.0
16	Density	g/cc
	<b>TOTAL</b>	<b>100</b>



**Table 11: Chemical Composition of solid waste generated in Puducherry**

S.No	Parameters	Unit	Values
1	Volatile Solids	%	29.2
2	Non-Volatile Solids	%	70.8
3	Moisture Content	%	35.1
4	Organic Carbon	%	0.62
5	Nitrogen	mg/kg	912
6	C/N Ratio	-	6.9:1
7	Phosphorous as P	mg/kg	27
8	Sulphur as S	%	BDL
9	Chloride as Cl	mg/kg	11700
10	BOD	mg/kg	12215
11	COD	mg/kg	41130

Solid Waste Management Policy for Union Territory of Puducherry was notified on 01.08.2018 and the Solid Waste Management Action Plan was notified for Union Territory of Puducherry on April'18. Based on the State Action Plan, all the Local bodies have prepared their action plan adopted in their respective local bodies. The Action plan that is prepared to comply with the SWM Rules, 2016 brings out the current practice and future plan under every stages of the SWM process. The Puducherry Solid Waste Management Action Plan is based on following principles:

- Reduce, Reuse, Recycle
- 100% Collection of Waste.
- Segregation at source as well as during processing.
- Awareness and IEC activity
- Maximum resources recovery
- Effective and scientific treatment

For the purpose of Solid Waste Management, the Urban Agglomeration of Puducherry consisting of Puducherry and Oulgaret Municipality areas and parts of

Ariyankuppam and Villianur Commune Panchayats are taken as one Unit and a single and unified system for Collection and Transportation (C&T) is in practice.

In PUAA, door to door collection and transportation of solid waste are in practice since 2010. The solid waste is collected from the PUAA area by the concessionaire M/s. Swachatha Corporation and taken to the landfill site at Kurumbapet which is located in the Oulgaret municipal area. In the PUAA area alone, 400 Metric Tonnes (MT) of waste is generated daily and around 350MT of waste from the PUAA area reaches the landfill site at Kurumbapet and remaining 50 MT consisting of silt reaches the C&D waste collection centre, Mettupalayam.

In Mahe Municipal area, all the bio-degradable waste are used by the households themselves for kitchen garden manure through pipe composting method and only non-bio degradable wastes to a quantity of 2 TPD are delivered to the Municipality which are scientifically processed.

In Yanam Municipality, un segregated collection at source is in practice. Preparation of RFP for floating tender for integrated SWM programme is under process.

In respect of PUAA, efforts to start scientific disposal of Solid Waste at MRF could not materialize due to stay granted by the Hon'ble NGT against any kind of activity in the MRF. Now, the stay granted has been vacated and the department is taking action to float RFP.

Segregation of Solid Waste is been done in selected wards and it is being implemented from past 1<sup>st</sup> November 2019, it is being segregated into degradable and non-biodegradable waste.

Plastic Waste are been segregated at RRP in Kurumbapet. The segregated Plastic Waste is being disposed through registered recycler / re-processor. The Bio-degradable Waste are processed in Bio-methanation plant located at Kurumbapet, with a capacity of 1 ton/day.

## **Legacy Waste**

Disposal of Legacy Waste is greater challenges. Approximately 5 lakhs tons of solid waste has been dumped at Kurumbapet since 2010. Govt. of Puducherry has initiated process for the disposal of this legacy waste through bio mining method.

## **Environment Quality Monitoring**

The ambient Air Quality and Ground water quality are periodically monitored by Puducherry Pollution Control Committee.

## **CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT**

C&D waste consists 18 % of the total solid waste. Unless, it is collected, transported and disposed separately, solid waste management could not be successful. Oulgaret Municipality has identified a site near Mettupalayam for collection of Construction and Demolition waste (C & D waste) and obtained authorization under C & D waste Management Rules, 2016.

Total quantity of C&D waste generated during the year 2018 is 17820.99 MT. 845.6 MT collected during lean period and 2585 MT collected during peak period. The average C&D waste generated per day is 48.82 TPD.

Strict instruction has been issued to the private contractor M/s. Swachatha Corporation for avoiding mixing of silt with solid waste as per the agreement. (Article2-Clause 2.1(10)).

## **PLASTIC WASTE MANAGEMENT**

Based on the Central Pollution Control Board (CPCB) report, Puducherry District is figured in one of the 13 cities where plastic waste generation is more than 10 % of the total solid waste generated. It is estimated that 35 TPD of plastic waste is generated. Plastic waste is segregated during door-to-door collection by the waste collector and by the rag pickers in the disposal sites. It is channelized to 42 Plastic Waste reprocessing units located in Puducherry by local scrap dealers. The invaluable plastic wastes are left over in the disposal site.

There are 42 plastic articles manufacturing units. Plastic waste generated from these units are collected and recycled by PPCC authorised recycling units.

There are four Multi Layer Packaging (MLP) manufacturing units exists in Puducherry. The plastic waste generated from these industries could not be recycled. It is estimated that around -- tons of plastic waste is generated from MLP units. It is co processed in cement plants located in Tamil Nadu. M/s Hindustan Unilever Ltd., Vadamangalam, has collected the Multilayered plastic (MLP) through NGOs around a quantity of 272 MT and sent them for Co-Processing in Dalmia Cements, Ariyalur. Details are given in the Table-12.

**Table 12: MLP Manufacturers**

Sl. No	Name of the Unit	Quantity of PW Generation
1	Ancor Flexibles India Private Limited, R.S.No.151/4, 151/5, Kandanpet Village, Manapet P.O., Bahour Commune, Puducherry	1193.9 T
2	Rajalakshmy Packaging Private Limited, R.S.No.92/7, Plot No.14 % 15, Sri Gokulam Nagar, Korukkumedu Road, Thavalakuppam, Puducherry	25 T
3	M/s. Aparna Paper Processing Industry (P) Limited, R.S.No.17/3-5,7 & 10, Sedarapet, Puducherry-605111.	30 MT
4	M/s. Aparna Paper Processing Industry (P) Limited-Unit II, R.S.No.15/2B, 3A, 3B & 15/4, Sedarapet Village, Puducherry	30 MT
	Total	<b>1278.9 MTA</b>

### Brand Owners

There are 9 Brand owners in Puducherry District manufacturing mainly various personal products and household consumable items. As per the provision of Section 9 (4) of Plastic waste management Rules, 2016, all the 9 brand owners have obtained Registration

from PPCC and have submitted Action Plan under Extended Producer Responsibility (EPR) to formulate channel link to collect and dispose the plastic waste. The details of waste generation are given in Table. Under the Chairmanship of the Secretary (LAD), implementation of EPR status is being monitored.

**Table 13: Brand Owners in U.T. of Puducherry**

Sl. No	Name of the Unit	Quantity of PW Generation
1	M/s. Fena (P) Limited, A-67 & 68, PIPDIC Industrial Estate, Mettupalayam, Puducherry	0.6
2	M/s. Godrej Consumer Products Ltd., R.S.No.245/1A, 245/3, 245/4 & 246/2A, Sethur Village, Thirunallar Commune, Karaikal	10.81 T
3	M/s. Hindustan Unilever Limited, Detergent Factory, NH-45A, Vadamangalam, Puducherry	157
4	M/s. Radha Plastickote Industries, R.S.No.51, Vadakku Vanjore Road, Keezhaiyur south, T.R.Pattinam, Karaikal	3 T
5	M/s. Hindustan Unilever Limited, (Tea Factory), No.9(3) Cuddalore road, Kirumampakkam, Puducherry	16 T
6	M/s. Godrej Consumer Products Ltd., R.S.No.239/3, 239/4, 240/5 & 240/6, Kurumbagaram Village, Nedungadu Commune, Karaikal	26.2 T
7	M/s. Hindustan Unilever Limited, Personal Products Factory, Vadamangalam, Puducherry	118.7 T
	Total	332.31

#### **Plastic waste in Road making**

On experimental basis, with the supervision of Prof.Vasudevan, 100 mt roads was laid in M/s. AMCOR Industry using their own plastic waste. The road is very strong and durability. Efforts are being made to have more such type of roads.

### **Plastic Pyrolysis Unit**

PPCC issued CTE for two plastic waste pyrolysis units in Sedrapet Industrial Estate, the unit yet to commence its production.

### **Bio-degradable Plastic manufacturing unit**

M/s. Rajaganapathy, has established Bio-degradable Plastic granules manufacturing unit with capacity of 4500 TPA. PPCC issued Registration to M/s. Sre Tharma Sasta Agency to sell biodegradable carry bags obtained from M/s.Easy Flex Polymers Pvt. Ltd. Udaipur, Rajasthan,, CPCB registered manufacturer.

### **Ban on usage of Single Use Plastics**

Realising the ill effect caused by usage of single use plastic , Govt.of Puducherry has imposed total ban on manufacturing , transport, stocking , sales and usage of single use plastic items with effect from 2<sup>nd</sup> August, 2019 vide, G.O.Ms. No.18/Env/2019, Puducherry, date 30/07/19.

### **Action initiated against violators**

- ❖ Four plastic manufacturing units were issued closure direction with disconnection of power for involving in manufacturing of banned plastic items violation of provision of Plastic Waste Management Rules, 2016. They are as follows:
  1. M/s Sri Krishna Polymers, Mettupalayam,
  2. M/s Sri Devidharshini polymers, Ariankuppam,
  3. M/s R.S. Polymers, Ottampalayam
  4. M/s.Kiran Plastics, Mettupalayam
  
- ❖ 6 cases have been filed under section 19 of Environment (Protection) Act, 1986 and violation was prosecuted. Penalty have been imposed to 5 major stokiect in Puducherry.

State Level Advisory Body has been constituted vide order No. 21116/LAS/A3/2017 dated 07.09.2017. It periodically monitors the implementation status of the provisions of the PWM, Rules, 2016.

## **BIO-MEDICAL WASTE MANAGEMENT**

In Puducherry District, 197 Health Care Facilities (HCF) are present. Out of which 36 are bedded and 161 are non-bedded HCFs.

**Table 14: Details of HCFs**

<b>Total No. of HCFs</b>	<b>197</b>
<b>No. of bedded HCFs</b>	36
<b>No. of Non bedded HCFs</b>	161
<b>Total No. of beds</b>	11712
<b>Authorisation obtained</b>	193

**Table 15: District-wise Bio-medical Waste Generation  
(for the previous calendar year 2018)**

<b>Sl. No</b>	<b>Name of the State / Union Territory</b>	<b>Name of the District</b>	<b>Bio-medical Waste Generation (in Kg/day)</b>	<b>Existing Total bio-medical waste treatment capacity (both captive and CBMWTF) in Kg/day</b>
<b>1</b>	U.T. of Puducherry	Puducherry	3145.34	All HCFs are disposing through CBMWTF located at Thuthipet.
<b>3</b>		Yanam	21.16	All HCFs are disposing through CBMWTF viz. M/s EVB Technologies, Rajamudry.
<b>4</b>		Mahe	60.5	All HCFs are disposing through incinerator available at General Hospital, Mahe.
<b>Total</b>			3226.96	

All HCF have entered agreement with Common Biomedical Waste Treatment Facility (CBMWTF either facility of Puducherry or neighbouring States like Tamil Nadu, Andhra Pradesh (Yanam) and one captive incinerator is available at Mahe.

**Table 16: District Wise Bio-medical Waste Generation as per part-2**

Sl. No.	District / Region	Total quantity of BMW generation in Kg/day
1.	Puducherry	3145.34
2.	Yanam	21.16
3.	Mahe	60.5
	<b>Total</b>	<b>3226.96</b>

The total BMW generated in the Puducherry district is 3226.96 Kg/day. These BMW are being disposed through CBMWTF at Thuthipet.

## **HAZARDOUS WASTE MANAGEMENT**

There are 120 hazardous waste generating industry are located in Puducherry District. Details of hazardous waste generation is given in Table-17.

**Table 17: Hazardous Waste Generation**

District	No. of Industries	Landfillable (TPA)	Incinerable (TPA)	Recyclable/utilizable (TPA)	Total (TPA)
<b>Puducherry</b>	120	4815	535	32695	38037

Figure 1.1 shows the graphical information on type of industry located in U.T of Puducherry. The automobile parts manufacturing unit is found to be maximum in numbers in U.T of Puducherry further followed by Consumer products and steel industry units. The Plywood, Glass manufacturing, Port are found to be minimum. The major contributor of Hazardous Waste generation based on authorized quantity is Pharmaceutical industry of quantity 36080MTA followed by Transmission line towers manufacturing industry and Automobile



parts manufacturing industries. Figure 1.2 shows the Total Waste generation by different Sectors based on Authorized quantity.

### **Hazardous Waste Disposal facilities**

Currently, the Hazardous waste are majorly disposed to authorized disposal facilities located in other states. The industries in U.T of Puducherry are directed to enter into agreement with authorized facility for disposal in other state at the stage of authorisation. The major TSDF facilities located in other states are M/s Mother Earth Environ Tech, Bangalore has Landfill facility, M/s Enano Incintech, Bangalore, M/s Gomiti Incinco, Bangalore has Incineration facilities authorized by Karnataka State Pollution Control Board, M/s ACC Limited, Madukarai, M/s GEPIL, Ranipet, M/s Sandhiya Enviro Tech System are authorized by Tamil Nadu Pollution Control Board for Co-processing and Pre-processing.

### **Future Aspects Disposal of Hazardous Waste**

In Puducherry, Consent to Establish was issued for setting up of Pre- Processing facility to M/s Nikkesh Enterprises and M/s Gujarat Enviro Protection Infrastructure Limited. It is also proposed to setup a TSDF facility in Puducherry as per the Hon'ble NGT order 804/2017.

### **Action taken by PPCC on Hazardous Waste Violators**

PPCC is taking severe action on violation of Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016. Based on the severity of the issue, PPCC issues direction or Show cause notice to the unit. PPCC has issued 8 show cause notice, revoked authorisation of 2 units and issued closure direction of 1 unit for violation of HOWM rules, 2016.

## **E-WASTE MANAGEMENT**

### **Introduction**

E-WASTE is a collective name for discarded electronic devices that enter the waste stream from various sources. It includes electronic appliances such as televisions, personal computers, telephones, air conditioners, cell phones, electronic products, etc. The list of e-waste items is very large and can be further widened. Faster technological innovation and

consequently a high obsolete rate poses a direct challenge for its proper disposal or recycling. This problem has assumed a global dimension, of which India is an integral and affected part.

The Ministry of Environment, Forest and Climate Change, Government of India notified the E-Waste Management Rules, 2016. Electronic waste or e-waste comprises old, end of life electrical and electronic appliances such as telephones, cellular telephones, computers, laptops, television sets, refrigerators, washing machine, air-conditioners, fluorescent and other mercury containing lamps etc., The rules apply to every manufacturer, producer, consumer, bulk consumer, collection centres, dealers, e-retailer, refurbisher, dismantler and

### **Source of E-waste**

Electronic waste especially computer waste is growing exponentially in volume because of increasing demand of information technology and its application in the national growth process. Various government department, public as well as private sectors are fast feeding old electronics appliances such as computers, telephones, etc., into the waste stream.

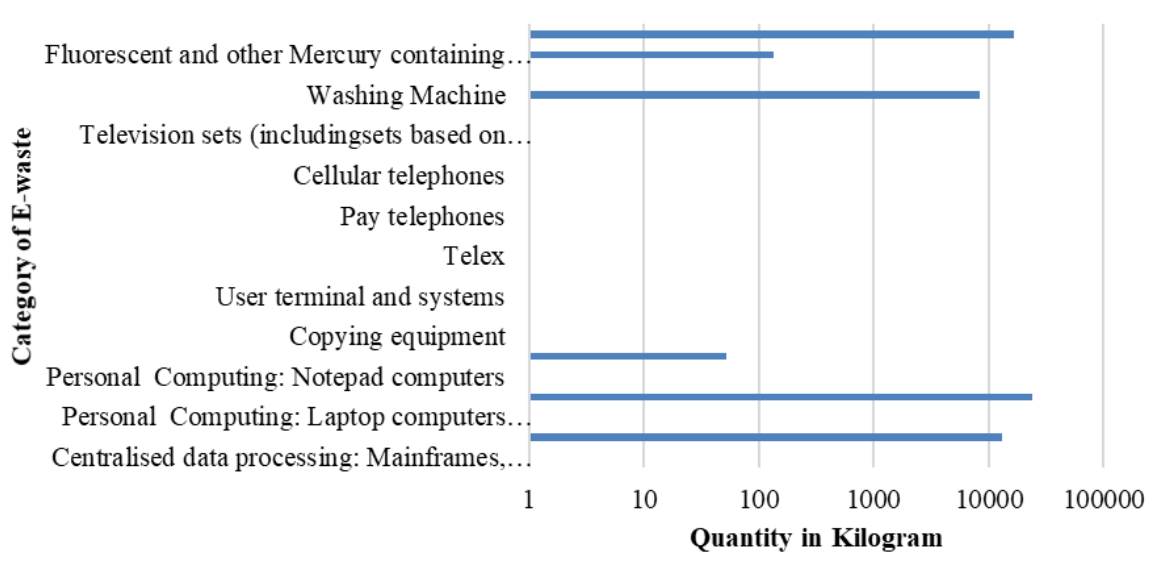
- Industries
- Individual household
- Institutions, Government organization, Education institutions and Banks
- Electronic manufacturers and retailers

### **Status of E-Waste Management in Puducherry**

PPCC issued authorization for 5 units (Manufacturer 3, Collection centre 2) under the E-Waste (Management) Rules. In U.T of Puducherry the major manufacturer of Electronic products are M/s Lenovo India Pvt. Ltd, M/s Acer India (P) Limited and M/s Whirlpool Pvt Ltd. The total generation of E-waste from U.T of Puducherry based on the annual returns is 62.5 tons for the year 2018-2019. The various category of E-waste generated as per E-waste management Rules, 2016 are shown below figure 1.1. PPCC has authorized 2 collection centers for collection of E-waste from U.T of Puducherry i.e. M/s Planet savers and M/s Borax India Limited. The E-waste collected from Puducherry are being disposed to authorized recyclers or dismantlers such as M/s Exigore recycling pvt ltd, M/s Virogreen India

Private Limited, and M/s Tesamm (india) Private Limited. There are no authorized recyclers or dismantlers located in U.T of Puducherry.

**Fig.8: E-waste Generation**



**Way Forward in E-waste Management.**

It is proposed to identify the collection points of Individual producers located in U.T of Puducherry and involve them actively in collection of E-waste through common service centers. In addition, E-waste drive are proposed to conduct to inhibit the informal trading, recycling and dismantling. PPCC also periodically inspects collection points to verify their conformity with Extended Producer Responsibility guidelines.

**8. Mining Regulation Plan**

**River bed sand mining**

River sand is one of the major components in construction activities. River beds viz. Sankarabharani and Thenpennai in the Puducherry are the main source of sand. Generally, monsoon rains brings in a lot of sand in the rivers and such sand deposits are permitted to be removed from the surface, based on the depth of sand deposits available, after inspection of

the sites jointly by the Revenue, Public Works Department, Science, Technology & Environment Department and applicants (Government owned corporations viz., M/s. PASIC, M/s. PAPSCO and M/s. PCBC). Normally, the sand is dug out from the dried river beds for the purpose of mineral development and to cater the needs of construction activities.

The sand Mining provisions are empowered from the Act, “Mines and Minerals (Regulations and Development) Act, 1957 (Act No. 67 of 1957)”. In exercise of the powers conferred by sub-section (1) or section 15 of the Mines and Minerals (Regulations and Development) Act, 1957 (Act No. 67 of 1957), the Pondicherry Minor Minerals (Concession) Rules, 1977 was derived / farmed.

The Puducherry Minor Minerals (Concession) Rules, 1977, empower the Government of Puducherry to permit sand quarrying by means of mining lease or mining permit. Lease is given for sand mining in respect of area stipulated for a particular period and whereas permit is provided for mining of specific quantity. Grant of sand mining licence / permit is governed by above Rules.

### **Encroachment of river, tank and pond**

106 encroachments have been reported in banks of some of the ponds, tanks and river bed. As part of Jal Shakti Abhiyan all the ponds, tanks are being revived by the respective estate officer i.e. Commissioners of local body and EE Irrigation Division by marking the boundaries, desilting and removing of encroachments thereon.

### **Type of Mining activity**

No major minerals are available in Puducherry. Only river sand, which is a minor mineral is permitted to be excavated. As per the Sustainable Sand Mining Guidelines, 2016 published by the MoEF & CC, New Delhi & the notification of MoEF & CC, New Delhi dated 15.01.2016 no mining is allowed without Environmental Clearance. Based on the conditions laid down by the State Environmental Impact Assessment Authority (SEIAA), Puducherry mining activity will be carried out by the Govt. agencies/corporations by open cast semi-mechanized method, shallow mining of less than 1m from the top of the river bed.

## No. of Mining Violations

Stringent action is being taken against the offenders involving in illegal sand mining/transportation. The action taken against those offenders for the past 4 years is detailed below:

**Table 18: Mining Violation**

Sl. No	Description	YEAR			
		2015-16	2016-17	2017-18	2018-2019
1.	Quantity of sand seized (cu.m)	140	560	700	1688
2.	Lorry captured	4	27	58	13
3.	Bullock carts captured	191	296	271	85
3.	No. of cases compounded	195	323	329	92
4.	No. of FIRs filed	10	16	13	45
5.	Compounding amount realized	Rs.6,33,300	Rs.15,53,000	Rs.34,33,000	Rs.10,14,000

## Environment protection measures in mining activity

The following conditions are laid down during mining activity.

The depth of the excavation of sand, dimensions will not be exceeded as per the limit prescribed in EC.

- i. No sand mining in rainy season.
- ii. To maintain safety and stability of river banks, 3 meters or 10% of the width of the river whichever is more will be left intact as no mining zone.
- iii. Adequate safe guard measures will be taken against dust emission, noise pollution and health risks.
- iv. Sand mining operations will be carried out between 7. 00 A.M. and 5.00 P.M.
- v. The excavated sand from the river bed will be transported to the storage facility and shall be distributed further by adopting proper dust control measures during

loading and transportation. The transport vehicles shall be covered with tarpaulin to minimize dust/sand particle emission.

### Measures taken to compact illegal mining activity

In order to curtail the illegal sand mining and transportation activities and in compliance with the directions of the Hon'ble High Court of Madras, check posts have been set up at Pathukkannu junction point, Arumbarthapuram, and Mullodai. These check posts are functioning round the clock and manned with revenue officials and Home Guards. These check posts play a vital role in curbing the illegal sand transportation activities and keep a constant vigil.

Further, as directed by the Hon'ble **National Green Tribunal**, Southern Zone, Chennai Bench, the Special Task Force on illegal sand mining comprising the following members was constituted vide Order No. 5920/DRDM/C2/NGT/2013 dated 02.11.2015:

**Table 19: Special Task Force**

Sl.No.	Designation of the Official	Designation
1.	The Deputy Collector (Revenue)-South, Villianur	Chairman
2.	The Executive Engineer (Irrigation Division), Public Works Department, Puducherry	Member
3.	The Superintendent of Police (West)	Member
4.	The Tahsildar, Taluk Office, Bahour	Member
5.	The Revenue Officer, O/o. Deputy Collector (Revenue)-South, Vilianur	Member Secretary

- ❖ Monthly review meeting is being conducted by the Special Task Force constituted under the chairmanship of the Deputy Collector (Revenue) South with the members comprising The Superintendent of Police and PWD officials to monitor the activities done during previous month and the activities to be done in the coming month.
- ❖ The Minutes of the Meeting is conveyed to all the line departments for taking necessary action.

- ❖ Check Posts have been constituted in the main entry points at the following places, under the head of Revenue Inspectors of the department to prevent the movement of the vehicle carrying illegal sand:-
  - a) Pathukannu
  - b) Odiampet
  - c) Periyar Nagar, Kuruvinatham.
  - d) Thookupalam, Irulansandhai.
  
- ❖ Prohibitory Order under Section 144 CRPC has been issued on various occasions in the River bank.
  
- ❖ An awareness camp was conducted in Soriankuppam and Kuruvinatham Villages by the Tahsildar, Taluk Office, Bahour along with the SHO, Bahour and the Villagers were educated about the ill-effect of the illegal sand mining on environment in the camp.
  
- ❖ An order has been passed to freeze the GLR values in respect of eight private lands where illegal sand mining is taking place along the bank of Sankaraparani River vide order No.6787/DCRS/GLR/B1/2018 dt.05/02/2018.
  
- ❖ Warning Notices have been issued to the Bullock Cart owners of Bahour and Lorry owners of Pillaiyarkuppam to stop illegal sand mining.
  
- ❖ Since the illegal sand mining is taking place at the other side of the river which falls in the Tamilnadu region, Tahsildar and Revenue Divisional Officer of Cuddalore District, have also been requested from time to time to take steps to curtail illegal sand mining in the Tamil Nadu site of the River Thenpennaiyar.
  
- ❖ Periodical ditches are made by the PWD in the river bed of Thenpennaiyar and Sankarabharani to prevent the illegal miners from getting into the rivers.
  
- ❖ A Cattle Trap near Soriankuppam Burial Ground has been constructed in order to

prevent the entry of the Bullock Carts into the Thenpennaiyar River for illegal Sand Mining.

- ❖ The sand mining squads are periodically demolishing the “floats/empty wooden barrel” which is being used to dig sand from the Sankaraparani River at Ariyapalayam.
- ❖ A team comprising of Police officials along with a Revenue Inspector has been deployed to carry out surprise raids/ attending complaints related to illegal sand mining/transportation during night time.

#### **Available legal Administrative frame work to regulate mining activity**

The sand Mining provisions are empowered from the act, “Mines and Minerals (Regulations and Development) Act, 1957 (Act No. 67 of 1957)”. In exercise of the powers conferred by sub-section (1) or section 15 of the Mines and Minerals (Regulations and Development) Act, 1957 (Act No. 67 of 1957), the Pondicherry Minor Minerals (Concession) Rules, 1977 was derived / framed.

The Pondicherry Minor Minerals (Concession) Rules, 1977, empower the Government of Puducherry to permit sand quarrying by means of mining lease or mining permit. Lease is given for sand mining in respect of area stipulated for a particular period and whereas permit is provided for mining of specific quantity. Grant of sand mining licence / permit is governed by above Rules.

Prior Environmental Clearance under EIA Notification is obtained before granting mining lease. Sustainable sand Mining Management Guidelines, 2016 of MOEF is being followed.

#### **Alternative source to carry out construction activity**

To prevent illegal sand mining and to meet out the shortage of sand for construction purpose, it was decided to import river sand from foreign countries. Accordingly, “The Puducherry Import of Sand, Transportation and Storage Rules 2018” have been framed and



published in the Extraordinary Gazette of Puducherry vide G.O. No.28 dated 05.06.2018 so as to allow the dealers to import and sell river sand to the general public. Under the said rules, 11 applicants have been registered as 'Importer of Sand' and 6 applicants have been registered as 'Mineral Dealer'. Further on 08.05.2019, M/s. Aban marketing & Exports Limited had imported **54,692.81** Metric Tonnes of sand from Malaysia through Karaikal Port. The imported sand is being sold to the general public through, a registered mineral dealer M/s. V.S.R Impex.

Further, the Public Works Department, Puducherry vide Circular No.342/PW/CE/EE(D)/AE(c) /F.No.734(B)/2017-18 dated 28.03.2018 had issued instructions to use crushed stone sand called as Manufacturing Sand (M-Sand) as an alternative source for construction purpose.

#### **E-flow affected by illegal mining activity**

Sankarabharani and Thenpennai are the major non-perennial rivers flowing in the Puducherry region. Due to failure of monsoon, non-availability of sand deposits and increased demand, sand is being excavated along the bunds indiscriminately by hand and bullock carts are used in transporting these unauthorizedly excavated sand. Due to illegal offenders, there exist some pits in the river beds in certain places which affect the natural flow of river current.

### **9. Bio-diversity and Greening Puducherry**

Puducherry District has no natural forest. Department of Forest and Wild Life has taken various measures to improve green cover of the district. Currently, 26.1 sq.km. of green cover has been developed by the Forest Department. Most of the plantation has been carried out in Social Forestry Scheme. Two nurseries were functioning one at Lawspet and another at Mettupalayam. Around 1 lakh seedlings have been produced annually in the two nurseries and distributed to the public at free of cost. One lakh trees have been planted for the last 3 years.

The Pondicherry Timber Transit Rules 1983, as amendment in 1999 is lonely available State legislation to curb illegal tree felling. Around 25 Nos. of illegal tree felling cases has been registered under Timber Transit Rules for the past 2 years

### **Species**

There 166 bird species have been spotted in Puducherry District of which 46 are migratory. In Reptiles, 3 species of turtles, 10 species of lizards and 16 species of snakes are reported.

### **Controlling Pouching activity**

Through intensive Patrolling and enforcement in the provision of the Wildlife (Protection) Act,1972. About 7 wildlife cases have been Registered on the poachers during the last 2 years.

### **Details on Turtle nesting ground**

Under Sea Turtle Conservation programme is being executed by this department. It may be noted that around 13,000 turtle eggs have been collected and maintained in natural hatchery center at Nallavadu and Panithittu. Out of them, 11,500 young hatchling were released in the Bay of Bengal during 2018 -19.

### **Details on endemic and endanger species**

Out of 480 plant species recorded, 11 species were endemic

1. *Andropogon pumilus*
2. *A systasia dalzelliana*
3. *Barberia acuminata*
4. *Cynodon barberii*
5. *Drypetes roxburghii*
6. *Loeilema anthephoroides*
7. *Jatropha tanjorensis*
8. *Maba buxifolia*
9. *Phyllanthus rotundifolia*
10. *Sarcostemma brunonianum*
11. *S. intermedium*

Among the 480 plant species, 20 different species are categorized under rare/endangered/threatened/vulnerable red listed medicinal plants category

1. Acacia chundra
2. Achyranthes bidentata
3. Aegle marmelos
4. Aristolochia indica
5. Buchanania axillaris
6. Cadaba indica
7. Cassia glauca
8. Clatrus panialatus
9. Crateva magna
10. Ericostemma littorale
11. Hemedismus indica
12. Hugonia mystax
13. Justicia gendarussa
14. Kedrostis foetidissima
15. Plumbago Zeglamica
16. Pseudarthria viscid
17. Salacia chinensis
18. Santalum album
19. Semegarpus anacardium
20. Terminalia arjuna

### **Coastal plantation programme**

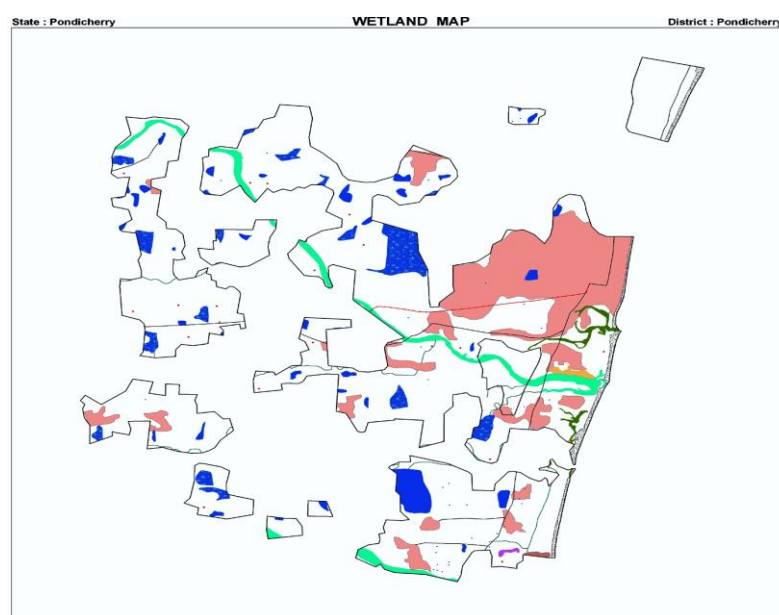
About 4000 Mangrove seedlings were planted on the bank of the Chunnambar river from April 2019.

## 10. Wet Land Conservation Plan

Wet land is heart of Eco-system. It supports biodiversity more than any other system. It act as natural check dam by arresting the flowing of water and there by controlling flooding and improving recharging of ground water. 115 wet lands, including 39 small wet land (<2.25 ha) are identified in Puducherry with 3506 ha area. Lakes and ponds contributed to 31 % of total wetland area. Other identified wet land are Lagoons (1), Creeks (5), beach (6) , mud flates (1) and salt marsh (1). **(Fig.9)** Ossudu Eri has been notified as Bird sanctuary by Govt.of Puducherry. Wet lands are governed by Wet land (Conservation and Management) Rules 2017. Puducherry Union Territory Wetland Authority has been notified by the Govt. of Puducherry under the Chairmanship of Chief Secretary, Puducherry.

Wetland is generally influenced by anthropogenic activities like poaching, discharge of sewage, effluent and dumping of industrial, biomedical and domestic waste. Notification of Wet land is basic step for its effective protection. Next measures is documentation of these wet land. Continuous vigil on poaching, discharge of sewage/effluent and over grazing activities shall be carried out. Intensive plantation will improve biodiversity.

**Fig.9: Wet  
Puducherry**

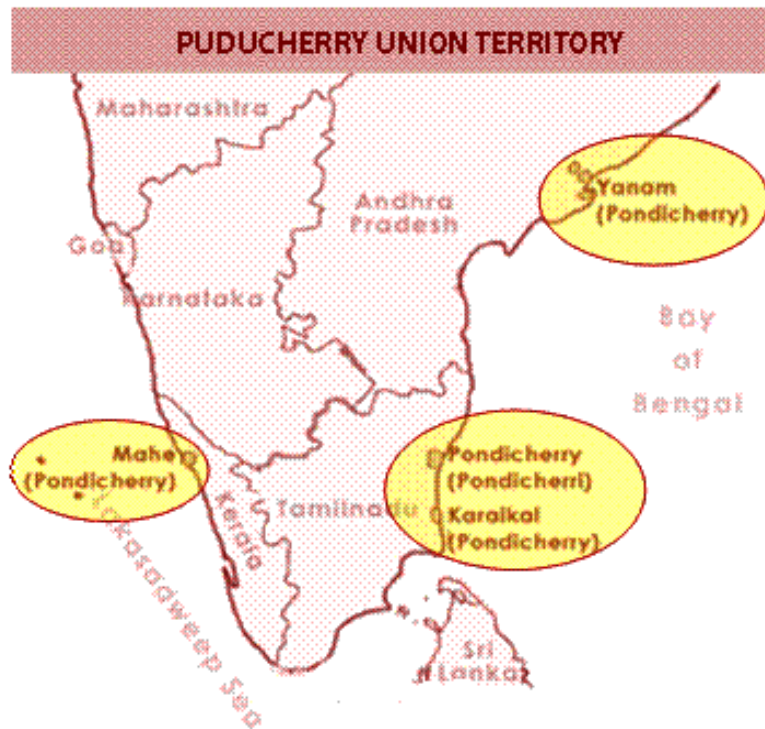


**Land Map of**

## 11. Coastal Zone Management

All the three regions of Puducherry District Viz. Puducherry, Yanam and Mahe are located in the coastal area and dependent on the coastal resources for its development and wellbeing. Puducherry region is interwoven within the state of Tamil Nadu along the Bay of Bengal coast. Yanam region is located within the state of Andhra Pradesh a few Kms inland of the Bay of Bengal Coast along the banks of Gautami Godavari River which is a tidal influenced water body. Mahe is located within the states of Kerala along the Arabian Sea coast.

**Fig.10: Puducherry Union Territory**



The coastal setting of all the four regions of Puducherry UT makes it highly vulnerable to the coastal disasters and climate change impacts. The limited coastal resources and the rising economic activities that compete for these vital resources are leading to more and more conflict.

## **Puducherry Region**

Pondicherry Region is a flat plain with an average elevation of about 20-25 metres above mean sea level. The marine plain stretches along the Bay of Bengal extends for about 22 km with a width ranging from 400 to 600 metres. The sea coast has a narrow flat beach with the sea almost touching the plain land at places. The marine plain consists of gently sloping lands with sand dunes. Other characteristic coastal land forms such as creeks and lagoons are also observed in it. The tidal flats extending along the coastal stretch are narrow, except around the Ariyankuppam estuary. Along the Puducherry coast, beaches are generally narrow and are undergoing severe erosion along the northern segment whereas in the southern segment, beaches are comparatively broad and depositional. Barrier dunes are seen as continuous mounds between Ariyankuppam, Kirumambakkam, Manapattu and Narimedu areas. Dunes are also seen almost on the entire coast except at Manaveli, Pooranankuppam and Manapattu coastal blocks. Estuarine mouths are prominent at Ariyankuppam, north of Pooranankuppam and in the southern segment where both Gingee and Ponnaiyar rivers join the Bay of Bengal.

**Table 20: Area Covered under CRZ in Puducherry**

Length of coastline along Bay of Bengal	22.23 kms
Length of tidal influenced inland water bodies like rivers and creeks	61.54 kms

## **Yanam Region**

Yanam is a small area of 8 square miles in extent, situated on the left bank of the eastern branch of the Gautami – Godavari River in Andhra Pradesh. It is built on a place where the river Coringa and the Godavari meet and is bounded on the East and the South by these rivers. Its located at about nine kilometres from the Bay of Bengal coast. It consists of relatively smooth flood plains, alluvial tracts and fluvial landforms produced by the river.

**Table 21: Area Covered under CRZ in Yanam**

Length of coastline along Bay of Bengal	Nil
Length of tidal influenced inland water bodies like rivers and creeks	65.43 kms

### **Mahe Region**

Mahe is a small coastal town situated on the west coast in Kerala, on the Malabar coast of the Arabian Sea located on the mouth of the Mayyazhi River. Mahe is bounded on the southwest by the Arabian sea, on the north by river Ponniyar (Moolakadavu) on the other sides by a stretch of calcareous hills of medium height, which are linked to the Ghats by a series of wooded hillocks. Mahe is a land that has its soul so connected to Kerala even though it forms a part of the union territory of Pondicherry. Mahe has a beautiful landscape surrounded by river and serene beach.

**Table 22: Area Covered under CRZ in Mahe**

Length of coastline along Bay of Arabian sea	1.46 kms
Length of tidal influenced inland water bodies like rivers and creeks	2.41 kms

### **Ecologically Sensitive Areas**

#### **Mangroves**

In Puducherry, mangroves exist as fringing vegetation distributed along the banks of the Ariankuppam estuary/backwaters. Though the waterway is a tributary of the river Gingee, freshwater input to this mangrove area is minimal and it mainly receives municipal and agricultural discharges. This tide-dominated estuary opens into the Bay of Bengal. Seven true mangrove floral species belonging to three families have been identified. The prominent species of mangroves found in this region include *Bruguieracylindrica*, *Rhizophora apiculata*, *Avicennia marina*, *Acanthus illicifolius*, *Suaedamonoica*, *Suaedamaritima*, and *Sesuviumportualacastrum*. Mangrove associates found in these areas are *Pongamiapinnata*,

Clerodendrum inerme, Eriosema littorale, Wattakakavolubilis, Hemidesmus indicus, Thespesia populnea and Scopariadulcis.

In Yanam region thick mangrove vegetation is found along in the river islands of Gautanmi Godavari which is a major tourism attraction. Total mangroves area in Yanam region is about 449.2 ha with diverse species of mangroves.

### **Sand Dunes**

Sand Dunes are formed by wind drift from the exposed sand areas of inter-tidal and supra tidal areas; the dunes take various shape and sizes and the height of which can go up to 10 m in undisturbed coastal areas. Puducherry being a coastal province too has moderate to good formation of sand dunes in Puducherry and Karaikal regions. The coastal zone of Puducherry comprises newer and older dunes including saline areas of clayey texture. These dunes are well stabilized and the locals claim that they are quite ancient. Though most of the dunes here have Casuarina or coconut plantations, some areas also have mixed vegetation supporting species like Prosopis, Eucalyptus and other shrub species. The sand dunes along the beaches of Puducherry area are slowly vanishing due to human intervention and also due to beach erosion. Many of these dunes have been reported to have been flattened for agriculture, as the swales have a high mineral and clay content, making it a very fertile soil to grow paddy.

Sand dunes play a vital role in disaster mitigation especially protection of other coastal features like vegetation and essentially forms as a part of the coastal ecosystem. The distribution of sand dunes in both the regions has not been mapped so far though their occurrence is reported. A project is proposed to be undertaken under the Integrated Coastal Zone Management Project funded by MoEF&CC for Mapping the Sand Dunes and Protecting them.

### **Turtle Nesting Grounds**

Eastern coastal regions of India are renowned for their marine turtle nesting beaches. The Gahirmatha beach of Orissa is one of the few remaining places where 'arribadas' or mass nesting of Olive Ridley turtles (*Lepidochelys olivacea*) occurs. Along the Coramandel coast



of Tamilnadu and Puducherry, the nesting beaches are spread from the Chennai coast to Point Calimere. Plants such as peach morning glory or *Ipomoea pes-caprae* (Linnaeus and raven's mustache or *Spinifex littoreus* and papyrus sedges or *Cyperus arenarius* are the coastal flora found in abundance here and serve as the natural nesting sites for sea turtles, such as the Olive Ridley (*Lepidochelys olivacea*), Leatherback (*Dermochelys coriacea*) and Hawksbill (*Eretmochelys imbricate*) turtles. The conservation status of these turtles is as Vulnerable (Olive Ridley, leatherback) and Critically Endangered (Hawksbill) according to the IUCN Red list of Threatened species. Because of this, the importance of awareness and conservation of turtles especially in this area is critical.

Earlier observations made by researchers, fishermen and wildlife enthusiasts in Puducherry identifies that Veerampattinam, Thengaithittu, Panithittu in the southern shores of the state as having wide shore areas with rich coastal vegetation and where most sightings were recorded when compared with the beaches in the northern shores of Puducherry. The nesting seasons for Olive Ridley turtles are unpredictable but generally appears focused between December and March.

The Forest Department is taking initiatives on conservation of the nesting grounds in collaboration with the local fishing community to identify hatching spots and to help guard the temporary hatcheries.

### **Coastal Issues**

The major issues of the coastal areas are beach erosion, pollution of water bodies, solid waste dumping, shrinkage of habitats like mangroves and geomorphic features like sand dunes, declining fishery resources, rapid growth of population and decreasing livelihood opportunities. The coastal issues are elaborated below.

### **Ports & Harbour**

The Minor Port of Puducherry region is situated in the East Coast of India between two Major Ports of India namely, Chennai and Tuticorin. It is an open roadstead anchorage port situated about 170 kms south of Chennai in position 11° 56' N, Longitude - 79° 50' E and is suitable for lighterage operations during fair weather months (February to September).

The minor port of Pondicherry constructed in 1986 consists of a pile supported jetty connected with an offshore breakwater. The length of the northern breakwater is 50m and southern breakwater is about 120m. This breakwater was constructed with the provision of sand bypassing system of about 400,000m<sup>3</sup>/yr. However, since the sand bypassing system has not been utilized appropriately. Because of this, deposition occurred on the south side of the breakwater and erosion on the north side of the northern breakwater. For protection of shoreline erosion, the Puducherry government has built riprap using boulders weighing 0.50 to 1.50 tonnes for a total length of about 8.55 km. In many places along this riprap, the seabed below the riprap is eroded due to severe wave action and ground subsidence. In order to have a sustainable solution for coastal erosion the Government of Puducherry has conducted long term coastal studies through NIOT from 2012 to 2015 and a pilot project on Restoration of Puducherry Beach is being implemented through NIOT.

Fishing harbours are located at the Ariyankuppam river mouth of Puducherry, at Godavari river in Yanam and at Mahe. The fishing harbor mouth at Puducherry experiences frequent sand accretion due to wave action, necessitating regular dredging at the mouth.

The activities of these Ports and Harbours needs to be closely monitored to prevent marine pollution.

### **Tourism**

Coastal Tourism is an important activity in Puducherry with upwards of 10 lakh tourists every year. About 10% of the tourists are from overseas. The serene beaches of Puducherry is a major tourism attractions. The growth of tourism activities has led to rapid development of coastal beach resorts, hotels, guest houses and restaurants. The solid waste and waste water management from these tourism infrastructures requires special attention.

### **Coastal Pollution**

Coastal areas are under pressure due to industrial growth and population explosion. Rapid development along the coast has resulted in increased migration to coastal cities and the expansion of coastal settlements. The coastal stretch of Puducherry faces the threat of coastal pollution due to the rapidly increasing tourism activities, resorts and hotels. Besides

waste water discharged from domestic and commercial activities to the nearby drainage canals finally enters in to the sea through backwaters and creeks.

The data collected in the coastal waters of Puducherry indicate that the dissolved oxygen level is within the permissible limits with an overall decline during the decade 2000-2010. Increased urbanization in the coastal areas has resulted in increased O<sub>2</sub> stress on the coastal waters. Moderate increase in levels of nitrate and phosphate has been observed over the years. High level of bacterial population in surface water indicates continued contamination of coastal waters due to untreated domestic sewage and industrial effluents.

The Government of Puducherry has submitted a proposal for implementation of the Integrated Coastal Zone Management Project in Puducherry UT which has been accepted by the MoEF&CC for implementation. Under this project Inventorization of all untreated waste water sources entering into coastal area will be undertaken and suitable action plan designing and implementation of pilot scale treatment plants at selected locations will be taken up.

### Coastal Erosion

Puducherry coast is facing the problem of shoreline erosion due to natural effects like wave force and littoral drift, and anthropogenic effects like construction of Breakwaters. In order to control coastal erosion, since 1969 the Puducherry Government constructed sea walls along the Puducherry town's coast. The status of shoreline changes along Puducherry was studied by the National Centre for Sustainable Coastal Management, Anna University, Chennai and the findings are given below:

**Table 23: Types of Coastal Erosion Zone**

Classification of Coast	Extent (km)	Percent of Coast	Cumulative (%)
<b>Length of Coastline including river mouths and Ports</b>	23.62		
High Erosion Zone			
Medium Erosion Zone	0.52	2.2	
Low Erosion Zone	0.46	2.0	
Artificial Coast: Seawalls/ Riprap	<b>6.18</b>	<b>26.2</b>	30.3

Stable Coast	9.27	39.2	39.2
High Accretion Zone			
Medium Accretion Zone	2.19	9.3	
<b>Low Accretion Zone</b>	5.00	21.2	<b>30.4</b>
<b>Details of Ports and Harbours</b>			
<b>Number of Ports/ Harbours</b>	2		
<b>Details of Fish Landing Centres and Groynes/ Breakwaters</b>			
<b>Number of Fish Landing Centres</b>	21		
<b>Number of Groynes/ Breakwaters</b>	7	100.0	100.0

- ❖ In the stretch between Pudukkuppam and Periyamudaliyarchavadi, the coast is “stable” and/ or accreting. This coast has many fish landing centres are dominated by tidal flats which tend to accumulate sediments. In addition, dunes are observed along this coastal area, providing stability to the entire coastal stretch.
- ❖ Covers the highly eroding coastal stretch between Bommaiypalayam and Puducherry’s Old Port. The most conspicuous features of this coastal stretch is the presence of coastal protection structures (seawalls/ riprap) and groynes all along the coast. The coastal stretch is classified as an “artificial coast” which has been undergoing high erosion in the past. Nearly 80% of this highly eroding stretch is managed by seawalls/ riprap as a coastal protection measure.
- ❖ Low erosion is observed in the north of Puducherry’s Old Port due to the presence of groynes. The coastal stretch near Bommaiypalayam is stable with dune formations. The rest of the coast consists of tidal flats and younger coastal plain.
- ❖ The Ariyankuppam, Gingee and Malattar Rivers join the Bay of Bengal in the north and south respectively. Between the Gingee and Ariyankuppam rivers, medium accretion is observed. This extends upto south of Puducherry Port. Zones of low to medium erosion is observed from north of the Puducherry Port to Thengattittu. The southern side of the Puducherry Port consists of breakwaters and seawalls that trap sediments moving north, thereby creating erosion along the coastal stretch after the northern breakwater.
- ❖ The coast is stable, extending from Sivanathapuram in the north to Manapattu in the south. The coast is accreting in the region adjacent to Puranankuppam. The

geomorphology of the coast is dominated by younger coastal plains.

- ❖ Stable coast throughout from Kirumambakkam in the north to the mouth of River Gadilam in the south.

**Fig. 11: Shoreline Changes Map of Puducherry Region**



## **Pilot Project for Restoration of Beaches**

Based on the request of Govt. of Puducherry to conduct a scientific study to protect and nourish the coast of Puducherry and the adjoining areas by adopting site specific coastal protection and restoration techniques, the National Institute of Ocean Technology, Chennai (NIOT) monitored the coastal processes responsible for shoreline changes from 2012 and has prepared a comprehensive Shoreline Management Plan for Puducherry in May 2015. Based on the studies NIOT subsequently designed and implemented the pilot project - **Restoration of Puducherry Beach.**

The proposed solution involves

- ❖ Construction of one Nearshore Wedge reef opposite to the Chief Secretariat on the north end of Pondicherry town foreshore, with the crest at Chart Datum.
- ❖ Construction of one Offshore reef placed at the south end, at 300 m north of the pier, with the crest at 1 m above Chart Datum.
- ❖ Sand nourishment using 4,50,000 m<sup>3</sup> of sand between northern and southern reef along the Coastline of Pondicherry Town near Gandhi Statue.

The goal of the near-shore wedge reef in the north is to provide a barrier to sediment losses, enabling sand to move naturally to the north while slowing the losses of sand from the town foreshore and the goal of the offshore reef at the south is to hold the sand on the beaches and prevent sand losses from the beach back to the Port.

The project commenced in March 2017 and construction of northern wedge reef was completed by August 2018. Sand nourishment was also carried out parallelly and it is to be continued. Construction of southern reef is yet to commence.

The fruits of this project is already visible as a Beach is already taking shape near the seawall and with the steady progress of the beach restoration project the city's coastline could soon travel back in time to its sandy past.

**Fig. 12: Formation of beach**



**Fig. 13: General public rejoicing in the newly formed beach**



### **Coastal Zone Management – Legal Framework**

Govt. of India has issued a Coastal Regulation Zone (CRZ) Notification, 1991 which was subsequently revised and reissued in the year 2011 and 2019. The CRZ Notification regulates all the developmental activities in the Coastal Regulation Zone. The coastal Regulation Zone extends between LTL and HTL and upto 500 meters from HTL on the landward side. Further, CRZ also applies to the land area between HTL to 100 meters or width of the creek whichever is less on the landward side along the tidal influenced water

bodies that are connected to the sea. The water portion of tidal influenced water bodies and water area upto 12 nautical mile in the sea is also covered under CRZ.

Government of Puducherry is enforcing the CRZ Notification through the Puducherry Coastal Zone Management Authority (PCZMA) at UT level and the Regional Coastal Zone Management Authorities constituted at the regional level.

The Coastal Zone Management Plan Maps have been prepared for the U.T. of Puducherry through Institute of Remote Sensing (IRS), Anna University and approved by MoEF&CC wherein the coastal regulation zone has been categorized as follows

- ❖ CRZ-IA – Ecologically Sensitive Areas like Mangroves, Turtle Nesting Grounds, Sand dunes, etc. CRZ-IB – Area between LTL and HTL
- ❖ CRZ-II – Considerably developed coastal (Urban/Municipal) areas
- ❖ CRZ-III – Rural (Commune Panchayat Limit) areas
- ❖ CRZ-IVA – Upto 12 nautical miles in the sea
- ❖ CRZ-IVB – Water portion of tidal influenced water bodies upto 5 ppt salinity

**Table 24: Area Statement for Puducherry District as per CRZ Notification, 2011**

Sl. No.		Puducherry	Yanam	Mahe
1	HTL Length along coastline in Kms.	22.23	-	1.46
2	HTL Length along Rivers / Creeks in Kms.	61.54	65.43	2.41
<b>CRZ CLASSIFICATION - AREA in Sq.Km</b>				
3	Mangroves (CRZ - IA)	0.23	3.19	97.63 Sq.mtrs
4	50m Buffer from Mangroves (CRZ - IA)	0.74	<b>3.87</b>	-



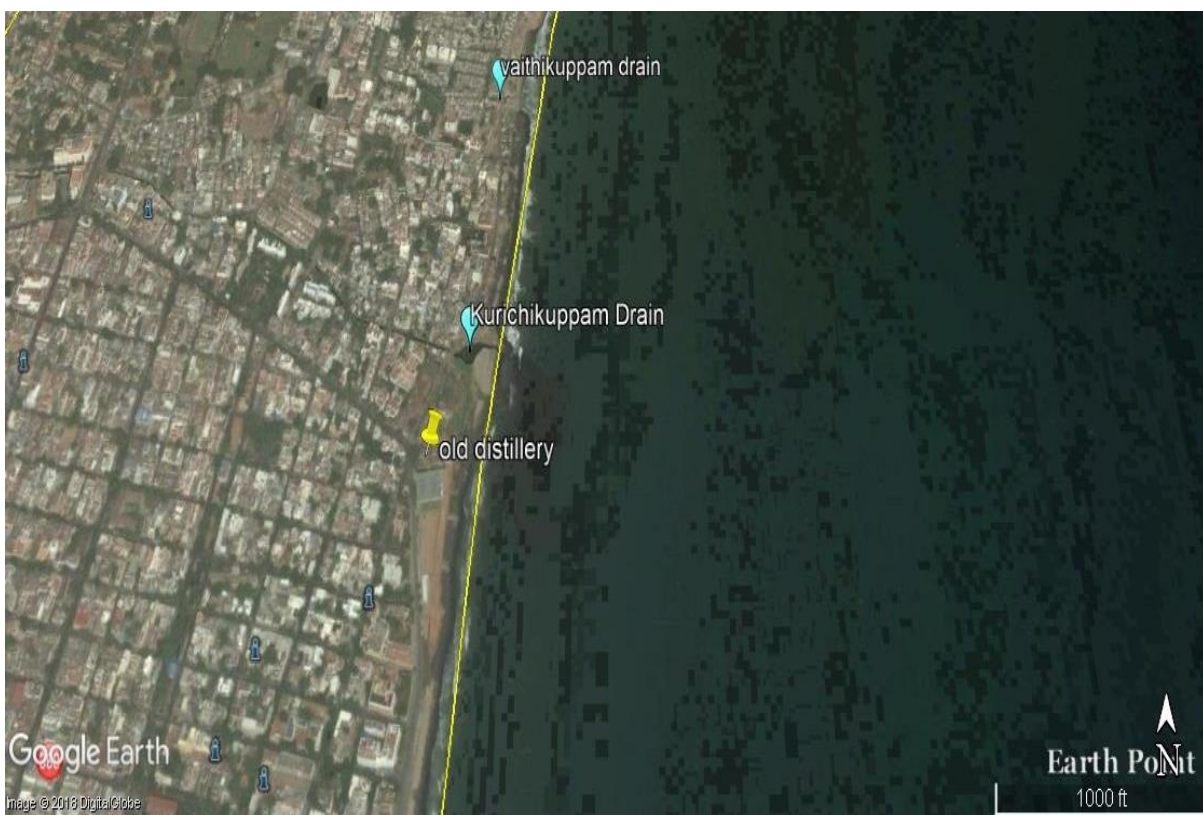
5	Salt Marsh (CRZ - IA)	0.01	-	-
6	Mudflat (CRZ - IA)	0.02	-	-
7	Archeological & Heritage (CRZ - IA)	0.18	-	-
8	Sand Dune (CRZ - IA)	0.19	-	-
9	Turtle Nesting Ground (CRZ- IA)	0.19	-	-
10	CRZ – IB	1.37	<b>1.14</b>	0.08
11	CRZ – II	7.28	<b>2.87</b>	0.80
12	CRZ – III	5.17	-	
13	CRZ – IVA	525.1	-	31.30
14	CRZ – IVB	3.17	<b>2.69</b>	0.13

**Table 25: Details of Coastal Revenue Villages falling under CRZ in Puducherry District**

Sea	River / Creek Name	CRZ - II Village Name	CRZ - III village Name
<b>PUDUCHERRY REGION</b>			
<b>Bay of Bengal</b>	River & Chunnambar River	Ariyankuppam	Poorankuppam
		Kalapet	Kirumampakkam
		Pillaichavady	Pillayarkuppam
		Puducherry	Manapattu
		Thengathittu	
		Ariankuppam	
		Manavelly	
		Murungapakkam	
		Olandai	
<b>Yanam Region</b>			
<b>Nil</b>	Gautami Godavari River	Iskitippah_Island	Nil
		Adivipalam	
		Tippah	
		Yanam	
		Kalnakalapet	
		Mettakur	
<b>Mahe Region</b>			
<b>Arabian Sea</b>	Mahe River	Kallayee	Nil
		Mahe	

Coastal ecosystems are of great importance and of immense value to mankind in the present and in the future. They are being degraded at an alarming rate by various preventable activities including that of human interference. The coastal ecosystems are to be monitored periodically for better management plans. Remote sensing technology has considerable potential in monitoring the changes periodically. DST&E is proposing to prepare a geospatial data base on the coastal resources of Puducherry under the Integrated Coastal Zone Management Project which will help the planners in identifying and addressing the key issues. The significant coastal issues are erosion rate, deteriorating coastal water quality and infrastructure developments for tourism. Hon'ble National Green Tribunal (NGT) in O.A.NO.829 of 2019 , directed all the coastal States to include components of coastal pollution issues in the District Environment Plan. These issues are addressed by the implementation of appropriate conservation measures and legal instruments.

**Fig.14 Map indicating locations of Vaithikuppam drain and Kurichikuppam drain**



**Fig. 15 Map indicating Pallavaikkal drain, Uppar drain and Grand canal**



**ANNEXURE - I****List of Industries Rain Water Harvesting Structures were Constructed**

<b>Sl.No.</b>	<b>Industries Name</b>	<b>No. of Structures</b>
1	M/s Fosico Industries, Mattupalayam, Puducherry	6
2	M/s Jothy Laboratory, Thethampakkam, Puducherry	2
3	M/s Ttk LG, Thirubhuvani, Puducherry	2
4	M/s Cheslind Textiles, Thirubhuvani, Puducherry	4
5	M/s Godrej Consumer Products, Nallur, Puducherry	6
6	M/s Axon Revocat (P) Ltd, Thirubhuvani, Puducherry	2
7	M/s Vasavi Educational Trust, Madagadipet, Puducherry	2
8	M/s Sri Pushpam Industries, Thirubuvanai, Puducherry	5
9	M/s Sri Balaji Industries, Kalitheerthalkuppam, Puducherry	3
10	M/s Pulkit Industry, Eripakkam, Puducherry	4
11	M/s GM Pens Private Ltd, Sedarapet, Puducherry	2
12	M/s VSP Papers, PSPalayam, Puducherry	2
13	M/s Appasamy Associate -Unit-II, Thiruvandarkoil, Puducherry	1
14	M/s Mahatma Gandhi Medical College, Pilliyarkuppam, Puducherry	4
15	M/s GM Pens Private Ltd, Thirubuvanai, Puducherry	2
16	M/s SPI Global, "Gothi Industrial Estate, Kurumpapet, Puduhercherry	3
17	M/s Premier distilleries, Mangalam, Puducherry	2
18	18 M/s Venkateshwara College of Engg & Tech, Ariyur, Puducherry	2

19	M/s Easun MR Tap Changers (P) Ltd, Thirubhuvani, Puducherry	2
20	M/s Rajaganapathy Paper Mills, Vadamangalam, Puducherry	2
21	M/s Rajaganapathy Paper Board, Vadamangalam, Puducherry	2
22	M/s Krishnasmy College of Education For Woman, Manapattu, Puducherry	4
23	M/s MRF, Private Limited, Eripakkam, Puducherry	7
24	M/s Hipro Ceramics Private Limited, Kalitheerthalkuppam, Puducherry	1
25	M/s ARAP Enterprises Private Limited, Sedarapet Puducherry	1
26	M/s Shasun Drugs & Chemicals, Kalapet, Puducherry	11
27	M/s Chemfab alkalies Private Limited, Kalapet, Puducherry	25
28	M/s Hindustan Unilivers Ltd (Soap Division), Vadamangalam, Puducherry	9
29	M/s Hindustan Unilivers Ltd (Personal Care Division), Vadamangalam, Puducherry	3
30	M/s Supreme (P) Ltd, Sanayasikuppam, Puducherry	10
31	M/s Neelkamal Industries, Senthatham, Puducherry	3
32	M/s Superfil products Ltd, Thirubuvanai, Puducherry	1
33	M/s Berger Paints , PS Nallure, Puducherry	6
34	M/s Snam Alloys, Kariamanickam, Puducherry	3
35	M/s Pondicherry Distilleries, Ariyalayam, Puducherry	4
36	M/s Kohinoor Printers, Thithipet, Puducherry	5
37	M/s Rajam Industries, Thithipet, Puducherry	2
38	M/s Lucas TVS, Thirubuvanai, Puducherry	3

39	M/s Superfil products Ltd, Mangalam, Puducherry	2
40	M/s Finewoods Private Ltd, Madugarai, Puducherry	2
41	M/s Natural Capsules (P) Ltd, Moolakulam, Puducherry	4
42	M/s Milton Laboratories, Thirubuvani, Puducherry	1
43	M/s Lucas TVS, Nettapakkam, Puducherry	4
44	M/s Hayagriva Polytechnic, Sooramangalam, Puducherry	3
45	M/s Santhosh Papers & Boards, Thirubuvanai, Puducherry	1
46	M/s GM Pens – EVR Street, - Sedarapet	2
47	M/s M/s Abirami Soap Works – Sembiapalayam	6
48	M/s Caplin point – Suthukeny	2
49	M/s Poclain Hydraulics – Thiruvandarkoil	3
50	M/s Petrogel – Thuthipet	2
51	Jipmer Hospital- Puducherry	8
52	M/s Providence Mall- Puducherry	3
53	M/s Samvi Plastic Products -Kurumbapet, Puducherry	1
54	M/s Teleflex limited - Thirubuvanai	2
55	M/s Manakula Vinayagar Engineering College- Madagadipet	9
56	M/s Manakula Vinayagar Medical College- Madagadipet	24
57	M/s Idhaya College of Arts & Science for Women, Pakkamudayanpet,	3
58	M/s Vasavi International School- Muthiyalpet, Puducherry	2
59	M/s True cartons – Sedarapet	1
60	M/s Micro Labs - Thirubuvanai	2
61	M/s KKNAG MAGIC, - Molapakkam Road, Kariamanickkam,	2

62	M/s SAB Millers, Mettupalayam	16
63	PIMS, Kalapet	9
64	Pondicherry University, Kalapet	11
65	Pondicherry Engineering College, Kalapet	6
66	M/s Sri Venkateswara Medical College, Aryiur	19
67	M/s. Guru Papers, Mettupalayam	2
68	M/s. Magna Chemicals, Mettupalayam	2
69	M/s. Christ Engineering College, Moolakulam	6
70	M/s. Achariya Engineering College, Villianur	4
71	M/s. Lakshmi narayana Medical College, Agaram	20
72	M/s J.R. Foods, Thirubuvanai	3
73	M/s Vel Biscuits, Sanyasikuppam	5
74	M/s. RAAK Institutions, Muthupillalalayam	5
75	M/s Rajivgandhi Veterinary College, Iyyankuttipalayam	7
76	M/s. SS Industries, Sedarapet	1
77	Government Arts College, Kadirkamam	2
78	M/s. L&T, Sedarapet	6
79	M/s Pallava Granites, Sedarapet	1
80	M/sCaplin Point, Suthukeny	1
81	M/s. Vimkar, Sedarapet	3
82	Muruga Theatre	1
83	M/s Vigneswara HSS, Sedarapet	1
84	M/s Nithya Packaging, Odiampet	3
85	M/s Santa Clara Convent, K. Manaveli	4
86	M/s Winbrose Distilleries, Odiampet	2
87	M/s Appasamy Associates, Thirubuvanai	2

88	M/ s Appasamy Associates, Vadamangalam	2
89	KVK, Kurumbapet	2
90	M/s Bharath Vidyashramam, Agaram	3
91	M/s Avvaiyar Engineering College, Thiruvandarkovil	2
92	M/s The Study School, Kalapet	4
93	M/s EATON Industries, Seadraper	4
94	New Collectorate, Pettaiyanchathiram	2
95	M/s Alpha School, Muthialpet	1
96	Co- Operative Building Centre	1
97	M/s Manatec Pvt. Ltd, Korkadu	2
98	M/s Ponlait, Iyyankuttipalayam	1
99	Raj Nivas, Puducherry	1
100	M/s Shanmuga Cinemas, Puducherry	2
101	M/s Hotel Accord	3
102	M/s Hotel Sunway	2
103	M/s D' Europe	2
104	M/s Hotel Karai Chettinadu	1
105	M/s DK Industries, Maducarai	1
106	M/s Nippon Electricals, Kariamanickkam	1
107	M/s G.G Organics, Thuthipet	1
108	M/s Ravikumar Distilleries, Katterikuppam	3
109	M/s Balaji Spirits, Sedarapet	3
110	M/s Primrose School, Moolakulam	1
111	M/s Sai KirubaHospital, Puducherry	1
112	M/s E-mox, Sedarapet	1
113	M/s Sabari College, Kirumampakkam	2



114	M/s Amcor industries, Kirumampakkam	4
115	M/s Mother son Industry, Thirubuvanai	2
116	M/s Mother son Sintermetal, Thiruvandarkoil	2
117	M/s Daya Petrochem, Sedarapet	1
118	M/s Pallava Granites, Sedarapet	1
119	M/s Reil Industries, Thuthipet	2
120	M/s Suja Rubber, Sedarapet	1
121	Govt. Dental College, Gorimedu	3
122	The Department of Agriculture constructed rooftop RWH structures in Government buildings	30
123	Public Works Department, Puducherry constructed rooftop RWH structures in Government schools and Colleges	165
	<b>TOTAL</b>	<b>649</b>

**ANNEXURE – II****Sewage generated by Units/Institutes**

<b>Sl.No.</b>	<b>Name of the Unit</b>	<b>Quantity Generated (KLD)</b>	<b>Utilized Institu (KLD)</b>	<b>Availability (KLD)</b>
<b>1</b>	M/s. Sri Manakula Vinayagar Medical College and Hospital	600	400	200
<b>2</b>	M/s. Pondicherry Institute of Medical Sciences	500	300	200
<b>3</b>	M/s. Sri Venkateshwaraa Medical College Hospital and Research Centre	400	200	200
<b>4</b>	M/s. Mahatma Gandhi Medical College and Research Institute	380	100	280
<b>5</b>	M/s. Aarupadai Veedu Medical College	240	200	40
<b>6</b>	M/s MRF Ltd., Eripakkam Puducherry	180	150	30
<b>7</b>	Providence Mall, Puducherry	80	50	30
<b>8</b>	M/s Lucas TVS Ltd., Eripakkam Village, NCP, Puducherry	96	90	6
<b>9</b>	Mahindra Holidays & Resorts India Pvt. Ltd., Valluvar Medu, Manapet Village, Bahour Commune, Puducherry.	60	60	0
<b>10</b>	WhirlpoolofIndia Ltd,Thirubhuvanai, Puducherry	55	55	0
<b>11</b>	M/s. Sri Lakshmi Narayana Institute of Medical Science Medical College & Hospital	200	100	100

12	Eaton Power Quality Pvt. Limited, No. 2, EVR Street, Sedarapet, Villianur Commune, Puducherry.	50	50	0
13	Larsen & Toubro Limited – TLT Unit, Mylam Road, Sedarapet, Villianur Commune, Puducherry	35	35	0
14	Lucas TVS Ltd, Kothapurinatham, Thiruvandarkoil, Puducherry	32	30	2
15	SPI Technologies India Pvt. Ltd., Gothi Industrial Estate, Kurumbapet, Villianur Commune Panchayat, Puducherry	32	20	12
16	Larsen & Toubro Limited – Form Work & Timber Shop Unit, Mylam Road, Sedarapet, Villianur Commune, Puducherry	30	25	5
17	Shenbaga Residency, No. 434, M.G. Road, Puducherry Municipality, Puducherry.	30	25	5
18	M/s India Nippon Electricals Limited, Madukarai, NCP, Puducherry	26	20	6
19	Hotel Athithi, S.V. Patel Salai, Puducherry Municipality, Puducherry.	23	20	3
20	Poclain Hydraulics Pvt. Ltd	13	13	0
<b>Total</b>		<b>3062 KLD</b>	<b>1943 KLD</b>	<b>1119 KLD</b>

**ANNEXURE – III****List of Effluent Generating Units With Quantity In U.T Of Puducherry**

Sl.No	District	Commune Panchayat	Name of the Unit	Quantity Generated (KLD)
1	Puducherry	Oulgaret Commune	M/s. Foseco India Ltd, MSI Area PIPDIC Industrial Estate, Mettupalayam. Puducherry.	12
2			M/s. Ucal Fuel Systems Limited (Plant 2) A-98, A-100, A-107, PIPDIC Industrial Estate, Mettupalayam, Puducherry.	25
3			M/s. Ucal Fuel Systems Limited (Plant 9) Plant 9 ,B 132, B 133, PIPDIC Industrial Estate, Mettupalayam, Puducherry.	0.3
4			M/s. Universal Pharmaceuticals Pvt. Ltd. A 38, 18th Cross PIPDIC Industrial Estate, Mettupalayam, Puducherry.	1.5
5			M/s. Swathi Organics Specialty Pvt. Ltd. A35 A36, PIPDIC Industrial Estate, Mettupalayam, Puducherry.	1.5
6			M/s Guru Paper Mills Pvt Ltd, B-176, PIPDIC Industrial Estate, Mettupalayam, Puducherry	10
7			M/s Richy Rich, A-127, 28th Cross, PIPDIC Industrial Estate, Mettupalayam, Puducherry	0.4
8			M/s Natural Capsules Limited, R.S No.84, Perambai road, Pitchaveerampet, Oulgaret Municipality, Puducherry	52
9			M/s Sri Venkateshwara Sizing and Processing Mills , A31 32, 10thCross, PIPDIC Industrial Estate, Mettupalayam, Puducherry	11
10			M/s The Flavors India (P) Ltd, C-5 & 14, PIPDIC Industrial Estate, Mettupalayam, Puducherry	2
11			IKON Associates, No 8 IV cross, PIPDIC Industrial Estate, Mettupalayam, Puducherry	1

12			Brightnex Pvt Ltd, Thattanchavady, Puducherry	2
13			Sun Fab, Plot NO B67, 68, VII cross road, PIPDIC industrial estate, Mettupalayam, Industrial Estate, Puducherry	3
14			Solara Active Pharma Sciences Pvt. Ltd., Kalapet	60(ZLD)
15			Chemfab Alkalis Pvt. Ltd., Kalapet	14
16		Puducherry Municipality	M/s. Sri Aurobindo Ashram Handmade Papers, No. 50, S.V. Patel Salai, Puducherry Municipality, Puducherry.	3
17			M/s. KUN HYUNDAI, (Kun Auto Co.Pvt.Ltd.), Cuddalore main road, Murungapakkam, Puducherry Municipality, Puducherry.	3
18		Bahour commune	M/s. Lanson Motors Pvt. Ltd., R.S.No.53/1A & 53/3, Pandy to cuddalore main road, Kirumampakkam, Bahour Commune, Puducherry.	9
19			M/s. Bio Genomics Ltd., No.139, Manapet road, Kanniakoil, Bahour Commune, Puducherry.	6
20			M/s. Schangalaya Motors, R.S.No.105/2, Pillaiyarkuppam Main road, Bahour Commune, Puducherry.	3
21			M/s. Schakralaya Motors, R.S.No.52/2, Cuddalore to Pandy road, Kirumampakkam, Bahour Commune, Puducherry.	3
22			M/s.TPRS Enterprises Pvt.Ltd., Kanniakoil Manapet Road, Bahour Cmmune, Puducherry	3
23		Ariankuppam Commune	General Optics (Asia) ltd	11.4
24		Yanam Municipality	M/s. Sree Srinivasa Papers, Adavipolam, Yanam.	15(ZLD)
25		Mannadipet Commune	M/s. Aeon Formulation, R.S. No. 515/1, Vinayagar koil street, Thirubhuvanai, Puducherry	5
26			M/s. GKM new Pharma., PIPDIC Electronic Estate, Thirubhuvanai, Mannadipet Commune, Puducherry.	3

27		M/s. Jyothy Laboratories, Thenthampakkam, Mannadipet Commune, Puducherry.	3
28		M/s. Skan Research lab Pvt. Ltd R.S. No. 3/7B, Pondy to Villuppuram Road, Puducherry.	2
29		M/s. Supreme Industries Ltd. Unit –II, R.S. No. 90,91, Sanyasi Kuppam, Mannadipet Commune, Puducherry.	20
30		M/s. Poclain Hydraulics Pvt. Ltd	5
31		Winner Diary, Kalitheerthalkuppam	32
32		Bymaa Laboratories	3
33		Best Care Formulation(P) Ltd, B15, PIPIDIC Electronic Park, Thirubhuvanai, Puducherry	3
34		TTK protective Devices Ltd Thiruvandarkoil, Puducherry	42
35		Caplin Point Laboratories, R.S.No. 85/3, Suthukeni, Puducherry	12
36		Rane Brake Lining Limited,Sanyasikuppam Puducherry	4
37		Indo French Laboratories, Thiruvandarkoil, Puducherry.	2
38		M/s. Dr. Milton Laboratories Pvt. Ltd, Sanyasikuppam, Puducherry	3.5
39		M/s. Motherson Sintermetal Technology Ltd, Thirubhuvanai, Puducherry	7
40		M/s. Micro Lab (Unit – III) , Thirubhuvanai, Puducherry	3
41		M/s. Arun Electronics, Thirubhuvanai, Puducherry	1.2
42		M/s. LSR Agro Foods, Thirubhuvanai,Puducherry	20
43		M/s. Teleflex Medical Pvt Ltd, Thirubhuvanai, Puducherry	30
44		M/s. V.S.B Paper Products, Vadhanur, PS palayam	20

45		M/s. SKN organics Pvt. Ltd, Thirubhuvanai, Puducherry	2
46		M/s. Vell Biscuits (P) Ltd Puducherry	9
47	Nettapakkam Commune	M/s. Berger Paints India Ltd., R.S.No.53-56, Pandacholanallur, Nettapakkam Commune, Puducherry	29
48		M/s. Subhiksha Dairy Products, R.S.No.68/1, Nathamedu, Eripakkam, Nettapakkam Commune, Kariyamanikkam Post, Puducherry – 605 106	4
49		M/s Abhirami Soap works R.S.No. 93/2, 1A & 1B, Sembiyapalayam Village, Embalam Main Road, Korkadu Post, Puducherry - 605 110.	18
50		M/s. Cavin Kare Private Ltd. R.S.No.81/1, Korkadu, Nettapakkam Commune, Panchayat, Puducherry - 605 110	2
51	Hospitals	M/s. Pondicherry Solid Waste Management Company Pvt. Ltd., Rajeev Gandhi Land Mark, ThuthipetVillage, Villyanur Commune, Puducherry.	10
52		M/s. Sri ManakulaVinayagar Medical College and Hospital, Kalitheerthalkuppam, Madagadipet, Puducherry- 605 107.	600
53		M/s Pondicherry Institute of Medical Sciences, Kanagachettikulam, Kalapet, Puducherry- 605 014.	400
54		M/s Aravind Eye Hospitals and Postgraduate Institute of Ophthalmology, Cuddalore Main Road, Thavalakuppam, Puducherry-7.	275
55		M/s. Mahatma Gandhi Medical College and Research Institute Pillayarkuppam Puducherry ETP I	600
56		M/s. Rajiv Gandhi Maternity Hospital, Ellaipillaichavady	280
57		M/s. AUM Hospital, Solainagar, Muthialpet	10

58		M/s. Sri Lakshmi Narayana Institute of Medical Sciences, Ossudu, Agaram Village, Villianur Commune, Koodapakkam Post, Puducherry- 605 502.	49
59		M/s Sri Venkateswara Medical College Hospital and Research Centre, PondyVillupuram Main Road, Ariyur Village, Villianur Commune Panchayat, Puducherry	400
60		M/s Aarupadai Veedu Medical College PondyCuddalore Main road, Kirumampakkam, Bahour Commune Panchayat, Kirumampakkam, Puducherry 607402	100
61		JIPMER Hospital, Dhanvandri Nagar, Puducherry	380
62		M/s A.G. Padmavati's Hospital, Atumparthapuram, Puducherry	45
63	Villianur Commune	M/s. Vinbros & Co., R.S. No. 250, Thirukanchi Road, Odiampet, Puducherry	20
64		M/s. Balaji Enterprises (Pondy) Pvt. Ltd.,R.S. No. 4/1, 4/2, Mailam Road, Sedarapet, Puducherry	6
65		M/s. Premier Distillery, R.S. No. 62/8, Madugarai Road, Mangalam, Villianur Commune Puducherry	1
66		M/s. Pondicherry Distilleries Ltd., R. S. No. 144 & 145, Ariyalalayam, Villianur, Pondicherry	55
67		M/s. Sai Supreme Textiles (P) Ltd.,R.S. No. 15/13 & 15/15,Vazhudavor Road,Kurumbapet, Puducherry	6
68		M/s. Steril GeneLife Sciences, Pvt. Ltd., Mangalam Village, Villianur Commune, Puducherry	41
69		M/s. Pondicherry Co-operative Milk Producers Union Limited, Kurumbapet, Puducherry	125
70		M/s. Sharun Pharmaceuticals Private Limited, R.S. No. 195/9, Pangur, Ariyur Village, Keezhur Road, Villianur Commune, Puducherry	2
71		M/s. Hindustan Unilever Limited, Personal Product Division, Off NH-45A, Vadamangalam, Puducherry	41



72		M/s. Hindustan Unilever Limited, Detergent Factory, Off NH-45A, Vadamangalam, Puducherry	96
73		M/s. G.G. Organics (P) Ltd., R.S. No. 122/6A & 120/1, Thuthipet, Villianur Commune, Puducherry	1(ZLD)
74		M/s. ATC Chemicals India (P) Ltd., R.S. No. 14/4 & 16, 15/9, Sedarapet, Villianur Commune, Puducherry	1(ZLD)
75		M/s. Sunbeam Generators (P) Ltd., R.S. No. 24/1, 2, 3A-D & 5, Canal Road, Koodapakkam, Villianur Commune, Puducherry	1(ZLD)
76		M/s. Nithya Packaging Pvt. Ltd. , R.S. No. 1/1 & 258/5, I.O.C. Gas Plant Road, Odiampet Village, Puducherry	150(ZLD)
77		M/s. SABMiller India Limited, Ayyankuttipalayam, Muthirapalayam Post, Puducherry	500
78		M/s. Ava Cholayil Health Care Pvt. Ltd., Odiampet, Villanur Commune, Puducherry.	0.4
<b>Total quantity generated</b>			<b>4504.2</b>

**ANNEXURE – IV**

**List of Effluent Generating Units Maintaining ZLD**

<b>S.No</b>	<b>Name of the unit</b>	<b>Quantity Generated</b>
1	Solara Active Pharma Sciences Pvt. Ltd., Kalapet	60
2	M/s. Sree Srinivasa Papers, Adavipolam, Yanam.	15
3	M/s. G.G. Organics (P) Ltd., R.S. No. 122/6A & 120/1, Thuthipet, Villianur Commune, Puducherry	1
4	M/s. ATC Chemicals India (P) Ltd., R.S. No. 14/4 & 16, 15/9, Sedarapet, Villianur Commune, Puducherry	1
5	M/s. Sunbeam Generators (P) Ltd., R.S. No. 24/1, 2, 3A-D & 5, Canal Road, Koodapakkam, VillianurCommune, Puducherry	1
6	M/s. Nithya Packaging Pvt. Ltd. , R.S. No. 1/1 & 258/5, I.O.C. Gas Plant Road, Odiampet Village, Puducherry	150
<b>Total</b>		<b>228</b>