Sr. No 204/2011
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Annexure -E

IN THE HIGH COURT OF JUDICATURE AT BOMBAY
ORDINARY ORIGINAL CIVIL JURISDICTION
PUBLIC INTEREST LITIGATION NO.17/2011

Nicolas H. Almeida ...Petitioner

v/s

State of Maharashtra through
Its Chief Secretary and Ors. ...Respondents

AFFIDAVIT ON BEHALF OF RESLPONDENT NO.3.

I, Yeshwant B. Sontakke, aged about 46 Years, occupation-service, the Regional Officer (HQ) and Incharge Joint Director (Water Pollution Control) of the Maharashtra Pollution Control Board, having my Office at Kalpataru Point, 3rd Floor, Sion-Matunga Scheme Road No.8, Opp.Cine Max Cinema, Sion (East), Mumbai -400 022, do hereby on state solemn affirmation as under :

I am working as the Regional Officer(HQ) w.e.f. 13/08/2003 and holding an additional charge of the Joint Director (Water Pollution Control) w.e.f. 30/09/2011. I say and submit that being the Joint Director (Water Pollution Control), I am overall incharge of the supervision of the CETPs in the State of Maharashtra at Head Quarter level. I say and submit that at the Regional and Sub-Regional Level, the concerned Regional Officers and Sub-Regional Officers of the Respondent-Board are responsible for

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the order passed by this Hon'ble Court dtd.1/12/2011 as well as are responsible for the monitoring of the CETPs in their jurisdiction(Mahad, Additional Mahad, Roha, Taloja, Patalganga, Additional Patalganga, Murbad, Additional Murbad, Talegaon, Vilebhagad, Shiroli (Kolhapur) and Vasarni (Nanded) respectively. I am filing this Affidavit in Reply in compliance of the order passed by this Hon'ble Court dtd.1/12/2011 and on the basis of the Water Quality Status of Water Bodies Report prepared by NEERI and the reports on Monitoring done by the MPCB Officials made available to me. I crave leave to file an additional Affidavit as and when necessary. I shall not be deemed to admit anything save except whatever stated hereunder :

(1) I say and submit that the Maharashtra Pollution Control Board has established a separate Division namely, Pollution Assessment Monitoring & Surveillance(PAMS) w.e.f. 3/08/2005 for effective implementation of National Air Quality Monitoring Program (NAMP) & National Water Quality Monitoring Program (NWMP) in the State and operation & maintenance of MMV and fixed stations of the Board, all other activities related to air & water monitoring, data collection, collation and compilation of air & water quality including updating the Website. Through PAMS Division, overall environmental monitoring and sampling is being carried out throughout Maharashtra including various catchment areas of the rivers in the State of Maharashtra at various points fixed by the Maharashtra Pollution Control Board and Central Pollution Control Board under the program Global Environmental Monitoring System(GEMS), Minimum National Aquatic Resource Survey (MINAS), National Water Quality Monitoring Program (NWMP) and State Water Quality Monitoring Program (SWMP).

(2) I say and submit that under the State Water Quality Monitoring

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(NWMP) and Hydrology Project, the river water quality is being monitored at 248 locations along 59 rivers in the State of Maharashtra. In the report, water quality data for these locations for the period 2007-2009 has been analysed. Sea water quality data monitored under SWMP, NWMP at 34 locations has also been subjected to analytical and statistical interpretation. On the other hand, Groundwater Survey and Development Agency (GSDA), Central Ground Water Board (CGWB) and MPCB have been regularly conducting Ground Water Quality Monitoring in various Districts of State of Maharashtra. Ground Water Quality data for 1406 locations in all at 35 Districts of Maharashtra have been studied and interpreted in terms of trends, patterns etc. through National Environmental Engineering Research Institute (NEERI) and Maharashtra Pollution Control Board.

(3) I say and submit that the above report has been prepared to derive information from the Water Quality Monitoring being carried out by multiple agencies. The report compiled the enormous amount of water quality data for all major & minor rivers, seafronts and creeks and ground water of Maharashtra collected from various locations through Organizations of the State and Center. Water quality data for 3 years during the period 2007-2009 for 59 rivers, monitored at 248 locations, 33 coastal water and about 3500 Ground Water Stations in 35 Districts of Maharashtra have been analyzed. The following are the summary observations in the Water Quality Status of Water Bodies in Maharashtra with Recourde to Analytical / Statistical Tools (April, 2011) prepared by NEERI :

i) Monthly Water Quality Data for selected physico-chemical

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Nitrate for the years 2007-2009 was compared with the Maharashtra Pollution Control Board Water Quality Standards of Class A-II for the best designated usage. Percent exceedance of these parameters with respect to the standards shows that at 140 locations out of 248 monitoring sites, the values exceeded to stipulated standards 50% of the times. At other 103 locations, the parameters exceeded the stipulated standards 75% of the time. At 43 locations, the parameters exceeded the stipulated standards all of the time.

ii) At most of the sampling locations in the rivers, BOD values have exceeded the MPCB Class AII standard of 5mg/l. Rivers with locations, where the BOD values exceed the standards 100% of the time are Bhima, Damanganga, Godavari, Indrayani, Kolar, Krishna, Mithi, Mula, Mutha, Pawana, Pedhi, Purna, Tapi, Ulhas, Vaitarna, Wena and Wainganga. Many townships are located on the banks of the rivers, which are the major sources of pollution of rivers. High BOD values observed in the downstream stretch of the river at major cities indicate poor performance of domestic waste water treatment. The locations close to the cities show frequent non-compliance of the standards.

iii) At several locations, pH values are not within the MPCB standard of 6.0 to 8.5. A lower value of 4 produces sour taste and higher value above 8.5 an alkaline taste. Extreme pH can result in rapid fish kill and alteration in flora and fauna. Microbial quality of water in terms of TC count showed that exceeding value with respect to MPCB

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iv) Water Quality Index evaluated using four parameters viz.pH, DO, BOD and FC showed that 58 locations had water quality index as "Good to Excellent" during the period 2007-2009. The 30 locations had water quality as "Very Bad' at least in one of the months during the period 2007-2009. Most of the other locations water quality index varied between "Moderately Good to Bad".

I am enclosing herewith the statement showing the exceeding parameters in comparison with the Water Quality Standards of Class A-II for the best designated usage prescribed in the River Regulation Zone Policy, as an **Exhibit : R-I** collectively.

(4) I say and submit that the Regional Officers of the Maharashtra Pollution Control Board at the above locations through the officers of the Board carried out monitoring of the above points in the catchment area of river. They were asked to make available the statement showing the water quality in respect of monitoring. The sum and substance of the reports received from the Regional Officers in respect of the subject matter can be summarized as under :

(a) The Regional Officer of the Respondent-Board at Navi Mumbai communicated that there are 2 MIDC Estates in the area of Navi Mumbai Regional Office viz (i) TTC, MIDC area, Navi Mumbai, Dist: Thane and (ii) Taloja MIDC Estate, Panvel, Dist: Raigad.

Taloja MIDC is situated near Kasardi river, which is a Notified River under River Regulation Zone Policy dtd.13/07/2009. It has provided Common Effluent Treatment

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from the Member Industries in the said cluster, so as to treat it to the standards laid down under the provisions of the Environment (Protection) Act, 1986 and Rules made thereunder for CETP under the Schedule-I at Sr.No.55. The treated effluent collected from the Members of the CETP Industries after pre-treatment given by them and after treatment disposed off into Waghivali Creek through a closed pipeline of 7 kms.

There is no river in Navi Mumbai area nearby TTC, MIDC, where, Common Effluent Treatment Plant of the capacity of 27 MLD for collection & treatment of pre-treated effluent of Member Industries provided. The treated effluent of CETP after achieving the standards laid down under Environment (Protection) Rules, 1986 in Schedule-I at Sr.No.55 disposed off into TTC Creek through a closed pipeline of 7 kms. at a point fixed by National Institute of Oceanography (NIO).

A statement showing the results on analysis of the effluent of both the CETPs at TTC & Taloja are enclosed herewith and marked as an **Exhibit : R-II**.

(b) The Regional Officer of the Respondent–Board at Kalyan has communicated that MIDC Murbad was established in the year 1984 as a Phase-I thereafter Phase-II was established in the year 1992. This Phase-II is now called as Additional Murbad MIDC. This industrial estate is having engineering type of industries, at present there are about 182 industries of which 100 industries are presently closed. The categories break-up of these industries is Red-25, Orange-5 & Green-154. In this industrial area, there is no chemical industries.

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In MIDC Murbad area, there are about seven industries from which the effluent is generated, this effluent is mainly from the plating section of these industries, which is treated individually in their effluent treatment plant, which comprises of primary, secondary & tertiary and the treated effluent is used for gardening within the premises. During routine vigilance in the MIDC, it is noticed that the effluent from these industries do not meet the Murbad river.

The Murbadi river is only seasonal & flows only during rainy season & is not notified as per the RRZ policy dated 13/7/2009. This Murbadi river originates from hilly area of village Deheri, Saralgaon etc. & flows from the MIDC area & meets to Ulhas river near Raite, at the upstream of this river, MIDC has constructed a K.T. Weir from which water is lifted & supplied to MIDC and surrounding villages.

The statement showing the results on analysis of the industries, which generates effluent in Murbad MIDC & Addl. Murbad MIDC are enclosed herewith and marked as an **Exhibit : R-III** collectively.

(c) The Sub-Regional Officer of the Respondent-Board at Kolhapur reported that the industries situated in MIDC Shiroli, are Engineering industries. These industries have provided effluent treatment plants and the treated effluent is used for gardening in their own premises. There is no discharge of effluent into the Panchganga river. The statement showing the results of analysis of the effluent of industries, which generates effluent in MIDC Shiroli are enclosed herewith and marked as an **Exhibit : R-IV** collectively.

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(d) The Regional Officer of the Respondent Board at Raigad communicated that PRIA CETP is located in the Patalganga MIDC and commissioned in June, 2004. The said CETP is designed for 15 MLD capacity and utilization is @ 86% i.e. 13 MLD (11 MLD from MIDC Patalganga & 2 MLD through tankers from non-MIDC areas, which mainly contains high concentrated steam/industrial effluent from Lote, Mahad area etc.). There are 32 members from MIDC Patalganga, discharging their treated effluent to CETP for further treatment. Further, MIDC has allotted plots to M/s. Hindustan Insecticides Ltd., Rasayani & M/s. Hindustan Organic Chemicals, Rasayani, these units are treating their effluent into individual ETP & discharge same to saline zone at Kharpada through close pipelines.

The treated effluent from CETP is discharged through closed pipelines (8 KMs), provided and maintained by MIDC into the saline zone of river Patalganga at Kharpada village.

The Board has issued Interim direction to M/s. PRIA CETP vide letter No. MPCB/WPAE/ID/B-7055 dated 4/11/2010. PRIA CETP has submitted the bank guarantee amounting Rs. 25.0 Lakh at Regional Office, Raigad. Due to poor performance and frequent complaints, the Board is initiating stringent legal action against the PRIA CETP in due course of time.

Mahad MIDC is established in the year 1981–82 and same is located on the bank of Savitri river. The total 103 nos. of industries in the jurisdiction of MIDC, Mahad, out of these, 72 are water polluting (effluent generating) units. The Industries have provided ETP for treatment of their industrial

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is provided by MMA Co-Op Society Mahad at Plot No. P-43, MIDC Mahad. The capacity of CETP is 7.5 MLD. The CETP completed in June 2005 & same is in operation. The treated effluent disposed into saline zone of Savitri River at distance about 23 Km. (approx) away from CETP i.e. at Ovale village.

MIDC Roha has established industrial area at Village Dhatav in the year 1970. There are 51 no of Large, Medium & Small scale industries are located in this industrial estate These industries are mainly involved in the manufacturing of Bulk Drugs, intermediates, Food dyes, Pigments, Pesticides & Specialty Chemicals etc.

MIDC has provided underground drainage system for the collection of industrial effluent for this area. Approximately 10 to 11 MLD effluent is treated in this CETP. During last year, 1938 MT HW was disposed off at the MWML,Taloja.

All the industries located in the MIDC area have provided individual effluent treatment plants. MPC Board is regularly monitoring the quality of treated effluent from industries and CETP.

Treated effluent is disposed through closed pipeline at a distance of about 9.2 km at Kundalika river near village Arekhurd.

Further, NIO suggested the disposal point at Mahadeokhar, which is at the distance of 19.614 km. away from existing disposal point. MIDC had made proposal to extend the disposal line up to Mahadeokhar, as per the suggestion of NIO. At present, the development of MIDC area in Vileghagad area is in progress.

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(Govt. of India)

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The statement showing the results of analysis of the effluent of industries being discharged by the industries/CETP in MIDC particularly situated at the MIDC Estate at Mahad, Addl. Mahad, Roha, Patalganga, Addl. Patalganga area are enclosed herewith & marked as an **Exhibit : R-V collectively**.

(e) The Regional Officer of the Respondent-Board at Pune communicated the results of MIDC Talegaon. From the results it may be seen that the concentration of BOD, COD & even some times suspended solids are marginally exceeding the prescribed standards of 30mg/l, 80mg/l & 100 mg/l respectively.

The Regional Officer of the Respondent-Board at Pune further communicated that the MIDC has developed software IT park at Talawade, Pune in 75 Hectors of land. The said park was established in 1989 which is prior to the declaration of RRZ policy dated 15/7/2000. The boundary of IT park is touching to the high flood level of Indrayani, which falls in A-II class of River water. The source of water is from river Pawana at Riveit weir. There are total 54 NOs. of plots & most of the plots are allotted to various IT industries. Presently each individual IT industry has provide Sewage Treatment Plant & treated sewage is used for gardening/plantation within premises. They have also proposed to provide Common Sewage Treatment Plant (CSTP) of 2.0 MLD capacity consisting of raw sewage collection sump, stilling chamber, screen chamber, grit chamber, UASB, feed well, UASB reactor, aeration tank, secondary clarifier, filter bed tank, multi-grade filter, treated sump & SDB's.

A statement showing the results of analysis of the

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CETP/MIDC Talegaon is enclosed herewith & marked as an **Exhibit : R-VI**.

(e) The Sub-Regional Officer of the Respondent-Board at Aurangabad has communicated that M/s.Government Milk Scheme industry is situated in MIDC Nanded near Godavari river at village Vasarni & at distance of 800 mtrs. All the other units generating effluent in MIDC area more than 1.5 Km away from Godavari river. There are 320 total no. of industries in MIDC Nanded. There are 33 industries falls in Red category, 95 industries in Orange category & 192 industries in Green category located in MIDC Nanded. There are 10 nos. of industries operating & generating effluent. Most of these industries are agro based industries, involved in Edible oil extraction & refining and are seasonal in nature. M/s Godavari Drugs Ltd. Is only large industry in operation & generating effluent. The said industry has provided primary & secondary treatment facility followed by solar evaporation, impervious concentrate lagoons & there is no discharge from this industry.

The statement showing the results of analysis of the effluent of industries being discharged by the industries in MIDC Chikalthana & Nanded are enclosed herewith & marked as an **Exhibit : R-VII** collectively.

(5) I say and submit that Government of Maharashtra has approved RRZ Policy for the State of Maharashtra by its Government Resolution (G.R.) dtd.15/07/2000, which has been revised by its G.R. dtd.13/07/2009. Those Government Resolutions imposed restrictions on the setting up or expansion of existing industries on the bank of notified rivers. Therefore, no new industry can be set

above Government Resolution dtd.13/07/2009, which has been replaced in the place of earlier G.R. dtd.15/07/2000. However, it will be more appropriate that the details of any other industries set up by MIDC at the river banks after the revised G.R. dtd.13/07/2009 can be taken from the MIDC itself.

(6) I say and submit that the Central Pollution Control Board has issued directions u/s 18(1)(b) of the Water (Prevention & Control of Pollution) Act, 1974, vide letter dtd.2/9/2008, directing the Maharashtra Pollution Control Board to initiate monitoring program for all CETPs and to take follow up action against industries/CETPs, not complying with the prescribed standards and not to permit expansion/establishment of the industrial units in these areas, where, the Associated CETPs are not complying with the required standards and not having adequate hydraulic load capacity.

I say and submit that the MPCB has issued Circular to the Chief Executive Officer, MIDC, Andheri and District Industry, Center-Raigad, Ratnagiri, Pune & Solapur dtd.17/11/2008 and 3/12/2011, pointing out that the performance of the CETPs at MIDC-Mahad, Roha, Lote, Kurkumbh and Solapur is not satisfactory and they were requested not to allow the plots / grant SSI registrations to any new establishments / expansion in these MIDC areas without permission of the Board. However, subsequently the Board has issued Guidelines on the basis of no increase in pollution load of CETPs and ensuring that the performance of CETPs will not be affected, the industries generating concentrated incinerable effluent being sent to CHWTSDF for incineration or the industries not generating trade effluent as well as having zero discharge and (remainder illegible)

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technologies subject to achievement of stringent standards laid down in the consent order, conforming to the stream standards unless the disposal of treated effluent is on land for irrigation purpose or gardening and tree plantation or otherwise recycle/reuse in the process itself, can be permitted with the undertakings to achieve the zero discharge and not to dispose off treated effluent to CETPs till upgradation of CETPs and ETPs are completed, can be allowed. Copies of the directions issued by the CPCB dtd.2/9/2008 and the Circulars issued by the MPCB on 17/11/2008 & 3/12/2011 are enclosed herewith and marked as **Exhibit : R-VIII, R-IX & R-X** respectively.

(Nitin Deshpande)
Advocate for Respondent No.3

(Yeshwant B. Sontakke)
Regional Officer(HQ) and
I/c Joint Director (Water Pollution Control)

VERIFICATION

I, Yeshwant B. Sontakke, aged about 46 Years, occupation-service, the Regional Officer (HQ) and Incharge Joint Director (Water Pollution Control) of the Maharashtra Pollution Control Board, having my Office at Kalpataru Point, 3rd Floor, Sion-Matunga Scheme Road No.8, Opp.Cine Max Cinema, Sion (East), Mumbai -400 022, do hereby solemnly declare that whatever stated in the aforesaid reply from paragraph 1 to 6 are true and correct to the best of my knowledge and belief. I say that the contents of the above reply from paragraph 1 to 6 are drafted as per the official record. The same are read over to me and I have understood the same.

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Hence, verified and signed at Mumbai on this ___ th day of December, 2011.

Deponent,

Solemnly affirmed at Mumbai }

On this 15 day of December,2011 }

(Yeshwant B. Sontakke)
Regional Officer(HQ) and
I/c Joint Director (Water Pollution Control)

Before me,

15/12/2011

S. K. WARKE
ADVOCATE & NOTARY
5/4, Himalaya, Opp. Podar Hospital,
Next to Sadanand Restaurant,
Worli, Mumbai - 400 018.

NOTARY * S. K. WARKE Notary (Govt. of India) Regd. No. 3304 * GOVERNMENT OF INDIA

Exhibit-R-I collectively

Annexure VII

Table AVII.1: List of River Stations where Percent Exceedance of any of Parameters is More Than 50%

Sr.	Rivers	Station No	pH	DO	BOD	TC	Ammonia	Nitrate
1	Amba	HP_AM_1	6	0	0	72	0	
2	Amravati	2652	20	0	67	0	82	0
3	Bhima	28	6	3	94	0	15	0
4	Bhima	1188	12	0	91	0	9	0
5	Bhima	1189	0	64	100	0	50	0
6	Bhima	1190	0	70	100	0	58	0
7	Bhima	1191	0	9	100	0	42	0
8	Bhima	1192	0	0	82	0	50	0
9	Bhima	2655	17	0	83	0	8	0
10	Bhima	2656	19	0	90	0	0	0
11	Bindusara	2657	7	14	64	0	18	0
12	Bori	2658	31	8	71	0	64	0
13	Burai	2659	20	0	43	0	77	0
14	Chandrabagha	1911	0	0	92	0	0	0
15	Chandrabagha	1912	8	0	83	0	0	0
16	Daman-Ganga	HP_DG_1	8	0	100	0	0	
17	Daman-Ganga	HP_DG_2	0	0	100	0	0	
18	Daman-Ganga	HP_DG_3	7	7	100	14	0	
19	Darna	2660	0	21	63	0	69	0
20	Darna	2661	0	0	38	0	83	0
21	Darna	2662	6	7	63	0	69	0
22	Darna	2663	12	0	65	0	64	0
23	Darna	2664	0	6	59	0	64	0
24	Ghod	2665	9	18	91	0	22	0
25	Girna	1252	27	9	60	0	0	0
26	Girna	1253	9	0	60	0	0	0
27	Godavari	HP_GD_5	50	71.4			100	
28	Godavari	HP_GD_1			100			
29	Godavari	HP_GD_3	33.3	33.3	100			
30	Godavari	HP_GD_7			100	80		
31	Godavari	1096			88.6		6.1	
32	Godavari	1211	2.9	5.9	90.9		6.1	
33	Godavari	2157		33.3			100	

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Table AVII.1 (Contd..) :
List of Sites where Percent Exceedance of any of Parameters is More Than 50%

Sr.	Rivers	Station No	pH	DO	BOD	TC	Ammonia	Nitrate
34	Godavari	2158	4.8	14.3	33.3		52.9	
35	Godavari	2159	14.3	14.3	23.8		50	
36	Godavari	2160		4.8	9.5		52.9	
37	Godavari	2177	4.3		56.5		19	
38	Godavari	2178	18.2	40.9	90.9		65	
39	Godavari	2179	5	14.3	85.7		26.3	
40	Godavari	2180	9.1	27.3	100		36.8	
41	Godavari	2181	13.6	27.3	100		37.5	
42	Godavari	2182			55		15	
43	Gomai	2666	25	0	75	0	82	0
44	Hiwara	2667	31	0	81	0	67	0
45	Indrayani	2197	0	16	94	0	29	0
46	Indrayani	2668	4	21	100	0	9	0
47	Indrayani	2669	5	14	100	0	10	0
48	Kalu	1092	0	29	50	0	0	0
49	Kan	2670	29	0	53	0	64	0
50	Kanhan	1909	0	0	78	0	30	0
51	Kanhan	2170	6	0	65	0	0	0
52	Kanhan	2171	6	6	94	0	0	0
53	Kolar	1908	0	0	100	0	0	0
54	Koyna	2189	10	0	84	0	7	0
55	Krishna	HP_KR_8	0		100		100	20
56	Krishna	HP_KR_21	60	0	0	0	0	
57	Krishna	HP_KR_10	0	92	64	97	18	
58	Krishna	HP_KR_13	0	0	0	74	0	
59	Krishna	HP_KR_14	17	0	8	100	0	
60	Krishna	HP_KR_19	11	0	0	67	0	
61	Krishna	HP_KR_23	0	0	0	77	0	
62	Krishna	HP_KR_24	0	114	72	89	25	
63	Krishna	1194	6	0	76	0	0	0
64	Krishna	1310	0	6	0	0	0	0
65	Krishna	2187	0	0	94	0	3	0
66	Krishna	2188	13	0	91	0	0	0
67	Krishna	2190	3	3	97	0	0	0
68	Krishna	2198	0	33	80	0	47	0

Table AVII.1 (Contd..) :
List of Sites where Percent Exceedance of any of Parameters is More Than 50%

Sr.	Rivers	Station No	pH	DO	BOD	TC	Ammonia	Nitrate
69	Krishna	2671	0	33	80	0	47	0
70	Mithi	2168	0	58	100	0	45	0
71	Mor	2674	20	25	60	0	50	0
72	Mula-Mutha	2191	0	100	97	0	89	0
73	Mula-Mutha	2192	3	78	100	0	90	0
74	Mula-Mutha	2193	3	48	100	0	84	0
75	Mula-Mutha	2194	3	61	100	0	87	0
76	Mula-Mutha	2677	8	42	96	0	26	0
77	Mula-Mutha	2678	0	56	100	0	59	0
78	Mula-Mutha	2679	0	82	100	0	75	0
79	Mula-Mutha	2680	10	0	75	0	0	0
80	Nira	1463	6	0	89	0	20	0
81	Nira	2195	0	23	97	0	11	0
82	Nira	2681	12	12	88	0	8	0
83	Nira	2682	25	4	92	0	16	0
84	Nira	2683	8	0	84	0	0	0
85	Penganga	2697	0	0	75	0	0	0
86	Penganga	2698	0	0	67	0	0	0
87	Panzara	2684	19	8	87	0	62	0
88	Patalganga	HP_PG_1	0	0	0	53	0	
89	Pawana	2196	0	71	100	0	86	0
90	Pawana	2690	8	54	100	0	74	0
91	Pawana	100	0	86	100	0	89	0
92	Pawana	2691	4	64	100	0	83	0
93	Pawana	2692	4	4	74	0	21	0
94	Pawana	2693	0	29	92	0	61	0
95	Pawana	2694	0	47	100	0	70	0
96	Pedhi	2695	0	42	100	0	0	0
97	Purna	1913	11	0	100	0	0	0
98	Purna	2155	0	11	100	0	13	0
99	Purna	2700	0	20	100	0	50	0
100	Rangavali	1907	10	0	80	0	0	0
101	Savitri	HP_SV_1	3	0	0	51	0	
102	Savitri	HP_SV_2	6	0	0	26	0	
103	Sina	2705	4	0	83	0	9	0

Table AVII.1 (Contd..) :
List of Sites where Percent Exceedance of any of Parameters is More Than 50%

Sr.	Rivers	Station No	pH	DO	BOD	TC	Ammonia	Nitrate
104	Sina	HP_TP_1	29	0	100	0		
105	Sina	HP_TP_4	0	13	100	89	0	
106	Sina	HP_TP_9	9	0	100	27	0	
107	Sina	HP_TP_12	0	7	100	8	0	
108	Sina	HP_TP_15	7	0	100	43	0	
109	Sina	HP_TP_14	7	0	100	7	0	
110	Sina	1251	15	3	74	0	0	0
111	Sina	1313	15	9	73	0	0	0
112	Sina	1314	6	6	61	0	0	0
113	Titur	2710	44	8	87	0	62	0
114	Titur	HP_UH_2	7	0	100	0	0	
115	Titur	HP_UH_3	0	77	100	80	0	
116	Urmodi	2711	0	0	88	0	4	0
117	Vaitarna	HP_VN_1	0	0	100	0	0	
118	Vaitarna	HP_VN_2	0	0	100	0	0	
119	Vaitarna	HP_VN_3	0	0	100	8	0	
120	Vaitarna	HP_VN_4	0	0	100	0	0	
121	Vaitarna	2712	0	0	50		0	0
122	Vel	2715	8	0	79	0	21	0
123	Venna	2186	0	0	90	0	0	0
124	Venna	2716	8	0	87	0	0	0
125	Venna	2717	0	0	92	0	13	0
126	Waghur	2718	0	0	82	0	0	0
127	Wardha	1212	0	0	82	0	0	0
128	Wardha	1315	11	3	88	0	18	0
129	Wardha	2156	0	14	93	0	0	0
130	Wardha	2174	10	0	94	0	15	0
131	Wardha	2719	10	0	94	0	15	0
132	Wardha	2720	7	0	73	0	33	0
133	Wardha	2721	6	0	82	0	24	0
134	Wena	2722	6	0	83	0	22	0
135	Wena	2723	13	7	100	0	33	0
136	Wainganga	11	11	0	77	0	3	0
137	Wainganga	1910	0	10	100	0	0	0
138	Wainganga	2172	0	0	95	0	0	0
139	Wainganga	2173	0	0	76	0	0	0
140	Wainganga	2175	7	0	79	0	0	0

Table AVII.2 : List of Sites where Percent Exceedance of any of Parameters is More Than 75%

Sr.	Rivers	Station No	pH	DO	BOD	TC	Ammonia	Nitrate
1	Amravati	2652	20		67		82	
2	Bhima	28	6	3	94		15	
3	Bhima	1188	12		91		9	
4	Bhima	1189		64	100		50	
5	Bhima	1190		70	100		58	
6	Bhima	1191		9	100		42	
7	Bhima	1192			82		50	
8	Bhima	2655	17		83		8	
9	Bhima	2656	19		90		0	
10	Bindusara	2657	7	14	64		18	
11	Bori	2658	31	8	71		64	
12	Burai	2659	20		43		77	
13	Chandrabagha	1911			92			
14	Chandrabagha	1912	8		83			
15	Daman-Ganga	HP_DG_1	8		100			
16	Daman-Ganga	HP_DG_2			100			
17	Daman-Ganga	HP_DG_3	7	7	100	14		
18	Darna	2661			38		83	
19	Ghod	2665	9	18	91		22	
20	Godavari	HP_GD_5	50	71.4			100	
21	Godavari	HP_GD_1			100			
22	Godavari	HP_GD_3	33.3	33.3	100			
23	Godavari	HP_GD_7			100	80		
24	Godavari	1096			89		6	
25	Godavari	1211	2.9	5.9	91		6	
26	Godavari	2178	18	41	91		65	
27	Godavari	2179	5	14	86		26	
28	Godavari	2180	9	27	100		37	
29	Godavari	2181	14	27	100		38	
30	Gomai	2666	25		75		82	
31	Hiwara	2667	31		81		67	
32	Indrayani	2197		16	94		29	
33	Indrayani	2668	4	21	100		9	
34	Indrayani	2669	5	14	100		10	
35	Kanhan	1909			78		30	
36	Kanhan	2171	6	6	94			
37	Kolar	1908			100			
38	Koyna	2189	10		84		7	
39	Krishna	HP_KR_8			100		100	
40	Krishna	HP_KR_10		92	64	97	18	
41	Krishna	HP_KR_14	17		8	100		
42	Krishna	HP_KR_24		114	72	89	25	
43	Krishna	36	3		91			

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Table AVII.2 (Contd..) :
List of Sites where Percent Exceedance of any of Parameters is More Than 75%

Sr.	Rivers	Station No	pH	DO	BOD	TC	Ammonia	Nitrate
44	Krishna	1194	6		76			
45	Krishna	2187			94		3	
46	Krishna	2188	13		91		0	
47	Krishna	2190	3	3	97		0	
48	Kundalika	2198		33	80		47	
49	Kundalika	2671		33	80		47	
50	Mithi	2168		58	100		45	
51	Mula-Mutha	2191		100	97		89	
52	Mula-Mutha	2192	3	78	100		90	
53	Mula-Mutha	2679	0	82	100		75	
54	Mula-Mutha	2680	10		75		0	
55	Nira	1463	6		89		20	
56	Nira	2195		23	97		11	
57	Nira	2681	12	12	88		8	
58	Nira	2682	25	4	92		16	
59	Nira	2683	8	0	84			
60	Penganga	2697	0	0	75			
61	Penganga	2698	0	0	67			
62	Pawana	2196	0	71	100		86	
63	Pawana	2690	8	54	100		74	
64	Pawana	100	0	86	100		89	
65	Pawana	2691	4	64	100		83	
66	Pawana	2693	0	29	92		61	
67	Pawana	2694	0	47	100		70	
68	Pedhi	2695	0	42	100			
69	Purna	1913	11	0	100			
70	Purna	2155	0	11	100		13	
71	Purna	2700	0	20	100		50	
72	Rangavali	1907	10	0	80			
73	Sina	2705	4	0	83		9	
74	Tapi	HP_TP_1	29	0	100			
75	Tapi	HP_TP_4	0	13	100	89		
76	Tapi	HP_TP_9	9	0	100	27		
77	Tapi	HP_TP_12	0	7	100	8		
78	Tapi	HP_TP_15	7	0	100	43		
79	Tapi	HP_TP_14	7	0	100	7	0	
80	Titur	2710	44	8	87	0	62	
81	Ulhas	HP_UH_2	7	0	100	0	0	
82	Ulhas	HP_UH_3	0	77	100	80	0	
83	Urmodi	2711	0	0	88	0	4	
84	Vaitarna	HP_VN_1	0	0	100	0	0	
85	Vaitarna	HP_VN_2	0	0	100	0	0	

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Table AVII.2 (Contd..) :
List of Sites where Percent Exceedance of any of Parameters is More Than 75%

Sr.	Rivers	Station No	pH	DO	BOD	TC	Ammonia	Nitrate
86	Vaitarna	HP_VN_3	0	0	100	8	0	
87	Vaitarna	HP_VN_4	0	0	100	0	0	
88	Vel	2715	8	0	79	0	21	
89	Venna	2186	0	0	90	0	0	
90	Venna	2716	8	0	87	0	0	
91	Venna	2717	0	0	92	0	13	
92	Waghur	2718	0	0	82	0	0	
93	Wardha	1212	0	0	82	0	0	
94	Wardha	1315	11	3	88	0	18	
95	Wardha	2156	0	14	93	0	0	
96	Wardha	2174	10	0	94	0	15	
97	Wardha	2719	10	0	94	0	15	
98	Wardha	2721	6	0	82	0	24	
99	Wena	2722	6	0	83	0	22	
100	Wena	2723	13	7	100	0	33	
101	Wainganga	11	11	0	77	0	3	
102	Wainganga	1910	0	10	100	0	0	
103	Wainganga	2172	0	0	95	0	0	
104	Wainganga	2173	0	0	76	0	0	
105	Wainganga	2175	7	0	79	0	0	

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Chapter 7
Summary Observations

This report has been prepared to derive information from the water quality monitoring being carried out by multiple agencies. The report compiled the enormous amount of water quality data for all major and minor rivers, seafronts and creeks and groundwater of Maharashtra collected from various locations through organizations of the state and center. Water quality data for three years during the period 2007-2009 for 59 rivers, monitored at 248 locations, 33 coastal water and about 3500 groundwater stations in 35 districts of Maharashtra have been analyzed.

7.1 River Water Quality

Monthly water quality data for selected physico-chemical parameters viz. pH, DO BOD, Ammonical Nitrogen and Nitrate for the years 2007-09 was compared with the Maharashtra Pollution Control Board (MPCB) water quality standards of class A-II for best designated usage. Percent exceedance of these parameters with respect to the standards shows that at 140 locations out of 248 monitoring sites, the values exceeded to stipulated standard 50% of the times. At other 103 locations, the parameters exceeded the stipulated standard 75% of the time **(Annexure VII).** At 43 locations, the parameters exceeded the stipulated standard all of the time given in **Table** 7.1.

At most of the sampling locations in the rivers, BOD values have exceeded the MPCB Class AII standard of 5mg/l. Rivers with locations where the BOD values exceed the standards 100% of the time are Bhima, Damanganga, Godavari, Indrayani, Kolar, Krishna, Mithi, Mula,Mutha, Pawana, Pedhi, Purna, Tapi, Ulhas, Vaitarna, Wena and Wainganga. Many townships are located on the banks of the rivers which are the major sources of pollution of rivers. High BOD values observed in the downstream stretch of the river at major cities indicate poor performance of domestic wastewater treatment. The locations close to the cities show frequent noncompliance of standards.

At several locations, pH values are not within the MPCB standard of 6.0 to 8.5. A lower value of 4 produces sour taste and higher value above 8.5 an alkaline taste. Extreme pH can result in rapid fish kill and alteration in flora and fauna.

Microbial quality of water in terms of TC count showed that exceeding value with respect to MPCB standard of 5000 counts/100ml at 10 locations.

Table 7.1 : List of Sites where Percent Exceedance of any of the Parameters is 100%

Sr.	Rivers	Station No	pH	DO	BOD	TC	Ammonia	Nitrate
1	Bhima	1189	0	64	100	0	50	0
2		1190	0	70	100	0	58	0
3		1191	0	9	100	0	42	0
4	Daman-Ganga	HP_DG_1	8	0	100	0	0	0
5		HP_DG_2	0	0	100	0	0	0
6		HP_DG_3	7	7	100	14	0	0
7	Godavari	HP_GD_5	50	71	0	0	100	0
8		HP_GD_1	0	0	100	0	0	0
9		HP_GD_3	33	33	100	0	0	0
10		HP_GD_7	0	0	100	80	0	0
11		2180	9	27	100	0	37	0
12		2181	14	27	100	0	38	0
13	Indrayani	2668	4	21	100	0	9	0
14		2669	5	14	100	0	10	0
15	Kolar	1908	0	0	100	0	0	0
16	Krishna	HP_KR_8	0	0	100	0	100	20
17		HP_KR_14	17	0	8	100	0	0
18	Mithi	2168	0	58	100	0	45	0
19	Mula-Mutha	2192	3	78	100	0	90	0
20		2679	0	82	100	0	75	0
21	Pawana	2196	0	71	100	0	86	0
22		2690	8	54	100	0	74	0
23		100	0	86	100	0	89	0
24		2691	4	64	100	0	83	0
25		2694	0	47	100	0	70	0
26	Pedhi	2695	0	42	100	0	0	0
27	Purna	1913	11	0	100	0	0	0
28		2155	0	11	100	0	13	0
29		2700	0	20	100	0	50	0
30	Tapi	HP_TP_1	29	0	100	0	0	0
31		HP_TP_4	0	13	100	89	0	0
32		HP_TP_9	9	0	100	27	0	0
33		HP_TP_12	0	7	100	8	0	0
34		HP_TP_15	7	0	100	43	0	0
35	Tapi	HP_TP_14	7	0	100	7	0	0
36	Ulhas	HP_UH_2	7	0	100	0	0	0
37		HP_UH_3	0	77	100	80	0	0

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Table 7.1 (Contd..): List of Sites where Percent Exceedance of any of the Parameters 100%

Sr.	Rivers	Station No	pH	DO	BOD	TC	Ammonia	Nitrate
38	Vaitarna	HP_VN_1	0	0	100	0	0	0
39		HP_VN_2	0	0	100	0	0	0
40		HP_VN_3	0	0	100	8	0	0
41		HP_VN_4	0	0	100	0	0	0
42	Wena	2723	13	7	100	0	33	0
43	Wainganga	1910	0	10	100	0	0	0

Water Quality Index evaluated using four parameters viz. pH, DO, BOD and FC showed that 58 locations had water quality index as "Good to Excellent" during the period 2007-2009 (**Table 7.2**). The 30 locations had water quality as "Very Bad" at least in one of the months during the period 2007-2009 which is given in **Table 7.3**. Most of the other locations water quality index varied between "Moderately Good to Bad".

Table 7.2: River Water Monitoring Locations where the WQI was Good to Excellent During the Period 2007-2009

Sr.	River	Station No.	Location
1	Amba	2651	D/s of Waken bridge & U/s of Jackwells of Supreme Petrochemicals & MIDC
2	Bhatasa	1461	D/s of Pise Dam, Tal:Bhiwandi, Dist:Thane
3	Darna	2661	Aswali (Darna Dam), Igatpuri, District: Nashik
4	Godavari	HP-GD_2	Dhalegaon
5		HP-GD_4	Hirapur
6		HP-GD_6	Killari
7		HP-GD_14	Pishor
8		HP-GD_15	Purnabridge
9		HP-GD_20	Takli
10		HP-GD_21	Taklidhangar
11		HP-GD_22	Toka
12		HP-GD_23	Wadvali
13		HP-GD_24	Yelli
14		HP-GD_25	Zari
15		HP-GD_27	Damrencha
16		HP-GD_28	Deori
17		HP-GD_30	Grugwada
18		HP-GD_32	Kardha

Table 7.2 (Contd..): River Water Monitoring Locations where the WQI was Good to Excellent During the Period 2007-2009

Sr.	River	Station No.	Location
19	Godavari	HP-GD_34	Mahagaon
20		HP-GD_40	Wadsa (Chincholi)
21		HP-GD_41	Wagholi-Butti
22		1095	Gangapur Dam
23		1210	Vishnupuri
24		1312	Jaikwadi Dam,Paithan
25		2183	Nandur Madhmeshwar Dam , Nandur
26	Krishna	37	Miraj
27		1153	Rajapur
28		1310	Kurundwad
29		1906	Walwa
30	Kundalika	1152	Roha bridge
31		2672	Dhatav at Jackwell
32	Muchkundi	2676	Waked
33	Mula-Mutha	2680	Mutha river at Khadakvasla Dam
34	Panchaganga	1904	U/s of Kolhapur town near Balinga Pumping Station
35		2163	Shirol Intake Well
36	Patalganga	1462	Intake MIDC, Turade
37		2686	Vyal Pump house
38		2687	Khalapur pumping station
39		2689	Gagangiri Temple,Khopoli
40	Pehlar	2696	Pehlar dam water works
41	Savitri	2199	Ovale Village
42		2701	Upsa kendre, Mangalwadi
43		2702	Shedav Doh
44		2703	Dadli Bridge
45		2704	Muthavali village
46	Surya	2706	U/S of Surya Dam, Dhammi, Vikramgad, Thane.
47		2707	MIDC Pumping Station, Garvshet, Palghar, Thane
48		2708	Intake of Vasai-Virar w/s Scheme, Masvan, Palghar, Thane
49	Tapi	HP_TP_2	Bhusawal
50		HP_TP_5	Hingona
51		HP_TP_11	Padalse
52		HP_TP_6	Kawtha
53		HP_TP_7	Khariya
54	Ulhas	1094	U/S of Badalapur water work, kulgaon village
55		2162	Jambhul water work Taluka: Ambernath
56	Vashishti	2164	U/S 3M Paper Mill Kherdi
57		2713	D/S 3M Paper Mill Kherdi
58		2714	U/S Konphansawane

Table 7.3 River water Monitoring Stations where the WQI is Very Bad

Sr.	River	Station Code	Location
1	Bhima	1189	U/s of Vithalwadi near Sankar Mandir, District-Pune
2		1190	D/s of Bundgarden, District-Pune
3	Daman-Ganga	HP_DG_3	Shindayacha Pada
4	Ghod	2665	Shirur
5	Indrayani	2197	D/S of Alandigaon
7		2669	U/s of Moshigaon
8	Kanhan	1909	D/S of Nagpur
9	Krishna	HP_KR_10	Dattawadi
10		HP_KR-24	Pimple Gurav
11	Mithi	2168	Mahim village
12	Mula-Mutha	2191	Sangam bridge near Ganapathy ghat
13		2192	Mundhawa bridge
14		2193	Aundh bridge
15		2194	Mula river at Harrison bridge near Mula- Pawana sangam
16		2677	D/S of Theur
17		2678	Mutha river near Veer Savarkar Bhavan
18		2679	Mutha river at Deccan bridge
19	Nira	2195	D/s of Jubilant Organosis, Nimbut
20	Pawana	2196	Sangavigaon
21		2690	Kasarwadi
22		100	Sangavigaon
23		2691	Dapodi at Pawana-Mula sangam
24		2693	Chinchwadgaon
25		2694	Pimprigaon
26	Pedhi	2695	Pedhi river brudge near Padhi village
27	Tapi	HP_TP_12	Sarangkheda
28	Titur	HP_UH_3	Manda
29		1093	U/S of NRC Bunder, Mohane village
30	Vashishti	HP_VA_2	Pimpali

The analysis of water quality of Rivers of Maharashtra during the period 2007-2009 can be summarized in the following Tables 7.4 and 7.5.

Table 7.4 Summary of Water Quality of Rivers of Maharashtra

Total No of Sites	No of sites with significant parameters exceeding the stipulated standard		
	100% of the time	More than 75% of the time	More than 50% of the time
248	43	65	140

Table 7.5 Summary of WQI of Rivers of Maharashtra, 2007-2009

Total No of Sites	No of Locations with "Good to Excellent"	No of Locations Between "Good to Excellent and Bad"	No of Locations with "Very Bad" at least once
248	58	160	30

7.2 Water Quality of the Seafronts and Creeks of Maharashtra

Water quality at Ganapatipule, Bhagwati Bunder, Karambhane Creek and Mandavi Bunder is good. Percent exceedance calculated based on CPCB water quality standards of class SW-II is nil for DO, BOD and FC at Ganapatipule, Bhagwati Bunder, and Mandavi Bunder. At Karambhane Creek, the percent exceedance for DO and BOD are 8 and 17% respectively and no exceedance for FC. However, the percent exceedance for pH at Ganapatipule, Bhagwati Bunder, Karambhane creek and Mandavi Bunder are 39, 26, 8 and 26% respectively. Water quality index evaluated for each month for the period 2007-2009 at these locations varied between good to excellent.

The water quality of all other Seafronts and Creeks of Maharashtra are poor. Percent exceedance of BOD was found to be 100% for 29 beaches and seafronts. WQI evaluated for each month for the period 2007-2009 varies between Moderately Good to Very Bad in these 29 beaches and seafronts. Three years Percent exceedance of pH, DO, BOD and FC for the sea water for the period 2007-09 are given in Table 7.6.

Table 7.6 : Percent Exceedance of pH, DO, BOD and FC for Sea water

Sr.	Monitoring Site	Station Code	pH	DO	BOD	FC
1	Arnala	135	0	33	100	60
2	Bassein creek water	1316	0	18	100	75
3	Bhagwati Bunder	25	26	0	0	0
4	Bhayander creek	138	0	31	100	69
5	Charni Road Chowpatty	2166	0	33	100	90
6	Shivaji Park (Dadar Choupathy)	38	5	38	100	93
7	Dahanu creek	152	0	31	100	100
8	Dandi creek	145	0	50	100	0
9	Ganpatipule	23	39	0	0	0
10	Gateway of India	2165	0	47	100	89
11	Haji Ali	36	0	47	100	79
12	Juhu Beach	40	0	13	100	64
13	Kalwa creek	129	0	54	100	73
14	Karambhane creek	155	8	8	17	0
15	Mahim Creek	1318	0	44	100	50
16	Malabar Hill	35	5	50	100	87
17	Mandavi Bunder	26	30	0	0	0
18	Kharekuran Murbe Creek	144	0	17	100	0
19	Nariman Point	33	6	59	100	92
20	Navapur Sea	147	0	17	100	0
21	Saravli Creek	146	0	29	100	0
22	Savta creek	151	7	13	100	70
23	Thane creej	1317	0	33	100	45
24	Ulhas creek	16	0	43	100	0
25		128	0	31	100	86
26		133	0	25	100	71
27		134	8	21	100	85
28		137	0	33	100	73
29	Uttan Sea	139	0	38	100	79
30	Vashi creek	2184	0	36	100	83
31		2185	0	35	100	74
32	Versova	2169	0	25	100	41
33	Worli Seaface	2167	0	25	100	85

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7.3 Ground Water Quality of Maharashtra

Groundwater Survey and Development Agency (GSDA) and Central Ground Water Board (CGWB) have conducted groundwater quality monitoring program in various districts of Maharashtra state. It involves identification of major pollutants and confirmation of suitability of groundwater for human consumption for drinking and other purposes. It is to be noted that in many talukas only one set of data is available for the period 2007-2009 and the conclusion is drawn based the limited data.

7.3.1 Nitrate Pollution

Nitrate pollution is becoming more prevalent in ground water of Maharashtra. The studies carried-out by Groundwater Survey and Development Agency (GSDA)and Central Ground Water Board (CGWB) during the period 2007-2009 revealed that 87 Talukas in 22 Districts have shown nitrate levels above desirable limits, 100% of the time (**Table 7.7**). However, nitrate monitored by MPCB at 34 locations in Maharashtra do not show high level of nitrate.

Human health consequences of exposure to high nitrate levels are of great concern. Greater NO_3^- intake reduces the oxygen carrying capacity in the blood by binding to hemoglobin, causing a condition referred to as *methemoglobinemia* or *blue baby* syndrome which may cause mortality especially in new born infants. Infants less than six months of age are at higher risk due to the presence of bacteria in their digestive systems that speed the binding process. Recent studies have revealed that nitrate can be endogenously reduced to nitrite, which can then undergo nitrosation reactions in the stomach with amines and amines to form a variety of *N*-nitroso compounds (NOC), which are mainly carcinogens. The continuous consumption of water containing high nitrate may cause several health hazards in animals, e.g. *gastrointestinal cancer, Alzheimer disease, vascular dementia, absorptive, secretive functional disorders of the intestinal mucosa, multiple sclerosis, Non-Hodgkin's lymphoma, hypertrophy of thyroid, etc.* In developing countries like India, NO_3^- enrichment in groundwater has been appearing as a major threat in few intensively cultivable Sates: Punjab, Haryana, Maharashtra, Andhra Pradesh, Uttar Pradesh, West Bengal, Rajasthan and Delhi. Excessive nitrate in the water could be due to intensive agriculture, un-sewered sanitation in densely populated areas or from point sources such as irrigation of land by sewage effluents. The heavy use of nitrogenous fertilizers in cropping system is also a large contributor to anthropogenic nitrogen in groundwater world wide

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