

6. Summary of Environmental Status in NMMC Area

6.1 Approach

The information on environmental parameters is often too complex and non-comprehensible to non-environmental professionals. The problem is further complicated as environment covers broad spectrum of areas from air quality to biomedical waste management. The goal of assessing status of environment is planning for sustainable development by ensuring that quality of life of the people is maintained and, if possible, improved while maintaining quality of environment.

With this backdrop, the findings of present assessment discussed in details in the earlier sections have been used in this section for computations of indicators that would enable in future assessing change in environmental status in NMMC area.

6.2 Methodology

Three indicators have been used in the present assessment:

- Environmental Quality Index (EQI);
- Urban Infrastructure Index (UII); and
- Quality of Life Index (QOLI).

For computation of EQI, ambient air quality (in residential areas & traffic junctions), noise levels (in residential areas & traffic junctions), quality of drinking water, quality of surface water, quality of ground water, adequacy of sewage treatment, adequacy of solid waste treatment, and adequacy of biomedical waste treatment are used as parameters. While air quality, noise levels and drinking water quality affects human health both in short term as also in long-term, impact of changes in other parameters are

comparatively less important in short-term. Hence, while computing EQI following procedure has been used:

- 1) Out of total score of 100, scores have been assigned to individual parameter based on importance. This is termed as Parameter Importance Unit (PIU).
- 2) For assessing status of individual parameter, a scale has been developed by assigning zero score to totally un-acceptable parameter measurement and 1 score to desired parameter measurement. This is termed as Parameter Environmental Quality (PEQ). For various nodes of NMMC, PEQ has been estimated based on data collected for ESR, and values have been averaged to estimate overall PEQ for NMMC area.
- 3) Environmental Quality Index (EQI) for an individual parameter has been worked out by multiplying PEQ and PIU.
- 4) Values of EQI for all parameters have been added to compute EQI.
- 5) Using this method, if values of all parameters are as desired ones the value of EQI will be 100.

For assessing UII, population density, water supply system, sewerage system and storm water collection system, solid waste collection system, slum development, health facility, educational facility, public transport, employment opportunity, parks & gardens, roads network, entertainment facilities, and public grievance redressal mechanism have been

used as parameters. As assessment of infrastructure facility is more a subjective judgement than quantitative evaluation, a seven-point scale has been used for evaluation of UII for individual parameters as follows:

- a) Very Poor : 0.0
- b) Poor : 0.20
- c) Satisfactory : 0.40
- d) Good : 0.60
- e) Very good : 0.80
- f) Excellent : 0.90
- g) Outstanding : 1.00

Values of UII for individual parameters have then been converted into percentage for easy comprehension.

Quality of Life Index has been computed as average of EQI and UII.

6.3 Estimation of Environmental Quality Index

The Importance assigned to various parameters selected for computing EQI and scale used for assessing the present status is presented in Table 6.3.1. PEQ for individual parameters have been computed based on data collected for ESR. Details of computation are presented in Annexure II. EQI computed for various nodes of

NMMC and overall EQI is summarised in Table 6.3.2. It has been found out that present EQI in NMMC area is 54.87 %.

6.4 Estimation of Urban Infrastructure Index

In the case of urban infrastructure, mere numbers may be misleading (e.g. average per capita water supply may be satisfactory but due to uneven distribution satisfaction level may be low). Hence, for computing UII subjective assessment has been used. Results of computation are presented in Table 6.4.1. It has been found out that present UII in NMMC area is 72.94 %.

6.5 Estimation of QOL

Quality of environment and availability of infrastructure facilities together decide quality of life. As the impact of these considerations is synergistic, equal importance needs to be give to both. Hence, QOL has been computed as average of EQI and UII. Present QOL Index for NMMC area has been worked out as 63.03 %. With implementation of recommended actions in ESR, QoL index is expected to improve by 10 to 15 %.

Table 6.3.1: Assignment of Importance Units and PEQ Scale for Parameters Selected for Computing EQI

Sr. No.	Parameter	Parameter Importance Unit (PIU)	Parameter Measurement for	
			PEQ = 0.0	PEQ = 1.0
A.	Ambient Air Quality	15		
A.1	Air Quality Index-Residential Area (RSPM)	10	200	20
A.2	Air Quality Index-Traffic Junctions (RSPM)	5	300	20
B.	Ambient Noise Levels	15		
B.1	Noise Level : Residential Area	10	100	40
B.2	Noise Level : Traffic Junctions	5	100	55
C.	Ambient (Surface/Ground) Water Quality	15		
C.1	Surface (drains) Water Quality, BOD mg/l	3	10	2
C.2	Surface (Lake) Water Quality, BOD mg/l	3	10	2
C.3	Ground (Well) Water Quality, BOD mg/l	3	5	2
C.4	Efficiency of Sewage Treatment Plants	6	30	90
D.	Solid Waste Management	15		
D.1	Solid Waste Collected, percentage	3	0	100
D.2	Solid Waste Segregation at Household Level, percentage	2	0	100
D.3	Solid Waste Segregation at Disposal Site, percentage	2	0	100
D.4	Solid Waste Recycle at Household Level, percentage	2	0	100
D.5	Solid Waste Recycle at Disposal Site, percentage	2	0	100
D.6	Biomedical Waste Collected, percentage	2	0	100
D.7	Road/Public Places Cleanliness *	2	0	1
E.	Protection of Ecosystem	20		
E.1	Protection of mangroves*	10	0	1
E.2	Protection of hills and quarry restoration*	10	0	1
F.	Public Health	20		
F.1	Drinking Water Quality, % samples fit for drinking	5	80	100
F.2	No. of cases of water borne diseases in node(cholera, Jaundice, Hepatitis)	5	100	0
F.3	No of cases of malaria in node	5	100	0
F.4	Cases of TB, percentage population affected	3	0.1	0.01
F.5	Control of Street Dogs*	2	0	1
	Total	100		

Note : Measured as V.Poor =0, Poor =0.2 Satisfactory = 0.4, Good = 0.6, V. Good = 0.80, Excellent = 0.90, Outstanding=1.0

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Sr. No.	Parameter	Environmental Quality Index, %									
		CBD Belapur	Nerul	Vashi	Turbhe	Kopar-Khairme	Ghansoli	Airoli	Digha	Average	Max
E.	Protection of Ecosystem										
E.1	Protection of mangroves	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	10
E.2	Protection of hills and quarry restoration	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	10
F.	Public Health										
F.1	Drinking Water Quality, % samples fit for drinking	4.35	2.03	0.00	3.38	3.30	3.78	3.18	3.60	2.95	5
F.2	No. of cases of water borne diseases in node(cholera, Jaundice, Hepatitis)	4.85	4.55	4.90	1.95	3.55	4.50	4.95	0.00	3.66	5
F.3	No of cases of malaria in node	0.00	0.00	5.00	0.20	0.00	3.25	3.35	5.00	2.10	5
F.4	Cases of TB, percentage population affected	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3
F.5	Control of Street Dogs	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	2
	Total	56.63	57.77	51.42	48.99	50.26	55.52	57.02	55.66	54.87	100

Table 6.4.1: Estimation of Urban Infrastructure Index for NMMC Area

Sr. No.	Infrastructure Facility/Amenity/Service	Status*	Score	Remarks
1.	Drinking water supply	V. Good	0.8	Except for slum pockets water distribution system is very good and quantity of water supply meets the norms.
2.	Sewerage	Excellent	0.9	Over 99 % area is covered with sewerage
3.	Storm water Drainage	Excellent	0.9	Storm water drain length to total road length ratio is 90 %
4.	Public toilets	Good	0.6	Adequate public toilets are provided. However, quality of toilets need improvement.
5.	Solid Waste Collection and transportation	Excellent	0.9	Solid waste collection system is designed operated efficiently. Only 18 paisa per tonne of waste is spent on collection and transportation. Solid waste collection is regularly done everyday.
6.	Health Services	Good	0.6	Adequate health facilities exist
7.	Public Transport	Good	0.6	The road transport facility needs to be augmented.
8.	Road Network & footpaths	Good	0.6	Road network and condition is very good. However, several potholes exist. Also roads do not show neat look. Plantation along roadside is poor. There is lot of scope for improvement of footpaths.
9.	Education Facilities	Excellent	0.9	NMMC has excellent educational facilities
10.	Parks/gardens & Tree Plantation	V. Good	0.8	There are 95 gardens in NMMC area. While the green spaces are adequate, their ample scope for improvement in quality.
11.	Entertainment	Good	0.6	Existing facilities need to be augmented to cater to the needs of NMMC area
12.	Public library	Good	0.6	Public library at Belapur need development. More public libraries required.
13.	Playgrounds	Good	0.6	Playgrounds provided in each node in planning. These grounds need development.
14.	Fire Fighting	V. Good	0.8	Fire fighting is meeting needs of NMMC area and has done excellent work in the past
15.	Slum Development	Good	0.6	There is vast scope for slum improvement
16.	Public Grievance Redressal and Participation	Excellent	0.9	The system of public interaction and participation in management of affairs in NMMC is excellent.
17.	Employment Opportunities	V. Good	0.8	V. Good employment opportunities are available due to industrial and commercial development in TBIA, Vashi and CBD Belapur.
	Total		12.4	
Urban Infrastructure Index for NMMC Area = $(12.4/17)*100 = 72.94\%$				

* Based on data available for overall NMMC area.