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**TECHNOLOGY MISSION ON  
DRINKING WATER IN VILLAGES AND  
RELATED WATER MANAGEMENT**

DEBARY  
INTERNATIONAL REFERENCE CENTER  
FOR COMMUNITY WATER SUPPLY AND  
SANITATION (IRC)

**REPORT**

**ON**

**TRAINING-CUM-AWARENESS CAMP ON  
PREVENTION & CONTROL OF FLUOROSIS  
AT CHANDRAPUR**

**AND**

**WATER QUALITY ASSESSMENT OF VILLAGES  
IDENTIFIED WITH EXCESS FLUORIDE IN  
CHANDRAPUR DISTRICT**



**NATIONAL ENVIRONMENTAL ENGINEERING RESEARCH INSTITUTE  
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**APRIL 1988**

**WTM/CSIR/NEERI/039**

2454-88RE-4943

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TRAINING-CUM-AWARENESS CAMP ON PREVENTION & CONTROL OF FLUOROSIS  
AT CHANDRAPUR

A Training-cum-Awareness Camp on Prevention & Control of Fluorosis was held at Chandrapur (Maharashtra) during April 20-21, 1988. The Camp was organised by (i) Director, Health Services, Maharashtra, (ii) Department of Rural Development, Maharashtra, (iii) Ground Water Survey and Development Agency, Maharashtra, (iv) Maharashtra Water Supply and Sewerage Board and (v) Water Technology Mission - Sub Mission on Control of Fluorosis.

The objectives of the camp were :

- to up-date the information on fluorosis
- to reveal the main features of dental fluorosis, skeletal fluorosis and non-skeletal manifestation due to fluoride toxicity
- to inform contamination in food and water with emphasis on permissible limits
- to assess magnitude of the problem of fluorosis
- to create awareness on prevention and control of fluorosis
- to introduce preventive measures

A one-day camp was organised on April 20, 1988 for doctors, engineers and chemists. A total of 120 participants attended the camp. The camp was inaugurated by Mr. P.R. Kulkarni, Chief Engineer, Maharashtra Water Supply and Sewerage Board. Dr. A.K. Susheela, Co-ordinator, Sub-Mission on Control of Fluorosis spoke on the aims and objectives of the camp.

Experts participating in the camp

- 1 Dr. (Mrs.) V.K. Desai  
Associate Professor  
Department of Social & Preventive Medicine  
Govt. Medical College  
Surat (Gujarat).
- 2 Dr. B.D. Punekar  
Head, Dept. of Biochemistry  
Krishna Medical College  
Karad (Maharashtra)
- 3 Mr. W.G. Nawlakhe  
Scientist  
National Environmental Engg. Research Institute  
Nagpur (Maharashtra)
- 4 Dr. A.K. Susheela  
National Co-ordinator  
Sub-Mission on Control of Fluorosis  
Water Technology Mission &  
Associate Professor  
Department of Anatomy  
All India Institute of Medical Sciences  
New Delhi.

Dr. (Mrs.) V.K. Desai spoke on fluoride poisoning, health hazards and epidemiological survey. She also demonstrated manifestations of fluorosis in the people afflicted with the disease who were specially brought from Dhoptala village in Rajura Taluka of the district.

Dr. B.D. Punekar apprised the trainees the importance of water quality, rate of contamination of water and food with fluoride and emphasised the upper limit of fluoride accepted for human consumption.

Dr. A.K. Susheela spoke on strategy planning and precautions to be taken for a successful epidemiological survey.

Mr. W.G. Nawlakhe from NEERI spoke on defluoridation technology covering theoretical and practical aspects with special reference to Nalgonda Technique for defluoridation. This was followed by demonstration of Nalgonda Technique showing how water can be defluoridated at domestic level.

On April 21, 1988 the camp was organised for paramedical workers. A total of 203 participants attended the camp. The camp was inaugurated by Mr. Chand Goel, Chief Executive Officer, Zilla Parishad Chandrapur. Lectures and demonstrations were held in similar manner as were held on April 20, 1988 in Hindi and Marathi.

#### **WATER QUALITY ASSESSMENT OF THE SOURCES PREVIOUSLY IDENTIFIED WITH EXCESS FLUORIDE CONTENT**

Water Quality Survey of Chandrapur district was earlier undertaken by District Health Office, Chandrapur. A total of 225 water samples were collected from various existing drinking water sources and analysed for physico-chemical parameters. It was reported that 53 samples showed excess of fluoride. Excess fluoride contents were reported in villages in Sindewahi, Rajura, Chandrapur and Warora talukas. The other talukas do not have significant fluoride problem in drinking water.

During Chandrapur Camp on Control of Fluorosis, 46 water samples from identified villages containing excess fluoride were collected from Rajura, Sindewahi and Chandrapur talukas. The samples were analysed for physico-chemical parameters which

include total dissolved solids, turbidity, pH, alkalinity, hardness, sulphate, chloride, nitrate, fluoride, iron and manganese. The units of these parameters are given in Table 1. The analysis results are given in Table 2.

The excessive limits of some of the important parameters prescribed by Water Technology Mission are given below :

<u>Parameters</u>	<u>Excessive Limits</u>
Turbidity	10 NTU
Total Dissolved Solids	1500 mg/L
Fluoride	1.5 mg F/L
Iron	1.0 mg Fe/L
Manganese	0.5 mg Mn/L
Nitrate	45 mg NO <sub>3</sub> /L
Total Hardness	600 mg CaCO <sub>3</sub> /L

There are 17 sources which contain excess fluoride. Maximum fluoride concentration was obtained in Dhoptala village in an open well containing 9.4 mg F/L. Severe dental and fluorosis cases were identified in this village. There is another source, an open well, in this village which contains 1.5 mg F/L which is an excessive limit for fluoride in drinking water. The villagers may be advised to use water from this well (1.5 mg F/L) for drinking and discard the well containing 9.4 mg F/L.

Excess iron was identified in 4 villages while excess manganese was obtained in 1 village only. Maximum of 5.10 mg/L

iron was obtained in Antargaon (Bujruk) village in Sindewahi taluka.

Excess nitrate problem was identified in 18 sources which seems to be the major problem in these three talukas. The highest value of 239 mg NO<sub>3</sub>/L was obtained in Bamni village in Chandrapur taluka.

Problems of excess dissolved solids were observed in 3 villages, excess hardness in 1 village and excess turbidity in 4 villages. Excess turbidity in 3 water sources were due to the contents of excess iron precipitated after exposure to the atmosphere.

**TABLE 1 : WATER ANALYSIS PARAMETERS**

S.No.	Parameters	Units
1.	Turbidity	NTU
2.	pH	-
3.	Total Dissolved Solids	mg/L
4.	P - Alkalinity	mg CaCO <sub>3</sub> /L
5.	M - Alkalinity	mg CaCO <sub>3</sub> /L
6.	Total Hardness	mg CaCO <sub>3</sub> /L
7.	Calcium Hardness	mg CaCO <sub>3</sub> /L
8.	Magnesium Hardness	mg CaCO <sub>3</sub> /L
9.	Fluoride	mg F/L
10.	Sulphate	mg SO <sub>4</sub> /L
11.	Chloride	mg Cl/L
12.	Nitrate	mg NO <sub>3</sub> /L
13.	Iron	mg Fe/L
14.	Manganese	mg Mn/L



TABLE 2 : PHYSICO-CHEMICAL QUALITY OF WATER IN RAJURA, SINDEWALI AND CHANDRAPUR TALUKAS OF CHANDRAPUR DISTRICT

S. No.	Taluka/Village	Source	Location	Turbidity	Total Dissolved Solids	pH	P-Alkalinity	M-Alkalinity	Total Hardness	Ca-Hardness	Mg-Hardness	Sulphate	Chloride	Nitrate	Fluoride	Iron	Manganese	
<b>RAJURA</b>																		
1	Khomona	W	--	10	606	6.5	0	364	192	40	152	40	32	31	2.0	0.39	0.11	
2	Palgaon	HP	Near Ambedkar Statue	1	558	6.5	0	340	292	56	236	5	28	53	0.7	0.12	0	
3	Palgaon	W	Near school	1.5	546	6.9	0	332	216	40	176	7	24	45	0.7	0	0.01	
4	Antargaon Bujruk	W	Road side	35	694	7.5	0	456	260	40	220	30	19	16	0.9	5.10	0.10	
5	Gadegaon	W	Near Chowk	1.5	1620	7.5	0	408	504	72	432	103	411	64	1.8	0.11	0.03	
6	Gadegaon	W	Outside the village boundary	18	1470	7.4	0	492	404	56	348	147	292	4	1.8	0.74	0.22	
7	Seraj Bujruk	HP	Near Gram Panchayat Office	3	582	7.4	0	348	260	52	208	88	28	47	1.3	1.05	0.01	
8	Matha	HP	Near Buddha Mandir	3	726	7.4	0	352	176	20	156	62	73	160	3.7	0.69	0.02	
9	Dhoptala	N	--	10	552	7.5	0	236	192	44	148	38	66	13	2.5	0.42	0.03	
10	Dhoptala	W	Near Hanuman temple	10	864	7.6	0	528	176	52	124	14	70	5	9.4	0	0.13	
11	Dhoptala	W	In Shri Mankar's field	10	408	7.7	0	292	216	52	164	11	23	7	1.5	0.04	0.09	
12	Korpana	HP	Near Burad Ward	3	528	7.1	0	292	188	80	108	11	37	47	1.2	0.20	0.01	
13	Korpana	W	Near Vasantrao Naik Vidyalaya	1	570	7.2	0	276	160	28	132	14	51	73	0.8	0	0.02	

S. No.	Taluka/Village	Source	Location	Turbidity	Total Dissolved Solids	pH	P-Alkalinity	M-Alkalinity	Total Hardness	Ca-Hardness	Mg-Hardness	Sulphate	Chloride	Nitrate	Fluoride	Iron	Manganese	
14	Pardi	HP	Near B&C Rest House	1.5	522	7.0	0	380	328	60	268	7	12	21	0.8	0.07	0.01	
15	Kakadghat	W	Near Chimbabu Atrane's residence	5	540	7.4	0	376	264	48	216	5	20	17	1.5	0.32	0.02	
16	Dewada	W	Near Gram Panchayat Office	1	468	7.3	0	324	272	40	232	5	13	26	1.6	0	0	
17	Dewada	W	Water Works Well	5	360	9.3	40	112	76	28	48	16	15	17	2.5	0.09	0.01	
<b>SINDEWAHI</b>																		
18	Antargaon (Mingaoon)	W	In Marayan Thakur's field	1	768	7.8	0	304	316	48	268	40	167	19	0.8	0	0.05	
19	Antargaon (Mingaoon)	W	In Dr. Bangade's premises	1	582	7.7	0	276	236	36	200	24	74	18	0.6	0	0.01	
20	Antargaon (Mingaoon)	W	In school premises	1	870	7.7	0	500	192	28	164	12	91	33	2.4	0	0.01	
21	Akapur	W	In Nanaji Gurnule's premises	1	375	7.9	0	176	200	68	132	10	43	12	0.6	0	0.05	
22	Akapur	W	--	7	882	7.1	0	324	360	48	312	50	25	84	1.0	0.49	0.09	
23	Karoli	TM	Near Primary School	2	750	7.0	0	400	316	276	40	9	94	53	0.6	0.08	0.01	
24	Karoli	W	Near Gram Panchayat Office	1	420	7.2	0	232	208	132	76	6	28	25	0.5	0.55	0.02	
25	Gayedongari	HP	Near Hanuman temple	50	1380	6.8	0	308	284	104	180	76	340	124	0.9	4.48	0.92	

S. No.	Taluka/Village	Source	Location	Turbidity	Total Dissolved Solids	pH	P-Alkalinity	M-Alkalinity	Total Hardness	Ca-Hardness	Mg-Hardness	Sulphate	Chloride	Milli-gramme	Fluoride	Iron	Manganese
26	Bhanapur	HP	Near residence of Laxman Sheddake	8	1080	6.9	0	80	540	164	376	32	311	53	0.6	0.63	0.25
27	Asola	HP	Near school	0.5	462	7.4	0	272	156	52	104	3	34	12	1.1	0	0.01
28	Laldbori	M	Near Primary School	1	2040	7.2	0	356	672	608	64	31	615	30	2.1	0	0
29	Ladbori	HP	Near Ambedkar Chowk	1	1200	7.2	0	420	348	88	260	38	215	111	2.0	0.02	0.04
30	Antargaon (Nawargaon)	HP	Near Primary School	0.5	780	7.3	0	532	216	60	156	7	55	14	1.9	0	0.02
31	Antargaon (Nawargaon)	M	--	1	672	7.8	0	536	96	64	32	2	14	18	2.3	0	0
32	Chargaon	M	Near Gram Panchayat Office	1	780	7.6	0	532	284	44	240	8	15	24	2.0	0	0
33	Lonwahi	M	Near Tatoba Meshram's residence	1.5	390	7.2	0	196	180	84	96	4	38	12	0.8	0	0.07
34	Sindewahi	M	Outside village towards Mui road	1	1140	7.3	0	316	432	72	360	36	281	63	1.9	0	0.01
35	Kinshi	TM	Near Hanuman temple	1.5	990	7.1	0	328	508	228	280	32	189	80	0.8	0.01	0.08
36	Muradi	HP	Near Pandurang Barekar's residence	6.5	1320	6.9	0	388	652	148	504	88	307	90	0.7	0	0

S. No.	Taluka/Village	Source	Location	Turbidity	Total Dissolved Solids	pH	P-Alkalinity	M-Alkalinity	Total Hardness	Ca-Hardness	Mg-Hardness	Sulphate	Chloride	Nitrate	Fluoride	Iron	Manganese	
<b>CHANDRAPUR</b>																		
37	Padoli	W	Near Bus stop	1	642	7.3	0	296	288	52	236	23	68	55	0.5	0.46	0.03	
38	Khutala	HP	Near Hanuman temple	1.5	750	7.6	0	360	192	48	144	88	65	11	0.8	0.09	0	
39	Chinchala	W	Near Ramchandra Khuje's residence	1	660	7.6	0	372	332	132	200	16	31	28	1.7	0	0.01	
40	Baoni	W	Near Nikhade Guruji's residence	1.5	1740	7.6	0	540	372	84	288	100	348	239	2.1	0	0.01	
41	Manora	W	Near Motiram Dhongade's	1	1440	7.3	0	356	424	72	352	46	386	69	1.2	0	0.05	
42	Manora	W	Near Gram Panchayat Office	4	1140	7.0	0	512	208	88	120	55	210	12	1.0	0.85	0.06	
43	Padampur	TW	Near Gram Panchayat Office	23	186	6.5	0	56	92	60	32	4	30	50	0.1	4.13	0.10	
44	Padampur	W	Near school	1.5	99	6.7	0	16	60	36	24	2	11	25	0.2	0	0.07	
45	Tadoba	L	--	4	48	7.0	0	28	40	16	24	3	5	5	0.1	0.45	0.11	
46	Tadoba	W	Staff colony	2.5	114	6.1	0	20	52	20	32	4	31	14	0.1	0	0.09	

Drinking Water Sources : W - Well water  
 TW - Tube well water  
 HP - Hand pump  
 N - Nalla  
 L - Lake