



## INCIDENCE OF ENVIRONMENTAL ISSUES IN TAMIL NADU: A DESCRIPTIVE ANALYSIS

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### **Abstract**

Major environmental issues are forest and agricultural degradation of land, resource depletion (water, mineral, forest, sand, rocks etc.), environmental degradation, public health, loss of biodiversity, loss of resilience ecosystems, and livelihood security for the poor. The major sources of pollution in India include the rampant burning of fuel wood and biomass such as dried waste from livestock as the primary source of energy, lack of organized garbage and waste removal services, lack of sewage treatment operations, lack of flood control and monsoon water drainage system, diversion of consumer waste into rivers, cremation practices near major rivers, government an dated protection of highly polluting old public transport, and continued operation by Indian government of government owned, high emission plants built between 1950 to 1980. Air pollution, poor management of waste, growing water scarcity, falling groundwater tables, water pollution, preservation and quality of forests, biodiversity loss, and land/soil degradation are some of the major environmental issues India faces today. India's population growth adds pressure to environmental issues and its resources. The present study tries to make an attempt to account the major environmental issues and its driving forces and consequences and further the mitigation measures for sustainable living of the state. It is observed from the study that it is known that 14727 tonnes of municipal solid waste is generated per day in Tamil Nadu with close to 60 per cent of that coming from the 12 corporations. Over the period of study, the average annual SO<sub>2</sub> concentrations increased in all locations in Chennai, Madurai and Trichy, whereas the same reduced in Thoothukudi and Coimbatore. Excepting some locations, the RSPM concentrations increased in all locations in Tamil Nadu over the same period. The groundwater development is reported more than 100 per cent in several districts including Chennai, Salem, Perambalur, Krishnagiri, Dharmapuri, Tiruppur, Dindigal, Coimbatore, Vellore, Thanjavur, Villupuram and Nagapattinam, highlighting the seriousness of overexploitation in the State. Coimbatore tops the list of districts reporting severe water contamination, with over 40 per cent of its tested sources turning out to be contaminated in terms of fluoride, nitrate, iron and faecal contamination. It is also observed that there are about eleven important schemes and measures implemented in the state to manage the environment. Measures should also be initiated that balance and harmony between Economic, a Social and Environmental need of the country is very important, the participation of voluntary organizations, local educational institutions; Services Organizations like Lions Club, Leo Club, Rotary Club, Jaycees, Junior Jaycees, Red Cross Societies, Exnora etc, should come forward to manage the environment effectively in the state,

**Key Words:** *Environmental Pollution, Solid Waste Pollution, Air Pollution, Water Pollution, Noise Pollution, Environmental Management.*

### **Rationale**

Environmental problems, particularly in recent decades, have attracted attention World Wide, revealing an impending age of scarcity, the phrase environmental crisis underscores the fact we are running out of resources and out of place to store or dispose of our wastes. Environmental problems are usually local in origin but have effects that almost always transcend regional and national borders. Globally, environmental degradation is manifesting itself through the loss of fertile soils, desertification, decreasing forest cover, reduction of fresh water availability, and an extreme loss of bio-diversity. These are serious consequences, and it has become clear today that economic development must be environmentally sustainable. The scarcities of natural resources now threaten the sustained productivity of the economy and economic production and consumption activities. These activities impair environmental quality by over loading natural sinks with wastes and pollutants. The environmental consequence of development tends to offset many benefits that may be accruing to individuals and societies on account of rising incomes. More importantly, the environmental damage can also undermine future attainments and productivity, if the factors of production are adversely affected. Further, Environment is a matrix of various ecosystems existing in a web of delicate relationship. Nature always tries to maintain equilibrium among these ecosystems. However, man's activities have started affecting the quality of the environment. Pollution is a significant facet of environmental concern apart from deforestation, natural calamities, famine, etc. The waste spewed by the developmental activities into the environmental resources without consideration of the assimilating capacity of these resources has seriously affected their quality. Pollution is perceptible in the form of alteration of the physical, chemical and biological qualities of the natural resources – viz. water, air and land. The industrial sector has registered a tremendous growth during the last few decades. Pollution caused by the industrial sector is quite significant Urbanization in Tamil Nadu is on increase decade after decade leading to consequent problem of disposal of liquid and solid waste .Tamil Nadu is the third industrialised and the



most urbanised state in the country. The impact of Industrialization and urbanization on environment is substantial as evidenced from rise in hazardous and biomedical waste generation, increasing vehicular population and consequent increase in energy demand and air pollution. The environmental challenges in Tamil Nadu and efforts to tackle them through institutional mechanism, increased public awareness and legislation are explained towards the end of the report. Strict improvement of environmental legislation coupled with environmental consciousness among the public at large alone can bring better environmental future for the present as well as future generation. From the above context, the present study tries to make an attempt to account the major environmental issues and its driving forces and consequences and further the mitigation measures for sustainable living of the state of Tamil Nadu based on the available secondary sources.

### Objectives

The present piece of research work tries to study the major environmental issues and its driving forces and consequences and further the mitigation measures for sustainable living of the state with the specific objectives to study the Eco-Profile of Tamil Nadu and its Management; to analyse the form wise incidence of pollution in the State; to know the driving forces to the incidence of pollution in the State; to explore the management measures taken by the State to mitigate the pollution in the State; and to suggest possible policy measures to safeguard the quality of environment in the State..

### Materials and Methods

To fulfill these objectives the required secondary data relating to the study have been gathered from various official documents- Economic Survey, RBI Bulletin, India- Infrastructures Report, Tamil Nadu-An Economic Appraisal, State of Environment Report, web sites, etc

### Analysis and Discussions

Based on the data from the State of Environment Report, it is found that with a 13 per cent increase in very dense forests, a 7 per cent increase in moderately dense forests, and a 21 per cent increase in open forests, the total forest cover in Tamil Nadu has increased by 14 per cent between 2005 and 2015. The tree cover in Tamil Nadu however, declined by 20 per cent over the same period. It is also found that the reserved, protected and un-classed forests in Tamil Nadu registered a marginal decline of about 0.7 per cent between 2004-05 and 2013-14. It is also found that as many as 230 medicinal species, 126 fish species, 56 amphibian species, 77 reptile species, 32 bird species, and 40 mammals are under the red-list category in Tamil Nadu. These species require sustained attention for conservation.

**Table 1. District Wise Qty of Hazardous Waste Generation in Tamil Nadu**

Sl.NO	Name of the District	No.of.Units	Total Quantity of HW Generation MTA	Land fills	Recyclables	Incinerable
1	Chennai	94	1644.41	187.82	1014.27	443.02
2	Coimbatore	368	23182.11	2261.46	822.48	98.16
3	Cuddalore	41	6541.25	4856.79	886.45	798.00
4	Dharmapuri	10	26.95	-	26.95	-
5	Dindugul	46	6055.56	5370.00	659.69	22.00
6	Erode	341	6191.71	5923.20	268.51	-
7	Kancheepuram	162	8913.88	6095.39	1750.42	1068.08
8	Kanyakumari	19	133.69	0.11	123.22	10.36
9	Karur	60	6482.43	6324.52	157.91	-
10	Krishnagiri	63	3324.17	1276.13	1481.02	567.02
11	Madurai	116	2007.51	964.06	564.23	479.21
12	Nagapattinam	17	652.34	296.28	290.59	65.47
13	Nammakkal	116	1664.31	1519.83	144.48	-
14	Nilgiri	11	685.82	618.00	51.82	16.00
15	Perambalur	13	286.36	1.68	137.69	147.00
16	Pudukkottai	29	478.53	443.07	35.40	0.06
17	Ramnad	10	9.19	0.10	9.09	0.01
18	Salem	118	13190.13	9474.83	794.82	2920.48
19	Sivagangai	20	223.51	162.02	60.79	0.70
20	Thanjavur	26	101.14	1.94	99.20	-
21	Theni	11	1029.05	1000.00	29.05	-
22	Thiruvallur	154	25011.55	5306.76	17960.48	1864.32



23	Thiruvannamalai	13	52.16	-	52.16	-
24	Thiruvarur	11	450.18	440.00	10.14	0.04
25	Thoothukudi	39	50026.93	39995.30	9958.43	73.21
26	Tirunelveli	38	1363.46	1171.58	126.50	65.39
27	Trichy	54	2906.55	990.10	972.72	943.72
28	Vellore	153	18308.32	13696.38	4264.25	347.69
29	Villupuram	17	483.63	445.18	28.44	10.02
30	Virudhunagar	40	429.83	161.39	135.78	132.66
	Grand Total	2210	181856.70	128,984.21	42,916.98	10,072.61

Source : Tamil Nadu Pollution Control Board, Chennai

With regard to the soil environment, cropping intensity increased by 51 and 47 per cent in the districts of Thiruvarur and Dharmapuri, respectively. It has increased significantly in Nagapattinam, Cuddalore, Villupuram, Thanjavur, Salem and Krishnagiri. In a majority of the districts, the area under non-agricultural use has increased over the period 2003-04 to 2013-14 in Tamil Nadu.

It is known that 14727 tonnes of municipal solid waste is generated per day in Tamil Nadu with close to 60 per cent of that coming from the 12 corporations. The state accounted for roughly 13.5 per cent of total biofertilizer production in India in 2011-12. Among the 12 corporations in Tamil Nadu, only six treat their municipal solid waste. In Chennai, other than the segregation done for recyclable waste by the sanitary workers, there is no further processing of municipal solid waste and it is disposed-off at two dumping yards at Kodungaiyur and Perungudi

The Government of Tamil Nadu has been proactive in setting up new biomethanation plants using municipal solid waste in the state. Following the successful testing of the pilot project at Arcot municipality, the Government has proposed to set up 29 new biomethanation plants of 3-5 MT capacity across 5 corporations and 24 municipalities in the state.

Over the period of study, the average annual SO<sub>2</sub> concentrations increased in all locations in Chennai, Madurai and Trichy, whereas the same reduced in Thoothukudi and Coimbatore. Excepting some locations, the RSPM concentrations increased in all locations in Tamil Nadu over the same period. The total number of motor vehicles has grown in Tamil Nadu by 125 per cent during 2005-06 and 2013-14. Besides Chennai, Ariyalur and Coimbatore districts have high vehicle densities in excess of 200 vehicles per kilometre of road length. Tamil Nadu produced roughly 27 per cent of all-India passenger vehicles and 13 per cent of all-India commercial vehicles in 2010-11. Other major industries with potential for air pollution include sugar (which registered 72 per cent increase in production between 2004-05 and 2012-13) and cement (where the state's share increased by 75 per cent over period 2004-05 and 2011-12). The small scale industries have also increased by 73 per cent in Tamil Nadu between 2004-05 and 2012-13. Despite impressive penetration of cleaner cooking fuels such as LPG, close to 70 per cent of households in Tamil Nadu still use firewood and other solid fuels for cooking in rural areas, putting significant health burden on women, children and the elderly.

**Table 2 Annual Average Concentrations of Air Pollutants in Major Cities of Tamil Nadu (in , ~g/m<sup>3</sup>)**

S. No.	City	S.No.	Location	Category	So <sub>2</sub>			No <sub>2</sub>			RSPM		
					Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
1	Chennai												
		1	Kathivakkam	Industrial	18	13	15	19	15	17	75	37	53
		2	Manali	Industrial	18	13	15	19	16	18	71	28	46
		3	Thiruvottiyur	Industrial	18	13	15	19	16	18	78	36	54
		4	Anna Nagar	Residential	17	8	13	36	16	22	159	72	101
		5	Adyar	Residential	16	9	12	30	16	21	69	41	55
		6	Kilpauk	Commercial	23	16	12	42	18	27	169	80	111
		7	Thiyagarayanagar	Commercial	26	10	16	42	20	29	189	90	121
2	Coimbatore												
		1	DCO	Mixed	5	4	4	31	22	25	55	29	44
		2	Ponaiyarajapuram	Residential	4	4	4	31	19	23	62	23	49
		3	SIDCOT	Industrial	5	4	4	34	23	28	77	45	60
3	Thoothukudi												
		1	Raja Agencies	Industrial	15	11	13	28	19	22	160	58	102



		2	AVM Buildings	Mixed	12	9	10	29	17	13	105	44	67
		3	SIPCOT	Industrial	16	12	14	25	19	22	98	49	74
4	Madurai												
		1	M/s Susee Cars & Trucks (P) Ltd.	Industrial	21	12	15	31	19	23	52	24	33
		2	Madurai Corporation Office (SZ)	Mixed	19	13	16	28	21	24	63	33	44
		3	Highways Project Buildings	Residential	17	10	14	28	18	22	41	29	35
5	Salem		Sowdeswari College Building	Mixed	9	8	8	29	23	25	85	48	61
6	Trichy												
		1	Gandhi Market	Commercial	19	14	17	23	19	21	120	17	105
		2	Main Guard Gate	Traffic intersection	19	17	14	24	18	21	131	109	118
		3	Bishop Heber College	Mixed	12	10	11	16	13	15	50	39	43
		4	Golden Rock	Residential	15	11	12	17	14	15	95	40	51
		5	Central Bus Stand	Traffic intersection	18	14	16	22	19	21	224	108	127
7	Cuddalore												
		1	Eachangadu Village	Residential	12	7	9	25	13	20	102	29	65
		2	DEE Office	Commercial	12	6	8	25	13	20	98	27	63
		3	SIPCOT	Industrial	9	6	8	22	13	19	85	35	58
8	Mettur												
		1	RamanNagar	Residential	8	5	7	25	19	21	67	39	49
		2	SIDCO	Industrial	11	9	10	30	20	27	89	44	64
Prescribed Standard (Annual Average) for Industrial, Residential, Rural & Other areas					50			40			60		

Source : Tamil Nadu Pollution Control Board, Chennai

It is found that with significant dependence on ground water for irrigation compared to canals and tanks, almost all districts report more than 50 per cent of irrigation needs met through groundwater. Some districts such as Thanjavur, Perambalur, Viluppuram, Dindigul report more than 95 per cent of their groundwater for irrigation. Nitrogenous nutrients currently account for more than two-thirds of the total fertilizer consumption compared to 51 per cent in 2007-08. Increased use of nitrogen containing fertilizers leads to water pollution owing to non-absorption by the plant and leaching into the groundwater. The groundwater development is reported more than 100 per cent in several districts including Chennai, Salem, Perambalur, Krishnagiri, Dharmapuri, Tiruppur, Dindigal, Coimbatore, Vellore, Thanjavur, Villupuram and Nagapattinam, highlighting the seriousness of overexploitation in the State. Coimbatore tops the list of districts reporting severe water contamination, with over 40 per cent of its tested sources turning out to be contaminated in terms of fluoride, nitrate, iron and faecal contamination in 2011.

**Table 3. Area wise Quality of Water Distribution in Tamil Nadu**

S.No.	District	% of water Contamination
1	Ramanathapuram	13
2	Dharamapuri	12.7
3	Virudhunagar	10.8
4	Sivaganga	10.7
5	Salem	10.1
6	Karur	5.8
7	Nagapattinam	4.5
8	Madurai	3.7
9	Perambalur	3.6
10	Namakkal	2.7



11	Thiruvallur	2.4
12	Erode	1.8
13	Thanjavur	1.5
14	Vellure	1.4
15	Thiruvarur	1.3
16	Krishnagiri	1.1
17	Tiruppur	1.1
18	Ariyallur	1.0
Mean = 5		
SD= 4.27		
C.V = 85		

Source: State of Environment Report, Department of Environment, Tamil Nadu

In January 2010, Government of India published norms of permissible noise levels in urban and rural areas. In India, the Noise Pollution (Regulation and Control) Rules, 2000 have been framed under the Environment (Protection) Act, 1986. As directed by the Central Pollution Control Board (CPCB) all the State Pollution Control Boards (SPCBs) & Union Territories (UTs) have to carry out ambient and noise level monitoring during Deepawali festival every year. The ambient air quality monitoring is carried out at 163 locations and noise monitoring is carried out at 209 locations across the country covering 21 States. In Tamil Nadu state, ambient air quality monitoring carried out in eleven cities and noise monitoring carried out at 28 locations in eleven cities. It is shown the status of ambient noise level across Tamil Nadu on normal and festival days. Since Diwali festival is one of the main events concerning noise pollution, several reports both State Pollution Control Board and the CPCB have analyzed the noise data recorded in cities on the festival day over the years. Based on noise data recorded during Diwali 2015, in Chennai, Guindy (under the industrial category) has the highest record of noise level during day and night, in the commercial areas category Pallikaranai recorded the lowest and Washermanpet recorded the highest, in the silence areas category Anna Nagar has reported the lowest noise level. However, recently CPCB conducted the Ambient Noise Level assessment at 70 locations in seven cities (Delhi, Mumbai, Chennai, Kolkata, Lucknow, Bangalore and Hyderabad) during Diwali festivals over the years 2011 to 2015. In Chennai, as per the observation of the report it is observed that at four of the five stations, the ambient noise levels have shown increasing trend over the past five years

A recent study constructed Environmental Sustainability Index (ESI) for the districts of Tamil Nadu using 2011-2 as the baseline year. The ESI consists of 45 indicators spread across nine thematic areas including, population, land-use, agriculture, transport, water, forests, solid waste, energy, and output. The study identified Vellore, Karur, Perambalur, Virudhunagar, Krishnagiri, Dharmapuri and Tiruppur as the least sustainable districts.

It is also observed that there are about eleven important schemes and measures implemented in the state to manage the environment, the important schemes are National River Conservation plan; Chennai City River Conservation Project; National River Conservation Programme; Palar River Conservation; National Green Crops, Formation of technical Cell, Environmental Awareness Camps and Competitions Schemes; Environmental Research and Development; Water Quality Monitoring Laboratory and Conservation of Coastal Eco-System.

**Table 4. Status of Ambient Noise Level in Major Cities in Tamil Nadu**

S.No.	District	City	Area/Zone	Normal Day	Festival Day
1	Chennai	T.Nagar	Commercial	75	81
		Sowcarpet	Commercial	79	84
		Triplicane	Residential	70	86
		Basant Nagar	Residential	61	78
		Nungambakkam	Residential	64	87
2	Vellore	Main Road, Gandhi Nagar	Residential	66	83
		Sainathapuram	Residential	62	88
3	Cuddalore	Imperial Road	Commercial	75	76
		Sekar Nagar	Residential	53	68
4	Hosur	Devaki Nursing Home	Commercial	64	83
		Transi House	Residential	63	82
		ESI Hospital	Silence	60	75
5	Salem	Shiva Tower, Meyyanur	Commercial	61	74
		Sri SaradhaBalamandir School	Residential	51	81
6	Trichy	Thillai Nagar	Residential	67	84



7	Madurai	Madurai Corporation south	Commercial	70	87
		Thirunagar	Residential	59	84
		Alagar Nagar	Silence	68	82
8	Tirunelveli	Samathanapuram	Commercial	64	88
		Tirunelveli Town	Residential	82	74
		Pettai	Silence	67	90
9	Dindigul	Municipality Building	Commercial	61	73
		NS Nagar	Residential	65	84
		Dist. Court	Silence	57	65
10	Coimbatore	SaibabaKovil Signal	Commercial	72	68
		Ponnirajapuram	Residential	67	82
11	Trippur	Kumaran Complex	Commercial	61	65
		Rayapuram	Residential	68	79

Source: State of Environment Report, Department of Environment, Tamil Nadu

It is also found that National River Conservation Plan was initiated for the interception, diversion and sewage treatment in the five major cities, Namely Trichy, Komarapalayam, Erode, Bhawani and Pallipalayam with the project cost of Rs.36.28 Crores in Tamil Nadu. In addition, Chennai City River Conservation Project to Conserve Coowam River Buckingham canal-Adayar, Otteri. Nullah, Capitains cotton& Mambalam Drain with the project cost Rs.491.52 crores.

The national River Conservation Programme was started for the pollution control in seven major towns around the river Cauvery, Vaigai and Tamiraparani- Trichy, Thanjavur, Kumbakonam, Karur, Mayiladuthurai, Madurai and Tirunelveli with the project cost of Rs.575.03 crores in the state, The Project of the Palar river Conservation for providing underground sewerage system to minimize pollution of the River Palar was also initiated by the state.

The National Lake Conservation Programme was started with the view to up gradation of environment through bioremediation in Ooty and Kodaikanal with the financial allocation of Rs.6.88 crores, The National Green Crops was Sponsored by the Government of India to 7500 schools, initially under this schemes so for Rs. 1.87 Crores was spend to create environmental awareness among students,

**Table 5 Scheme- Wise Allocation of Amount on Environment**

NO	Scheme	Amount
1	National River Conservation Plan	Rs.21.05 Crs
2	Chennai City River Conservation Plan	Rs.358.46 Crs
3	National River Conservation Programme	Rs.325.92 Crs
4	Plan River Conservation Plan	Rs.25 Crs
5	National lake Conservation Programme	Rs.1.97 Crs
6	National Green Crops	Rs.1.87 Crs
7	Formation of Technical Cell	Rs.53 Lakhs
8	Environmental Awareness Camps and Competitions	Rs.22.5 Lakhs
9	Environmental Research& Development	0.010 Cr
10	Water Quality Monitoring Laboratory	Rs.0.10 Cr
11	Conservation of Coastal Eco System	Rs.17 Crs

Source: State of Environment Report, Dept of Environment, Tamil Nadu

### Recommendations and Conclusion

Based on the findings the following suggestions have been made to reduce the incidence of pollution and safeguarding the quality of environment in the state. It is suggested that the solid waste management in Tamil Nadu faces similar challenges as faced in other Indian states (cities) – including, inadequate segregation of waste at source, and improper disposal in land fill site leading to serious environmental challenges. Governments should make the segregation of wastes mandatory and municipalities could be authorized to levy fines if segregated waste is not made available to the municipalities for collection; Each municipality should identify land for setting up of landfills on a priority basis and land filling should be restricted to non-biodegradable/inorganic waste.

It is recommended that the posts, particularly of staff involved in the monitoring of pollution and the environment, be filled to full capacity in order that these activities may be carried out efficiently and effectively.



The total plan outlay of the Central and State Governments, the allocation to the Environment and Forestry Sector is less than one percent. Many of the schemes have allocations that are too small to make any real impact. Efforts should also be made to ensure prominent share of renewable energy in the energy mix in installed capacity for electricity generation in the State and the capacity of existing institutions must be enhanced to handle volatile nature of renewable energy generation with emphasis on creating flexible systems.

It is also suggested to mandate solar power generation and use for common lightings in all the new commercial and residential structures/complexes. Further, to mitigate the Air Pollution in the state. phasing out of old vehicles, creation of effective and efficient transport system; fast and cost effective intra-city railway network effective, good road conditions with more flyovers and underpasses etc.; use of clean and good quality fuels like CNG; and stringent enforcement of various standards/norms for curbing pollution may give a desirable result.

### **Conclusion**

It is a fact that the rapid economic growth experienced by the state is resulting in adverse and harmful environmental conditions that are affecting the people of the state as well the wider national and global population. Environmental degradation is one of the concomitants of economic development and its causes such as increase in green houses gases, degradation of land, pollution of air and water, degradation loss of bio- diversity and the fragile eco-systems pose a challenge to the country's policy makers and planners in ensuring sustainable economic growth. Several initiatives have been taken by the government for pollution abatement in rivers and lakes besides promoting environmental consciousness among the public at large Environmental conservation requires creation of awareness and attitudinal change among the people. Since the ensuring the environmental sustainability is one of the eight Millennium Development Goals and Sustainable Development Goals, the National Environmental Policy was approved by the government of India for conservation of critical environmental Resources; Intra- Generational; Integration of Environmental concerns in economic and social development, Efficiency in Environmental Resources use; Environmental Governance, Enhancement of resources for environmental conservation. Measures should also be initiated that balance and harmony between Economic. Maintaining a healthy environment is not the states responsibility alone, but also that of every citizen public- private partnership is crucial in the spectrum of environmental management, The environmental issues, problems, environmental attitudes, which would have significant impact on intentional ecological behavior must be emphasized that may direct people towards preservation and conservation of environment. Hence, the participation of voluntary organizations, local educational institutions; Services Organizations like Lions Club, Leo Club. Rotary Club, Jaycees, Junior Jaycees, Red Cross Societies, Exnora etc, should come forward to manage the environment effectively in the state,

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