12 REVENUE ENHANCEMENT STRATEGIES

The main sources of revenue for MPCB are water cess, analysis charges and consent fees. We would look at how, and to what extent, revenues could be enhanced for each of the above:

12.1 WATER CESS

Cess is applicable to all categories of industries except hydel power stations and industries having power consumption of upto 10 cubic metre per day provided the industry does not generate hazardous waste. The cess collected by MPCB is remitted to the Govt of India, which in turn reimburses 75% to MPCB. The rest would be utilized by CPCB for projects of National importance.

The total industries in the State would be as follows:

Nature of industries	Red	Orange	Green	Total
Large Scale	1031	126	86	**1243**
Medium Scale	787	309	169	**1265**
Small Scale	7071	8573	31772	**47416**

Table 5: Number of industries, category wise

The green category of around 32000 industries in small scale would be under the exempt category. Around 5000 industries may be consuming less than 10 cubic metres of water and hence it may not be economical to assess such units. These industries may be given the option to pay a one-time cess. Thus the total number of exempt industries would be around 37000. The remaining 13000 industries need to be assessed. Currently less than 50% of the actual potential is assessed.

The reasons for the same include:

- Shortage of manpower
- Copies of consents issued from HO and ROs are not received regularly by the cess collecting dept and hence they are not updated about the new industries that have been granted consent.

At present cess collection is Rs. 14.4 cr., assuming even an 80% increase, the total cess collection would be Rs. 25.92 crores. 75% of the same would accrue to the Board i.e. Rs. 19.44 cr. Further, a large amount of cess worth Rs. 58.33 cr. is pending to be recovered, the main reason being the appeals pending before the appellate authority of the Board. These appeals mostly relate to disputes regarding quantity of water consumption and thereby the amount of cess. MPCB may consider appealing to the Government of India for an amendment to the Act for payment of atleast 75% of the amount assessed before filing an appeal against a particular assessment. This is suggested on the basic rules existing in MSEB and telephone bills. This may reduce the cases of appeal, which consume time and delay in collection of cess.

12.2 ANALYSIS

One of the functions of the Board is to visit industries, local bodies for inspections of process, consumption of water, effluent treatment and sludge. This work is done through inspecting the factories and taking samples and analysing them. In addition to monitoring industries, there has to be a monitoring of rivers, seas, wells, air and noise pollution. Based on the above categorization of industries, the income to be received by the Board would be as follows:

The sampling pattern for the industries is as under:

Nature of industries	Red	Orange	Green
Large Scale	12	12	2
Medium Scale	12	12	2
Small Scale	1	1	--

No. of industries (approx)	50,000	
No. of visits for collection of samples	43,000	Green industries without pollution excluded from the sampling details

Revenue head	No. of Industries/ Samples	Unit Charges	Total Revenue (Rs)
Collection charges for sampling	43,000	700	3,01,00,000
Analysis charges			
Red industries - 8 parameters	21,816	670	1,46,16,720
6 parameters - orange	12,294	530	651,5,820
5 parameters- green	9,083	435	39,51,105
Hazardous waste sample	10,000	3,650	3,65,00,000
Solid waste sample (municipal bodies and industries)	4,000	500	20,00,000
Air stack monitoring	11,000	1,000	1,10,00,000
Ambient air monitoring	400	2,100	8,40,000
			10,55,23,645

Table 6: Number of industries category wise

The current revenue of the Board from this activity is around Rs. 1.5 crores. Hence there is a lot of potential to increase revenues on this front. These estimates do not include the monitoring of saline water at the point of discharges into the rivers and seas, which if carried out could increase the revenues to the Board.

13 IMPLEMENTATION PLAN – INFORMATION BASED

13.1 MANAGEMENT

The Board would oversee the implementation of the information-based strategy with the assistance of a special committee formed for the purpose. The committee would advise the Board on various issues with respect to the strategy, including the following:

- The nature of information to be disseminated
- The periodicity of information
- Target audience
- Mode of transmitting the information

13.2 COORDINATION RESPONSIBILITY

The implementation of the information-based strategy would be done through co-ordination between the technical and non-technical departments. The senior manager-MIS in the technical department and the senior manager - corporate communication in the non-technical department would be responsible for actual implementation of the information based strategy in terms of collection of data, updation of data on a regular basis, analysis of data and information dissemination. The support for collection of data would be at regional and zonal levels.

13.3 SETTING TARGETS

In this case, while it would be difficult to set clearly defined targets, it would always be better to have some obligations of a general nature and some process based obligations like coverage of the target segment, extent of publicity, etc. These targets may also require incorporation of a workable set of performance indicators

13.4 MONITORING

Once there are targets in place, there is a necessity to monitor the progress towards achieving these targets. The monitoring would be done by the special committee in charge of shifting to an information based strategy.

13.5 CREATION OF RELIABLE DATABASE

Information based strategy would also require creating an effective database of information. As a regulator, MPCB is privy to a lot of information. However, currently this is being collected by various departments and there is no centralised and co-ordinated information. In the process of moving towards an information-based strategy, MPCB needs to ensure that the data collected is stored centrally and that it is analysed to ensure that it provided in a meaningful form to the public.

Further, as a part of the CPCB's guidelines, a zoning atlas is required to be prepared at various levels. The State Pollution Control Board would be responsible for State level and District level zoning encompassing the following:

State Level	**Mapping of environmentally sensitive zones and industrial sites - State wise** (Information on environmentally sensitive zones such as national parks, sanctuaries, forests etc. are mapped)
District Level	**Zoning Atlas for Sitting of Industries - district-wise** (Zones and classifies the environment, district-wise, and provides information on environmentally sensitive zones and possible sites/zones for siting of industries)
Local level	**Industrial Estate Planning** (These studies, in continuation of the zoning atlas studies, help in identifying sites for industrial estates or growth centres or a cluster of industries.) **Environmental Management Plan for Urban Areas** (Studies are targeted at identifying problems due to poor land use compatibility and lack of infrastructure in cities and providing solutions. Planning authorities from cities are also being trained on environmental considerations in urban planning)

Table 7: Tentative activities under various levels

Currently MPCB does not have a zoning atlas and hence creating one becomes important for moving towards an information-based pollution control strategy.

13.6 CREATION OF CITY/ TOWN LEVEL ENVIRONMENT ACTION PLAN

An environment plan needs to be prepared both at the city level and town level. The planning would be done by city level committees with representatives from urban local bodies, local academicians, NGOs, local consumer association, media representatives and local politicians in addition to MPCB representatives. MPCB would be the nodal agency for preparation of the plan.

The city level committee would be responsible for the action plan and would also foresee the implementation and progress of the city action plan. The action plan would include the following

- Time schedule for implementation
- Budget and resource allocation for the project
- Process of implementation

ANNEXURES

14 ANNEXURE I - RELEVANT CASE STUDIES

14.1 AN OUTSTANDING SUCCESS - THE PROPER PROGRAM IN INDONESIA

Starting in the 1980s, the Indonesian Government charged BAPEDAL - the national pollution control agency - with enforcing standards on discharges from industrial plants. But enforcement was weak because the regulatory budget was limited and the courts were plagued by corruption. With industrial output growing at over 10 percent annually, by the mid-1990s the government was becoming concerned about the risk of severe damage from pollution.

Faced with this predicament, BAPEDAL decided to initiate a program for rating and publicly disclosing the environmental performance of Indonesian factories. BAPEDAL hoped that the resulting pressure would provide a low-cost way to promote compliance with regulations, as well as create new incentives for managers to adopt cleaner technologies. The program that ensued was called PROPER—for Program for Pollution Control, Evaluation and Rating.

In the pilot phase of PROPER, which began in early 1995, BAPEDAL rated water pollution from 187 plants. Initial ratings showed that two-thirds of the plants failed to comply with Indonesian regulations. Although this showing was dismal by Western standards, fully one-third of the rated factories were in compliance despite BAPEDAL's evident inability to enforce regulations, mainly because two-thirds of the regulatory triangle—local communities, and markets—were already in place, albeit operating with poor information. These actors had already brought considerable pressure to bear.

Public disclosure is a political act and a media event, so BAPEDAL's leaders thought carefully about the strategy before releasing the results. In June 1995, Tri Sutrisno, Indonesia's Vice President presided over a high-profile public ceremony to congratulate the "good guys"—the five green-ranked plants whose performance met formal requirements. After publicly rewarding these best actors, BAPEDAL privately notified other plants of their ratings, and gave the non-compliant ones six months to clean up before full public disclosure.

A scramble ensued as the polluting plants considered their options, and by December 1995 striking changes had already occurred. The serious violators (polluting well in excess of prescribed norms) were the first ones to react. Even before public disclosure, PROPER had scored a considerable success. In the same month, BAPEDAL delivered on its commitment to full disclosure, releasing ratings by industry groups over several months to hold media attention. By December 1996—one year later—improvements had become much more pronounced. Compliant plants, originally one-third of the sample, now constituted over half. Even the non-compliant plants had moved from the highly polluting categories to relatively lower polluting groups. Only 18 months after full disclosure, PROPER had reduced pollution by more than 40 percent in the pilot group.

Given Indonesia's previous regulatory history, this remarkable result suggests that performance ratings and public disclosure can be powerful tools for improving environmental conditions in developing countries.

Success factors and perceived benefits of the PROPER program

The key success factors being the position to negotiate pollution control agreements with neighbouring factories. This is especially true because lack of information can distort communities' perceptions. The PROPER system adds critical information to this picture and certifies the claims of local communities, which can use PROPER's ratings to engage the most serious polluters. PROPER also allows each community to more readily choose its own level of environmental quality.

Better information can also influence the market side of the triangle. Indonesia had a new stock market and, until the recent crisis, its rapidly expanding industrial economy had extensive credit needs. With BAPEDAL's ratings, the stock market can more accurately value companies' environmental performance, and banks can factor pollution-related liability into their lending decisions.

Focus on the right kind of incentives, collection and dissemination of information

BAPEDAL itself benefits from public disclosure. More widespread adherence to environmental standards has boosted BAPEDAL's credibility with industry, NGOs, and the public and

enhanced its ability to do its job. All regulators need good data about firms' pollution, but noncompliant firms have a clear incentive to withhold such information. ***Under PROPER, clean firms have an incentive to identify themselves, and the agency can then hone in on serious polluters and keep them in the public spotlight. Rewarding good performers also Insulates regulators from charges that they are anti-business.***

Community and information driven approach is also a low cost one

PROPER appealed to BAPEDAL because it had neither the resources nor the legal support to implement a traditional, standards-based system. The agency's managers also decided that they lacked the capacity to enforce pollution charges. Viewing charge-based regulation as an inside transaction between the agency and a plant, they feared that corruption of their inspectors would distort emissions information and undermine the market-based approach. Public disclosure, by contrast, allows communities to check an agency's claims against their own daily experience.

As resources for traditional monitoring and enforcement have diminished, Indonesia's leaders have found ***PROPER's low-cost leveraging of community and market action even more attractive***. Overall, PROPER-type programs are efficient because they leverage channels inaccessible to formal regulation.

Widespread acceptance of PROPER reflects a broader trend in public policy. Students of economic development are paying closer attention to the role of social capital - the informal relationships and institutions that strengthen developing communities. Similarly, legal scholars are focusing on the strong complementarities between social norms, which communities draw on to enforce public disclosure programs, and formal laws. ***The evidence shows that formal and informal regulatory mechanisms almost always coexist, but that the latter often dominate in developing countries where regulatory institutions are weak.***

14.2 PHILIPPINES' SUCCESS WITH USER CHARGES

With a total surface area of about 90,000 hectares, Laguna Lake in Philippines is the second largest inland body of water in Southeast Asia. Twenty-one rivers flow into the lake, whose drainage region includes Manila and many smaller cities. According to the Laguna Lake Development Authority (LLDA), 1,481 factories occupied about 20 percent of the region's land area in 1994. While a few plants tap the lake's water for industrial cooling, most simply use the lake and its feeder streams as sinks for waste. Industry accounts for about 30 percent of the lake's pollution, while agriculture contributes about 40 percent and domestic sewage about 30 percent.

The Philippines had long maintained a traditional regulatory system, and over 60 percent of local factories have adopted at least nominal pollution control. However, ***polluters had very little incentive to take regulators seriously because the inspection rate was low, legal enforcement was time consuming, and most ensuing fines were minimal.*** A rigorous audit of water polluters before recent regulatory reforms found that only 8 percent of polluters were in compliance.

To provide new incentives and restore Laguna Lake, the LLDA instituted an "environmental user fee" (EUF) for industrial pollution. Initial studies identified five industries as the primary sources of organic water pollution: food processing, hog farms, slaughterhouses, beverage firms, and textile makers. The agency first implemented pollution charges—in this case EUFs—in 1997, for a pilot group of 21 plants. The system had two parts: a fixed charge determined by discharge volume, designed to cover administrative costs for LLDA, and a two-tier assessment for emissions. The latter included one charge per unit of emissions that meet the legally permissible standard, and a higher unit charge for emissions above the standard. Abatement cost analyses provided the basis for setting charges at levels that would induce plant managers to cut pollution significantly.

After two years of implementation, LLDA reports that BOD discharges from the pilot plants have dropped 88 percent. Faced with a continuous financial drain rather than sporadic legal action, plant managers have moved quickly to reduce pollution to the point where the marginal cost of abatement is equal to the pollution charge. Because pollution charges are remitted to LLDA, its resources for monitoring and enforcement have also increased significantly. In light of

this experience, the Philippine Government has announced its intention to implement the EUF system nationwide.

14.3 MALAYSIA- POLLUTION CHARGES COMBINED WITH EFFECTIVE REGULATION

During the 1960s and 1970s, Malaysia grew rapidly while diversifying exports away from its two traditional products, natural rubber and tin. The country selected palm oil for promotion, and by 1975 private palm oil plantations covered two-thirds as much area as private rubber estates. This economic boom, unfortunately, was accompanied by an environmental tragedy. Malaysia's palm oil mills discharged their waste effluent directly into nearby waterways. Since this discharge was laden with organic pollutants, the effect on aquatic life was catastrophic. Freshwater fish could no longer survive in 42 of Malaysia's rivers, marine spawning beds near river mouths were dying, and the stench from decomposing anaerobic waste was so bad that some riverside villages had to relocate.

Faced with this crisis, in 1974 the government passed the Environmental Quality Act and established the Department of the Environment (DOE), which could withhold operating licenses from severe polluters. This gave a ***strong, credible signal to the Malaysian palm oil producers,*** who began working on waste- treatment technologies.

The agency moved swiftly to enact a system that ***combined traditional regulations with pollution charges***. Within four years, palm oil mills were required to reduce BOD in their effluent from 5,000 parts per million (ppm) to 500 parts per million, with the understanding that the fourth-year standard would not be the final one. Operating licenses were issued for a flat M$100 fee, plus a charge of M$10 per ton of organic pollution discharged into water. Because the DOE had no way of valuing actual damages from pollution, it intended this charge to be high enough to provide some abatement incentive without being burdensome.

DOE added a surcharge of M$100 per ton for BOD discharges beyond the allowable limits. The surcharge, intended to have real teeth, was based on mandatory quarterly discharge reports verified by independent laboratories. Mills were required to apply for an operating license every year and include a description of their waste treatment system. DOE could reject license applications if it disapproved of the treatment approach—but it could also waive all fees for mills engaged in serious research and development on cost-effective pollution control.

In a single year, these combined measures produced a remarkable change: The mills' average daily discharges fell from about 220 tons to 125 tons. The regulatory package was clearly effective in reducing pollution and improving the quality of Malaysia's rivers. The estimated cost of compliance was also substantial—M$100 million by 1984—and in a highly competitive world market; palm growers bore most of the cost. However, the Malaysian boom absorbed this cost with no apparent problem. Unemployment remained low, and palm oil production remained profitable for most producers.

14.4 APPCB – EXCEEDING EXPECTATIONS

The objective of the State of Andhra Pradesh is capitulated in the Vision 2020 document which lays down the requirements of Andhra Pradesh in enabling a clean and conducive environment. The document envisages the need for reforms within the state and also details the steps that have been taken by the responsible agencies in fulfilling the objectives.

The vision document details the following parameters:

1. Environment management through **environmental resource planning**
2. Setting **back-end standards** for achieving the environmental objectives
3. Waste minimisation through **training and demonstration activities**.

Inspections have been made very methodical with a detailed proforma backing up each inspection. The proforma provides an updated database for the 1200 Red – Category of industries inspected which was prepared to assist the consent committees for decision-making and to provide a base for the computerisation process, updating the cess requirements and evidence in courts, and for authorization under the Hazardous Waste Management Rules.

Important notifications were proposed by APPCB in the year 1998. These were the first steps in internalisation of environment considerations in developmental decision making in the Government. The following notifications were mooted-

- To prohibit new 'red' category industries within a 25 km radius of metros and to control the misuse of land use on the peripheries of industrial estates.
- To promote the use of fly-ash by Government construction departments

- To environmentally zone new areas for the location of new industries
- To restrict the plying of certain categories of vehicles in the metros
- To confiscate effluent tankers plying illegally for dumping waste instead of going to CETP for treatment disposal.

While the last two actions are still under examination, the first three actions have been approved by the State Government.

APPCB has also looked at systems improvement and computerisation of the head and zonal offices. The decision making in the consent process has been made more transparent with the introduction of a committee system for decision making both at the HO and RO level.

15 ANNEXURE II - LAB-WISE: TECHNICAL REVIEW FINDINGS

15.1 MPCB REGIONAL LAB

1.	Name of the Laboratory	MPCB Regional Lab, Nagpur Udyog Bhawan, 6th Floor, Civil Lines, Nagpur
2.	Total Area	483 sq.mtr., Electricity: connected load: 20 KV, water source: Municipal water supply.
3.	Layout plan	Enclosed.
4.	Jurisdiction	Whole of Vidharbha (Amaravati, Akola, Chandrapur, Nagpur, Wardha, Bhandara, Gondia, Yevatmal, Gadchiroli)
5.	Organizational Chart	Enclosed
	• No. of Personnel	10
	(period of their posting / how long in one station)	
6.	Educational background	Enclosed
	• Specialized training undergone	1
	• Inception training after appointment	
	• Period of their service	
	• Assessment period / reporting	
	• No. of unskilled / semiskilled workers	
7.	Inventory of the laboratory	Enclosed
8.	Inventory of equipments	
	- Frequency of breakdown	Very rare, instruments with AMC, no problem,
	- How soon rectified	other instruments repaired within a week's time.
	• Inventory of chemicals	
	• Type of testing (Parameters)	

-	Air	Stack and ambient air samples
-	Water	Water and waste water samples
-	Solid	yes
-	Hazardous	yes
-	Biomedical	no
-	Misc.	NA

9. Cost of testing each parameter — Available
10. Testing procedures — As per NEERI manual, American Standards methods.
11. Standards followed — American Standards, EPA, BIS, MINAS, CPCB
12. No. of samples tested under each category and test followed

    JVs: 1467/year — Ambient Air: 836/year

    Environmental: 592/year — Stack: 181/year

    Private: 20/year — Hazardous: 406/year

    Under GEMS programme, three rivers i.e. Wainganga, Wardha river at two stations are monitored.
13. Time period from collection of sample to final report submission.

    15 days time is required
14. Resources required
    - Field instruments – handy field kits
    - More staff and training
    - ICP for heavy metal analysis
    - Cold room for preservation of sample and Scientific staff is highly neglected
    - During sample collection by field staff, scientific staff should also be present
    - Time bound promotions needed and Extra computers needed
    - Proper ventilation and exhaust fans are required
    - TOC analyzer and GC required.
    - Too congested lab – more space required
    - Acid digestion unit – microwave unit should be provided
    - Good lighting is needed

15.2 MULUND CHECK NAKA

1.	Name of the Laboratory	Mulund Check Naka
2.	Total Area	1200 sq.ft
3.	Layout plan	Enclosed
4.	Jurisdiction	Thane, Kalyan and Tarapore Samples received from areas: SRO Thane I-II, Tarapore I-II including RO Thane SRO Kalyan I, II, III SRO Mumbai III
5.	Organizational Chart	Enclosed
	• No. of Personnel (period of their posting / how long in one station)	Enclosed
	• Educational background	---
	• Specialized training undergone	None
	• Inception training after appointment	None
	• Period of their service	Enclosed
	• Assessment period / reporting	As applicable
	• No. of unskilled / semiskilled workers	
6.	Inventory of the laboratory	
	• Inventory of equipments	Enclosed (one mobile van equipped with instruments for RSPM, SO_2, NOx, Ammonia and CO)
	- Frequency of breakdown	No frequent breakdown
	- How soon rectified	Where AMC is there, immediate action is taken. Other instruments are repaired within a month
	• Inventory of chemicals	Record of all chemicals well maintained.
	• Type of testing (parameters)	
	- Air	Ambient air quality SO_2, NOx, SPM.

-	Water	Routine five parameters, pH, COD, BOD, SS and oil and grease
-	Solid	Municipal solid waste analysis on request
-	Hazardous	Both liquid and solid
-	Biomedical	None
-	Misc.	Oil and grease Sample

7. Cost of testing each parameter — Available
8. Testing procedures — Standard Methods (American), EPA, NEERI manual
9. Standards followed — EPA standards and CPCB guidelines
10. No. of samples tested under each category and test followed

    Water: 100-150/month

    Air: 30-40/ month (including fugitive, stack and also ambient air)

    Hazardous: 15-18/month.
11. Time period from collection of sample to final report submission

    Air: within 24 hours

    Water: within a week

    Solid: no analysis done (sent to central lab)
12. Resources required
    - Water problem is acute: hence overhead storage needed
    - Cold room for sample preservation
    - A well equipped micro biology test facility
    - Extra space is needed as the lab is too congested
    - Field kits are needed
    - Other requirements enclosed

15.3 REGIONAL LABORATORY PUNE

1. Name of the Laboratory — Regional Laboratory Pune
2. Total Area — 3500 sq.ft., Electricity: total connected load 46KW, Genset 1, of 125KV
3. Layout plan — Annexure I
4. Jurisdiction — Pune, Satara, Solapur
5. Organizational Chart — Enclosed (Annexure II)
   - No. of Personnel
     (Period of their posting / how long in one station)
   - Educational background
   - Specialized training undergone — Not given
   - Inception training after appointment
   - Period of their service
   - Assessment period / reporting
   - No. of unskilled / semiskilled workers
6. Inventory of the laboratory — Enclosed
   - Inventory of equipments
     -Frequency of break down — Depending on workload, instruments break down
     -How soon rectified — As early as possible, considering the office procedure
   - Inventory of chemicals — Available systematically records are maintained
   - Type of testing (Parameters)
     - Air — Ambient air quality and stack sample
     - Water — Industrial effluents and water samples
     - Solid — nil
     - Hazardous — Expect metals
     - Biomedical — nil
     - Misc. — none
7. Cost of testing each parameter — Enclosed

8. Testing procedures — Enclosed (NEERI, EPA, AWWA)
9. Standards followed — EPA Standards and CPCB Guidelines
10. No. of samples tested under each category and test followed

    JVs samples: 1878/year, Hazardous Waste: 284/year

    River sample: 344/year, Ambient air/Stack analysis: 380/year

    Private samples: 84/year.
11. Time period from collection of sample to final report submission.

    Final analytical report of samples submitted within two weeks after receiving the sample.
12. Resources required :
    - Additional manpower: JSO: 04, JSA: 07, Store Clerk: 01, Lab.Asst.: 02, Peon: 01
    - TOC analyzer
    - Vis / Uv / JR: Spectrometer
    - ICP metal analyzer
    - Training: Inception and also advanced training required
    - Cold room for sample preservation
    - Insurance cover for persons doing stack monitoring
    - One microbiologist is urgently needed
    - One zoologist is required to carry out fish bioassay and integrate the results.
    - Field kits for field analysis are provided
13. Comments
    - Results are interpreted based on only one sample, which will not be authentic.
    - At least two samples (duplicate) are given to two persons and the results be compared. Based on the two results the authenticity and quality of the work can be assessed.
    - During JVC sampling (joint vigilance sample) along with field officer, scientific staff should also go for sampling which would prevent any misunderstanding between the sample collector and analyst. Results obtained can also be properly interpreted based on actual field conditions.
    - Pune lab is well maintained and work is carried out very meticulously.
    - CPCB has certified the Pune Lab as the best laboratory.

- Recent edition of American Standards methods be followed instead of 13th and 19th edition.
- All staff wants training.
- As per the staff members, they need authority to carry out legal samples at Pune lab. And MPCB should declare Pune lab. as board analyst.
- RO of the Pune lab., has powers to take action, namely, disconnecting electric supply/water supply in case of defaulters.
- Show cause notice is served on defaulters in the first instance. If the approach is positive, then the industry is given time to rectify itself, and action taken by the industry is verified. If the industry is a regular defaulter, then legal notice is served under Water Act 33A, Air Act 31A, and the proposed directives are issued.
- New sophisticated instruments have been indented and will be procured soon.

15.4 REGIONAL LABORATORY THANE

1. Name of the Laboratory — Regional Lab., Thane
2. Total Area — 1200 sq.ft
3. Layout plan — Under construction (available)
4. Jurisdiction — Regional office Thane and Kalyan, Tarapore 7 SROs
5. Organizational Chart
   - No. of Personnel — SO 1 (29-30 yrs exp.), JSO 1, JSA 3, clerk 1, driver 1, peon 1

     (Period of their posting / how long in one station)
   - Educational background
   - Specialized training undergone — None
   - Inception training after appointment — None
   - Period of their service
   - Assessment period / reporting — As and when vacancy arises.
   - No. of unskilled / semiskilled workers
6. Inventory of the Laboratory
   - Inventory of equipments
     - Frequency of breakdown — where AMC is there, immediate action is taken
     - How soon rectified — Within a month
   - Inventory of chemicals — Non consumable chemical/glassware record maintained in the stores.
   - Type of testing (parameters)
     - Air — Ambient air quality/Stack
     - Water — Five parameters for effluent
     - Solid — MSW
     - Hazardous — Solid and liquid
     - Biomedical — None
     - Misc. — Oil waste

Separate mobile van available

Red once in a month, orange quarterly, green once in a year. In case of emergency or problem, it can be done anytime.

7. Cost of testing each parameter — Available
8. Testing procedures — Standard method, EPA, NEERI manual
9. Standards followed — EPA Standards and CPCB guidelines
10. No. of samples tested under each category and test followed

    Water: 100-150/month

    Air: 30-40 samples (sample includes fugitive stack and ambient)

    Solid: 200
11. Time period from collection of sample to final report submission.

    Air: within 24 hours

    Water: within a week

    Solids: no solids waste analysis. It is done only central lab
12. Resources required

    - Sampling not done in lab
    - Water problem is acute
    - Overhead Storage tanks needed
    - Chemicals required are stored with three month capacity for emergency telephonically procured with rate contract person
    - Instruments should be maintained in an air cooled lab, but cold room not available.

15.5 REGIONAL LABORATORY, NASHIK

1. Name of the Laboratory	Regional Laboratory MPCB Board Nashik , 1st Floor, Udyog Bhawan, Rathi Chowk, Trimbakashwar Road, Nashik
2. Total Area	3000sq.ft., Electricity connected load 49 KM (100KV), Inclusive of both lab and regional office
3. Layout plan	Enclosed
4. Jurisdiction	Nashik, Dhule, Jalgaon, Ahmednagar, Nandurbar
5. Organizational Chart	Enclosed
• No. of Personnel	Lab In charge - 1, scientist 7, lab asst. 1, store clerk 1, peon 1

(Period of their posting / how long in one station)

- Educational background
- Specialized training undergone

  One seminar/two days workshop only allowed
- Inception training after appointment
- Period of their service
- Assessment period / reporting — No time bound Promotion
- No. of unskilled / semiskilled workers

6. Inventory of the Laboratory	List Enclosed

- Inventory of equipments
  - Frequency of breakdown — Instruments with AMC, very rare, Milliopore membrane spoiled, it will be replaced soon.
  - how soon rectified
- Inventory of chemicals — Prior inventory for both chemicals and glassware maintained in register very systematically.
- Type of testing (parameters)

- Air — Ambient air quality samples are analyzed for SO_2, NOx, SPM, RSPM, HCI, CL_2
  Stack samples – SO_2, TPM, HCI, CL_2 and Ammonia is done. NOx is not done for stack sample as no facility and technical knowhow also is not available
- Water — Yes
- Solid — Yes
- Hazardous — Yes
- Biomedical — No
- Misc. — NA

7. Cost of testing each parameter — Enclosed
8. Testing procedures — NEERI manual, American Standards ISI
9. Standards followed — EPA standards and CPCB guidelines
10. No. of samples tested under each category and test followed

    JVs Sample: 2034/year

    Water Sample: 18/year

    Environment Sample: 700/year

    Hazardous Waste: 175/year

    AAQ: 169/year and Stack: 88/year
11. Time period from collection of sample to final report submission.

    One month from date of collection
12. Resources required

- Extra computers with internet facility
- Computer operator for both lab and regional office required
- Extra van for sampling required and laboratory staff require separate vehicle
- It is proposed to start bioassay analysis and microbiology work after the furnishing of the regional lab. Hence training for laboratory staff is required in the above two fields.
- Training is also needed for operating GC and AAS.

- MPCB has included some more special parameters of air, water and HW which are not analyzed at present in the Nashik Lab. Hence it is requested to provide the procedure to be followed for the analysis of these parameters, particularly in hazardous waste samples.
- A lab manual for the analysis of hazardous waste may be prepared for the use of the entire board laboratory.
- At present no medical waste sample is handled.
- No proper methodology is followed for sampling which needs proper protocol.
- No cold room is available for sample preservation.
- Dissolved oxygen parameter is to be done at the field only but it is not followed. This leads to discrepancy in the DO value.
- Lab in charge, analyst should accompany the field officers while sampling, so no problem appears during analysis. Mutual blaming for wrong data can be averted.

15.6 CENTRAL LABORATORY

1.	Name of the Laboratory	Central Laboratory, 5th Floor, CIDCO Bhawan, Southwing, Belapur, Navi Mumbai.
2.	Total Area	10,000 Sq.ft., Electricity: Total Connected is 55 KW, No generators, Water Source: Municipal supply.
3.	Layout plan	Attached
4.	Jurisdiction	From all over Maharashtra for selected parameters Ex: heavy metals from Chiplun, major parameters from Mumbai and Navi Mumbai.

5.	Organizational Chart	Enclosed
	• No. of Personnel	57 including all designations
	(Period of their posting / how long in one station)	List enclosed
	• Educational background	List enclosed
	• Specialized training undergone	Few scientists have undergone training conducted by CPCB
	• Inception training after appointment	None
	• Period of their service	Given in list
	• Assessment period / reporting	No time bound assessment, stagnation is as long as 20 years
	• No. of Unskilled / semiskilled workers	4 skilled 6 unskilled
6.	Inventory of the Laboratory	
	• Inventory of equipments	Enclosed
	- Frequency of breakdown	Once in a while
	- How soon rectified	Instruments with AMC – immediately. Others, one week to one month

- Inventory of chemicals — Detailed inventory of chemicals maintained systematically.
- Type of testing (parameters)
  - Air — Ambient air quality (SO_2, NOx, NH_3, RSPM, SPM, Pb), stack monitoring (particulate emission, SO_2)
  - Water — Industrial effluents (joint vigilance sample), legal. The Board goes and collects the samples based on complaints received), routine bioassay test are carried out for all industrial effluent samples received and complaint oriented river samples, routine parameters like pH, COD, BOD, SS and oil and grease.
  - Solid — Municipal solid waste, on request
  - Hazardous — Regular for metals, sulphates, chlorine and pH.
  - Biomedical — None
  - Misc. — Rare samples of oil and grease.

7. Cost of testing each parameter — Details enclosed
8. Testing procedures — American public health - Standard methods, NEERI manual, ISI books also followed.
9. Standards followed — CPCB, WHO, MINAS, BIS
10. No. of samples tested under each category and test followed

    Water: 500-600/month (sometimes around 800/month)

    Ambient air quality: 50-60 stations/month

    Stack: 15-20/month

    Routine five parameters Vi2, pH, COD, BOD, SS and oil and grease done. Based on specific industries, parameters like cyanide, phenol, arsenic, fluoride, detergents (ABS) and heavy metals are done.
11. Time period from collection of sample to final report submission - Within seven working days.
12. Resources required

- Generator for instruments like AAS, ICP, UV-Vis/Jr, GC/HPLC is needed.
- Library facility available but needs updating.
- Centralized computer division with internet facility.
- Microbiology division needs complete revamping/remodification.
- Cold room for preserving samples.
- Require more lab space to accommodate inflow of samples.
- Exhaust fans in the laboratory.
- Too congested. Improvement in general in house management needed : space should be increased.
- One instrumentation expert needed to look after routine maintenance and for minor repairs of the instruments.
- Sample collection method has flaws example, oil samples are collected in polythene carboys which is not correct. DO have to be fixed on field for river samples. Heavy metals have to be fixed by HNO_3 but it has been learnt that only one sample is collected and used for different parameters.
- Training should be provided to the new entrants regarding sampling techniques, analytical methods, and precautions during sampling, etc.
- While sample collection by field officers, one senior person from laboratory should be present.
- Centralized cooling is needed at least for microbiology division and sophisticated instruments division.
- Microbiology division needs complete modification, and sterile atmosphere, simple lamellar flow through chamber needed.
- Microwave digestion unit may be installed.
- A cold room for storing samples is a must.
- Toilets are primitive, need modification.
- More attention towards cleanliness needed.
- No electricity problem UPS installed.

15.7 NEW LAB – PAWNE NEAR THANE

1. Organizational Chart
   - No. of Personnel 38
     (period of their posting / how long in one station)
   - Educational background

Engg.	Science	Others
2	12	24

   - Specialized training undergone
     State level seminars, training at CPCB, Colombo plan, WHO, Danida, NEERI
   - Inception training after appointment Given in groups
   - Period of their service List enclosed.
   - Assessment period / reporting No fixed assessment period, as and when a vacancy is created, people are promoted; but stagnation period is as high as 18 years.
2. Roles and responsibilities (functions / geographical jurisdiction)
   Thane, Vasai, Palghar, Dahanu, Jawahar, Mokhanda, Talasar and Vikramgad tal.
   - Frequency of visit to the factory / site
     As decided by CPCB, New Delhi.
   - Frequency of monitoring
     Red category (Large and Medium): monthly: Red-small quarterly, Orange – six monthly, Green – once in a year.
   - Sampling procedure employed
     (Air / water / solid) - As quoted in American Standards.
   - Time of analysis
     One to three months (on an average 2 months)
   - List of equipments with the year of their procurement
     Instruments just procured (new), no safety instruments available.
     Stack monitoring instruments:
     Computer: 5
     Xerox: 1
     Fax: 1

AC: 2

Stack monitoring: 1, AAO monitoring: 1, handy sampler: 12.

- Existing facilities / facilities needed
  - Only one vehicle is available for sampling. When needed extra vehicle is hired. So few more vehicles are needed.
  - Scientists/workers feel that they need security cover (insurance)
  - Person trained for some specific job should carry out same job when he is transferred to other places.
  - All field officers and sub-regional officers should be given exposure at different topographical places.
  - Manual for working is needed for organization.
  - Each zonal office should have its own vehicles.
  - Regional officer needs financial power (in the year 1996, power was given, but later withdrawn).
  - Practical problems faced during sampling and field visit hence, frequent training in sampling techniques is needed.
  - Collection of samples is wrong, e.g: oil and grease samples are collected in polythene corboys instead of glass containers, certain parameters which need immediate analysis are not carried out at the field like pH, temperature and DO.
  - Enforcement cell: laws, legislation are needed to plug loopholes used by the industry.
  - A senior laboratory person should always be present during sample collection/field visits.
  - A full-fledged laboratory with all necessary equipment and facilities is required.
- Availability of field protocols / procedures

  Track register maintained with clearly defined protocols exists but started one year back only. All visit reports are maintained.
- Last period of update

  Regular updating is followed.

- Any environmental emergency / disasters encountered

  None so far

- How was it tackled

  Does not arise

- Procedures available to tackle

  No protocol as such

- Awareness about biomedical waste / hazardous waste

  - Sampling / type of waste (has any case been reported and what action plan solicited / remedy suggested)

  Common biomedical waste treatment and disposal facility available and concerned persons are directed to send their waste to this facility.

- Do the industries update the process diagram of their processes?

  Yes, checking is done but only during expansion and during renewal process.

- Do they have list of industries storing hazardous waste

  Yes, list enclosed.

3. No. of consents awarded / monitored

   Hazardous waste authorization granted, biomedical waste authorization granted.

   Red category: Member Secretary.

   Orange Category: Regional Officer

   Green Category: Sub-Regional Officer.

4. Details about water cess

   From 1st June 2005 onwards, the Regional Office will prepare an assessment draft report and send to the board office for further action. Assessment/monitoring will be done at Regional level. Other details maintained at Sion office.

5. Revenue source and zonal office earning

   Through consent awarded

   Fine imposed on industries who are defaulters.

   Violators of consent are given notice and if required money is charged as fine.

6. Revenue generated goes to head office; request is placed 4 months in advance for finance. Funds are received in bits and pieces.

15.8 RO - NASHIK

1. Organizational Chart — Enclosed
   - No. of Personnel
     (Period of their posting / how long in one station)
   - Educational background — Engg. — Science — Others
   - Specialized training undergone — Degree
   - Inception training after appointment
   - Period of their service
   - Assessment period / reporting
2. Roles and responsibilities (functions / geographical jurisdiction)

   Regional office, Nashik, is covering the 5 districts namely Nashik, Ahmednagar, Jalgaon, Dhule and Nandurbar. For the supporting work of the Regional office, Board has opened the Sub-Regional Offices at Ahmednagar, Jalgaon-I (for Jalgaon District) Jalgaon II (for Dhule and Nandurbar districts). For the analysis of the waste water, ambient air quality, hazardous waste etc., one regional lab is also opened in Nashik. In addition to the above, a mobile ambient air quality monitoring van is also made available in which the parameters like SPM, NO_x, So_2, Hydrocarbons (methane and non-methane), CO, CO_2, ammonia and meteorological parameters can be monitored. The van is fully computerized and ambient air quality can be made available at a glance.

   - Frequency of visit to the factory / site

     Red category: Once in a month for large industry
     Once in three months for medium scale industry
     Once in six months for small scale industry

     Orange Category: Once in three months for large industry
     Once in six months for medium scale industry
     Once in a year for small scale industry

     Green Category: This being a non polluting industry, frequency of samples varies from once to three years depending upon scale of the industry.

- Frequency of monitoring — as mentioned above
- Sampling procedure employed (air / water / solid) — yes, as per APHA collection of samples and preservations.
- Time of analysis

  This is related to regional laboratory
- List of equipments with the year of their procurement

  For sampling purpose – equipments such as HVS, stack monitoring kits, noise meters, handy samplers, etc., are available. These instruments are purchased recently in the year 2000-01. For analysis purpose, the details of instruments/equipments are available with regional laboratory.
- Existing facilities / facilities needed

  For every field officer, sampling assisting staff and contract labours are required and also for every filed officer separate vehicle is also required. For filed staff special insurance is also required as monitoring of the stacks and working in BMW field is very risky and affecting the health of working people.
- Availability of field protocols / procedures - The sampling procedure for collection of waste water sample is being followed as per the std. procedures, such as carrying the samples in an ice box upto the lab, fixation of the DO at the site in respect of env. Samples etc. Whereas sampling for BMW is not standardized and same is being done as per the Water Act, 1974 and Air Act, 1981.
- Last period of update - June 2004, latest collection for sample charges and analysis charges are prescribed by the Board and the same is being implemented from 5th June, 2004 (copy of the same is enclosed).
- Any environmental emergency / disasters encountered
  1. Chlorine gas leakages of M/s Mangalan Lb. Sangamner - Dec. 2003.
  2. Discharge of acidic effluent through a tanker from M/s Mahajeet Clayton, Sinnar, Nashil – May, 2002.
  3. Discharge of effluent from non-point sources into Godavari river from Satpur MIDC in the year 2000.

4. Agitation of citizens of Panchvati and CIDCO for the shifting of the municipal solid waste from Panchvati to existing location i.e. Pathardi-2001.
5. Odour nuisance due to compost plant in Satpur, MIDC – June - 2004.

- How was it tackled?
  - Immediate rush to the site and measurements of the chlorine and closing down of the factory.
  - Stoppage of the discharge of the acidic effluent and also closing of the mfg. activity.
  - Survey of the industrial area and stoppage of the mfg. activity of the defaulting industries and NMC.
  - Shifting of the compost depot of NMC as per the directives of the High Court, Mumbai.
  - Directions for removing of the compost material and stoppage of the manufacturing activity of the concern industry.
- Procedures available to tackle

  As per the experience and available methods for attending the complaints and as per the legal procedure, collection of samples and analysis.
- Awareness about biomedical waste / hazardous waste
  - Sampling / type of waste

  (Has any case been reported and what action plan solicited / remedy suggested)

  Giving the publicity through newspaper for creating environmental awareness, contacting the individual.
- Do the industries update process diagrams of their processes
- Do they have list of industries storing hazardous waste

  Yes, list is enclosed.

3. No. of consents awarded / monitored
4. Details about water cess

   Available at HQ
5. Revenue source and zonal office earning

   Following are the revenue sources:

- JVS of water, air and hazardous waste.
- Through the consent fees for consent to establish/operate/renewal.
- Through mobile van.
- Through public hearing.
- Through bank guarantee.
- Through the fines through the courts, High Courts.

15.9 RO - PUNE

1. Organizational Chart Enclosed
    - No. of Personnel 46, every three years staff is transferred.
      (Period of their posting / how long in one station)
    - Educational background Engg. Science Others
    - Specialized training undergone Degree
      Once in a while staff is sent for training (NEERI, CPCB, State level conference, seminar, and symposium)
    - Inception training after appointment
      No special training given, Administrative training is given to persons who need it.
    - Period of their service
      Enclosed.
    - Assessment period / reporting
      No time-bound promotion. Staff is promoted as and when vacancy is created, stagnation period is quite long, as long as 20 years.
2. Roles and responsibilities (functions / geographical jurisdiction)
    - Frequency of visit to the factory / site
      Based on complaints received in case of emergency, otherwise red category – once in a month, orange – once in three months, green – once in a year.
    - Frequency of monitoring
      As indicated above
    - Sampling procedure employed
      (air / water / solid)
      Grab samples, routine, composite samples when needed, during survey composite samples
    - Time of analysis
      As early as possible.
    - List of equipments with the year of their procurement
      AC, computer, fax.

- Existing facilities / facilities needed

  Computer, AC, training for air quality monitoring and updating of data, vehicle training, legal advice cell needed, legal assistance at zonal office, one member with hospital and health care management qualification at zonal office needed.

- Availability of field protocols / procedures

  No specific protocol

  As per the court's orders, MINAS, sample procedure for air and water is followed before 10th of every month MINAS samples are to be collected and ambient air quality at fixed stations.

- Last period of update

  As per requirement, it is updated.

- Any environmental emergency / disasters encountered

  Yes it does happen

- How was it tackled

  Prior intimation to avoid disaster is given. Example, lagoons for spent wash during heavy rains. Visit to the fragile sites are made, district collector is informed, and necessary precautions are taken to avoid such accidents.

- Procedures available to tackle

  Visit to the site, sample collection, investigate the details about the accident, then course of action is initiated.

- Awareness about biomedical waste / hazardous waste

  - Sampling / type of waste

  (Has any case been reported and what action plan solicited / remedy suggested)

  Disposal of hazardous waste is identified on Thane Belapur road, Mumbai waste management and at Taloja. At present, no disposal site at Pune. Common disposal facility, for biomedical waste for Pipri Chichwad available. Incinerators for >5 lakh population present. Energy saving, waste reduction, reuse/recycle of water, rain water harvesting etc suggested.

- Do the industries update their process diagram of their processes

  Yes, cleaner technologies are followed.

- Do they have a list of industries storing hazardous waste

  Yes, enclosed.

3. No. of consents awarded / monitored

   During routine checking, validity of consent is checked. 103 consents have been awarded between Jan-March, 2004.

4. Details about water cess

   Cess details are maintained at main office at Sion, Mumbai. Cess returns, collected at regional office, are submitted to headquarters i.e. Sion office. Cess details are maintained at headquarters. List of defaulters prepared and followed up. But other details and the track of the cases is maintained at Pune zonal office.

5. Revenue source and zonal office earning

   - Fines through court.
   - Finance collected from defaulters.
   - Through consent fees.
   - Through mobile van.
   - Through public hearing.

16 ANNEXURE III - REGIONAL OFFICE REVIEW – FINDINGS - SUMMARY

Regional Offices of MPCB

Parameters	Thane	Pune	Nashik	Nagpur
Name of the regional office and address	MPCB Regional Office, Office Complex Building, 5th Floor, Mulund Check Naka Wagle Estate, Thane - 400604	MPCB Regional Office, Jog Centre, 3rd Floor, Wakdewadi, Mumbai-Pune Road, Shivaji Nagar, Pune - 411033	MPCB Regional Office, Udyog Bhawan, 1st Floor Trimbak Road, Satpur, Nashik - 422007	MPCB Regional Office Udyog Bhawan 6th Floor, Civil Lines Nagpur
Number of Personnel (Total) Engineer Scientist Others	38 2 12 24	46 9 6 31	11 1 1 9	45 7 5 33
Inception Training	Given in Groups	Rarely Staff is send for training to NEERI, CPCB, Admn. Training given to needed staff	R.O. has undergone special training in solid waste management and air pollution	Training in industrial operation in CMA, Air pollution training in NEERI
Assessment Period	No fixed time period for promotion	No fixed time period for promotion	No fixed time period for promotion	No fixed time period for promotion
Functions	Visit to the site, Consent awarding and monitoring, Issue of notice to defaulter units, Imposing fine on defaulters.	Based on complaints visit the site, collect sample. Any emergency, take action. Scrutinizing the application for consent, and award consents Routine grab sample collection.	Waste water samples and ambient air quality and hazardous waste are collected and analyzed. Defaulting units served notice. On reviewing complaints visit to site and sample collection is undertaken.	Visit to the sites. Scrutinizing the consent letters and awarding consents. Checking water and utilization of the industry and collection of Cess. Issue of notice to defaulters units.
Jurisdiction	Thane, Vasai, Palghar, Dahanu, Jawahar, Mokhanda, Talasar and Vikramgad Taluka	Solapur, Satara, Daund, Pimpri, Pune, Baramati, Indapur, Khed, Maval, Junnar, Bhor, Purandar, Velhe Taluka	5 districts namely Nashik, Ahmednagar, Jalgaon, Dhule and Nandurbar	Whole of Vidharba (Amaravati, Akola, Chandrapur, Nagpur District, Wardha, Bhandara, Gondia, Yevatmal, Gadchiroli)
Frequency of visit to the Factory Site	As decided by CPCB	Based on complaints received and as decided by CPCB	Based on complaints received and as decided by CPCB	Once in a month
Frequency of Monitoring	Red category (Large and Medium): monthly Red-small: quarterly Orange – six monthly Green – once in a year.	Red category – once in a month Orange – once in three months Green – once in a year.	**Red category:** Once in a month for large industry Once in three months for medium scale industry Once in six months small scale industry **Orange Category:** Once in three months for large industry Once in six months for medium scale industry Once in a year for small scale industry **Green Category:** Frequency of samples varies from once to three years depending upon scale of the industry.	Red category (Large and Medium): monthly Red-small: quarterly Orange – six monthly Green – once in a year.
Sampling Procedure	As per standard Mathod	Grab and Routine Samples composit when required during surveys.	As per Standards procedure	As per norms laid by the board
Time needed to analyse	one to three month	As early as possible	Analysis pertains to regional laboratory	Fifteen Days

Availability of Field Protocols / Procedure	Track register maintained with clear defined protocols exists but started one year back only, all visit reports are maintained.	No specific protocol	The sampling procedure of collection of waste water sample is being followed as per the std. Procedures, such as carrying the samples in the ice box upto the lab. Fixation of the DO at the site in respect of env. Samples etc; whereas sampling for BMW is not standardized and same is being done as per the water act, 1974 and air act, 1981.	No specific protocol
Any Environmental Emergency/Disasters	No so far	yes it does happen	1. Chlorine has leakages of M/s Mangalan Lb. Sangamner- Dec. 2003. 2. Discharge of acidic effluent through the tanker from M/s Mahajeet Clayton, Sinnar, Nashil – May, 2002. 3. Diacharge of effluent from non-point source into Godavari River from Satpur MIDC in the year 2000. 4. Agitation of citizens of Panchvati and CIDCO for the shifting of the municipal solid waste from Panchvati to existing location i.e. pathardi-2001. 5. Odour nuisance due to compost plant in Satpur, MIDC-June-2004.	None
How Tackled	Does not arise	Prior initmation provided	Immediate rush to the site and measurements of the chlorine and closing down of the factory. Stoppage of the discharge of the acidic effluent and also closing of the mfg. Activity. Survey of the indl. Area and stoppage of the mfg. Activity of the defaulting industries and NMC. Shifting of the compost depot of NMC as per the directives of the High Court, Mumbai. Directions for removing of the compost material and stoppage of the mgf. Activity of the concern industry.	Does not arise
Procedures avaiable to tackle	No specific protocol as such	As per the situation necessary steps are taken	As per our experience either legal action intiated/methods suggested to control it.	N.A.
Awareness about medical/hazardous waste	Published in collaboration with NGO	Corporation has protocols even for MSW corporation has brought out pamphlets	Giving publicity through newspaper	Through newspaper public, awareness programmes, seminars etc