

**RAINWATER HARVESTING POTENTIAL FOR INDUSTRIAL UNITS IN PIMPRI
CHINCHWAD MIDC, MAHARASHTRA, INDIA**

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Abstract –

India is a developing country which recently experienced a rapid growth in the industrial sector. Pimpri – Chinchwad is one of the major industrial area in Maharashtra.

Water is an important and essential requirement for industrial growth. Pimpri-Chinchwad industrial area receives water supply from Pawana dam in Maval tahashil of Pune districts.

Now day's water supply to rural and urban population, agriculture and industries is burning issue in many parts of Maharashtra. As the industries are growing rapidly it is an urgent need to look in to the issue of accurate management of water in industrial units. Therefore we have focused the electronic zone of Pimpri-chinchwad MIDC to study of water management. Basically the assessment of industrial water use also domestic its use in those industrial units was made through the filling up the questioner in the electronic zone. The use of excess water in industrial process also domestic use of water, its scarcity and deficit were assessed in the study. This study provides to plan for other alternatives of water supply by applying rainwater harvesting techniques. The study also calculates rainwater harvesting potential for industrial units. Therefore industrial units look forward as their own alternative water supply source.

The study reveals the amount of water used by every industrial units under study. As well as proper utility of water, problems related to water supply, water management and alternative to overcome the related problem.

Key words - *Industrial Field survey, Industrial Water Management, Industrial Water use and need, Rainwater harvesting.*

Introduction –

The day by day water requirement of all the sector industry, agriculture and domestic uses is increasing as they are growing rapidly in most of the big cities in India are getting piped water from far-off places. This is putting tremendous pressure on the local population whose water is being snatched to feed urban and industrial growth.

Increasing industrial water use has been the increase in conflict between society and the industry on issues ranging from to water scarcity. In areas where there is water scarcity, industries are under tremendous pressure from society and government alike to reduce water use. In India, The main sources of water for the industrial sector are groundwater and surface water. Selection of source of water depends on the availability of sufficient and regular supply and the cost of water from the source. Industrial sector require huge amount of water. Since the surface water supply from the any other source like municipal, and industrial development authority sources is not sufficiently guaranteed, industrial units to depend on groundwater.

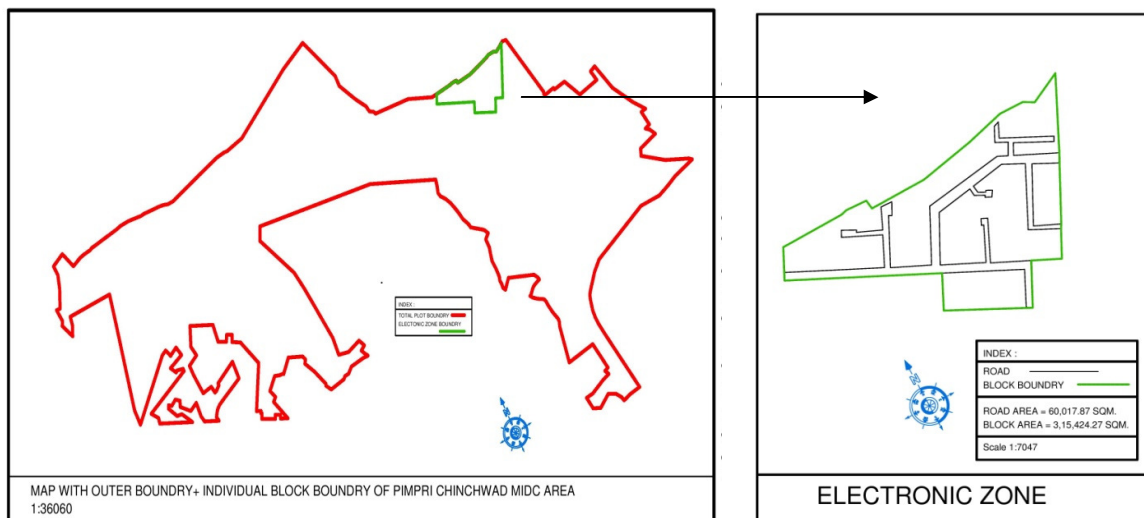
With a view to optimize water usage we are looking at alternatives, which are sustainable, reliable and cost effective. Rainwater harvesting appeared as a potential source of supply. Rainwater harvesting provides the long-term answers to the problem of water scarcity. (Geography of water resources- R.K.Gurjar, b.C.Jat, Rawat Pub) To asses and understand the industrial water use following twenty eight industrial units are selected to study the varies problems in water management and industrial campuses asses to get the potential of water from the rain.

Location of study area -

The city of Pimpri-Chinchwad is situated near the western margin of the Deccan Plateau on the leeward side of the Sahyadri ranges and Western Ghats, 560 m above sea level, on the banks of the rivers Mula, Pawana and Indrayani.

Industrial development in the Pimpri-Chinchwad region started in 1954 when Hindustan Antibiotics, then rapid industrialization over the next few years. The Maharashtra Industrial Development Corporation acquiring (MIDC) is started the process of industrial development in 1956. specially this belt is indicate the automobile industry but variety of industries like pharmaceuticals, chemicals, telecommunications and even Information Technology companies now setting up there on large scale Electronic zone industrial area is one the important industrial sub area In Pimpri Chinchwad MIDC .

Location of Pimpri- Chinchwad MIDC



Methodology –

Selection Of site and data collection to understand the water management in the different industrial units the 28 industries from Electronic Zone area were selected for the study by using stratified random sampling method. And the assessment of industrial water use and management was made through the filling up the questionnaires and prepare interviews in the industries. One questionnaire dedicate for rainwater harvesting.

Results and Discussion -

Water management and Rainwater harvesting potential in Electronic Zone –

The Electronic zone area has 80 number of small, medium and large scale industry. The industrial units of electronics spare parts, heavy duty fabrication, and coats industry. These manufacturing industry require huge amount of water in there industrial process. In this area industries are mainly producing the electronics

parts, testing and customized machinery in large scale on fabrication work. They requires water for cooling process, acid wash process, painting process, Tank testing. Also seven tank testing process. The graph no. 1 show the annual water use in industry with the bifurcation of internal use like domestic and industrial process.(Ref. Table No.01) The industrial domestic water use includes the water used for drinking, cleaning, and for the supply of toilets seats.

Table No.-1) Electronic Zone - Annul Water Use In Ltr.

Sr.No.	Name Of Industry	Industrial Annul	Domestic Annual	Total
1	Rasco Industry	365000	547500	912500
2	Mogora Cosmic Ltd	730000	1460000	2190000
3	S H Pithkar Ortho tools	365000	1095000	1460000
4	Lonlife Sciences Ltd.	292000	1095000	1387000
5	Jayashree Electron	0	1825000	1825000
6	Power Formers Eng.	0	1095000	1095000
7	Tri-o Enterprises	0	547500	547500
8	Savm Electronics P. Ltd	0	912500	912500
9	Prasad Mcab p Ltd.	365000	1095000	1460000
10	Asain Power system P. Ltd	0	730000	730000
11	Alok Chemicle P. Ltd.	730000	1095000	1825000
12	Svs Industries	0	547500	547500
13	Zeutch Engineers P. Ltd	365000	547500	912500
14	Mithsagar Electronic P. Ltd	0	730000	730000
15	Jabro Engineers	292000	547500	839500
16	Power Win House	0	912500	912500
17	Jaldoot material and handling P. Ltd	365000	1095000	1460000
18	Sakshi metal and tools P. Ltd	438000	1095000	1533000
19	Jayashree Electrical P. Ltd	0	1460000	1460000
20	Frontline Electronics	0	1460000	1460000
21	Deairj Tech India	365000	730000	1095000
22	Mitoubhi Electrical	0	547500	547500
23	Cpgemini	0	730000	730000
24	Shree Industries	0	730000	730000
25	Scope T and M Ltd	0	1642500	1642500
26	Fablectiani Engineers	0	255500	255500
27	Try Engineers	0	912500	912500
28	Sru Tech Engineering	0	255500	255500

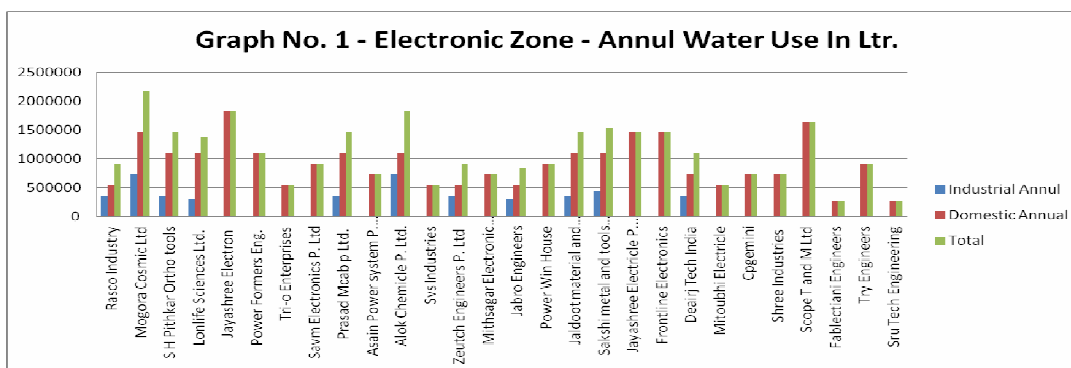


TABLE NO. 02 - OBSERVETION OF WATER MANAGEMENT

Sr. No.	Name Of Industry	Water Management	Extra / Excess Use Of water		Recycling Of Used water	Pipeline linkeges	Garden Irrigation
			Domestic	Industrial			
1	Rasco Industry	Unplan	Yes	Yes	No	No	NA
2	Mogora Cosmic Ltd	Plan	No	No	No	No	Drip
3	S H Pithkar Ortho tools	Plan	No	No	No	No	NA
4	Lonlife Sciences Ltd.	Plan	No	No	No	No	Drip
5	Jayashree Electron	Plan	No	No	No	No	Drip
6	Power Formers Eng.	Plan	No	No	No	No	Traditional
7	Tri-o Enterprises	Unplan	Yes	No	No	No	NA
8	Savm Electronics P. Ltd	Unplan	Yes	No	No	No	Traditional
9	Prasad Mcab p Ltd.	Unplan	Yes	Yes	No	No	Traditional
10	Asain Power system P. Ltd	Unplan	Yes	No	No	No	NA
11	Alok Chemicle P. Ltd.	Unplan	Yes	Yes	No	No	NA
12	Svs Industries	Unplan	Yes	No	No	No	NA
13	Zeutch Engineers P. Ltd	Unplan	Yes	Yes	No	No	NA
14	Mithsagar Electronic P. Ltd	Unplan	Yes	No	No	No	NA
15	Jabro Engineers	Unplan	Yes	Yes	No	No	NA
16	Power Win House	Unplan	Yes	No	No	No	Traditional
17	Jaldoot material and handling P. Ltd	Unplan	Yes	Yes	No	No	NA
18	Sakshi metal and tools P. Ltd	Plan	No	No	No	No	Drip /Sprinkler
19	Jayashree Electric P. Ltd	Plan	No	No	No	No	Drip /Sprinkler
20	Frontline Electronics	Plan	No	No	No	No	Drip /Sprinkler
21	Deairj Tech India	Plan	Yes	No	No	No	Traditional
22	Mitoubhi Electric	Plan	Yes	No	No	No	Traditional
23	Cpgemini	Plan	No	No	No	No	Drip
24	Shree Industries	Plan	No	No	No	No	Traditional
25	Scope T and M Ltd	Plan	Yes	No	No	No	Traditional
26	Fablectiani Engineers	Plan	Yes	No	No	No	NA
27	Try Engineers	Plan	Yes	No	No	No	Traditional
28	Sru Tech Engineering	Plan	No	No	No	No	NA

Following problems are observed in industrial units –

- 1) Lack of the awareness of water management only 12 industries are does not having planning for water use and water management. It is indication of lack of awareness of water management in industry.
- 2) Extra and excess use by Workers due to lack of awareness of water using, also none of automatic flushing system observe in industry that’s why flushing is uncontrolled. 17 industries excess use of water in domestic use. This observation indicates the flushing cannot be save water and excess or extra use of water is increasing as compare to requirement.
- 3) Water use in industrial process leads to water loss. 6 industries use excess use of water in industrial processes. Industry does not have regulatory mechanism of water use in processes. 9 industry use traditional method of water use which is leads to wastage of water in huge amount.

4) Industry does not have any recycling mechanism of used water. Once water is utilized it is disposed of without utilizing it for a second use.

Roof top water harvesting as alternative –

The study also calculates rainwater harvesting potential for industrial units. Therefore industrial units look forward as their own alternative water supply source.

The study reveals the amount of water used by every industrial units under study. As well as proper utility of water, problems related to water supply, water management and alternative to overcome the related problem. Industrial region face many problems regarding water use. Defective traditional water supply, Unplanned Water management, extra use of water, does not recycle of water these major problems observe in industrial region. With analysis of water use and water demand we must think of for alternatives, which are sustainable, reliable and cost effective. Harvestable rainwater can be supportive alternative to fulfill the progressive future water need in industry. Rainwater harvesting provides the long-term answers to the problem of water scarcity and fulfill water demand in industrial water use. This is a representative study of condensation of roof top rainwater harvesting potential for these industries. Following table shows the roof pattern and rooftop area which is helps to calculate the rainwater harvesting potential. (Ref. Table no.3)

Sr.No.	Name Of Industry	Campus Area In Sqm					Roof Area In Sqm	
		Parking	Godown	Open Space	Garden	Road	Slab	Cross Metal Sheet
1	Rasco Industry	0	0	92.903	0	0	0	557.418
2	Mogora Cosmic Ltd	92.903	0	185.806	278.709	46.4515	371.612	0
3	S H Pithkar Ortho tools	185.806	0	185.806	0	92.903	371.612	0
4	Lonlife Sciences Ltd.	92.903	0	278.709	92.903	0	278.709	92.903
5	Jayashree Electron	92.903	0	185.806	185.806	92.903	371.612	0
6	Power Formers Eng.	185.806	0	185.806	185.806	92.903	185.806	185.806
7	Tri-o Enterprises	92.903	0	278.709	0	0	0	185.806
8	Savm Electronics P. Ltd	92.903	0	0	185.806	0	371.612	0
9	Prasad Mcab p Ltd.	0	0	371.612	92.903	0	0	929.03
10	Asain Power system P. Ltd	92.903	0	185.806	0	0	371.612	278.709
11	Alok Chemicle P. Ltd.	92.903	0	185.806	0	0	185.806	0
12	Svs Industries	0	0	0	0	0	0	278.709
13	Zeutch Engineers P. Ltd	0	0	0	0	0	0	278.709
14	Mithsagar Electronic P. Ltd	0	0	92.903	0	0	371.612	185.806
15	Jabro Engineers	0	0	46.4515	0	0	0	929.03
16	Power Win House	0	0	185.806	185.806	0	371.612	0
17	Jakdoot material and handling P. Ltd	0	0	92.903	0	0	0	464.515
18	Sakshi metal and tools P. Ltd	0	0	278.709	185.806	0	0	464.515
19	Jayashree Electric P. Ltd	0	0	92.903	92.903	0	371.612	0
20	Frontline Electronics	0	0	92.903	92.903	0	371.612	0
21	Deairj Tech India	111.4836	278.709	0	74.3224	195.096	1114.836	0
22	Mitoubhi Electric	111.4836	0	111.4836	92.903	185.806	668.9016	0
23	Cpgemini	18.5806	0	18.5806	74.3224	46.4515	222.9672	0
24	Shree Industries	668.9016	0	278.709	371.612	334.451	1337.8032	0
25	Scope T and M Ltd	668.9016	418.0635	780.3852	891.8688	83.6127	4180.635	780.3852
26	Fablectiani Engineers	92.903	0	167.2254	0	185.806	0	501.6762
27	Try Engineers	0	278.709	278.709	92.903	0	0	1114.836
28	Sru Tech Engineering	278.709	445.9344	111.4836	0	0	501.6762	139.3545

Following methods is used calculate the harvestable rainwater potential of roof-top rainwater for the above industries. For this calculation we have referred Manual of rainwater harvesting and conservation by Govt. Of India, Consultancy services organization central public works department, nirman bhavan, new Delhi. In 2002.

CALCULATION OF AMOUNT OF RAINWATER

Rainwater Harvesting Potential Cum =
 (Area of roof top in sqm) x(Annual rain fall in meter)
 x (Run off coefficient) x (Constant co-efficient 0.80)

Table no – 04 - Run off co-efficient

Sr.No	Roof Catchments	Run off Co- efficient
1	Tiles	0.8 - 0.9
2	Corrugated Metal sheets	0.7 - 0.9
3	Asphaltic or concrete pavement (Parking, Roads)	0.70 - 0.95
4	Unimproved land areas	0.10 - 0.30
5	Parks	0.10 – 0.25
6	Annual Rainfall	0.7 – 0.8

As per the calculation following table no. 5 ,6 and 7 shown the calculation of harvestable rainwater in electronic zone .

Table No. 5 - Electronic Zone Campus Area Calculation of RWH

Sr.No.	Name Of Industry	Campus Area In cum					Total In cum
		Parking	Godown	Open Space	Garden	Road	
1	Rasco Industry	0	0	17.837376	0	0	17.837376
2	Mogora Cosmic Ltd	56.485024	0	35.674752	44.59344	28.242512	164.995728
3	S H Pithkar Ortho tools	112.970048	0	35.674752	0	56.485024	205.129824
4	Lonlife Sciences Ltd.	56.485024	0	53.512128	14.86448	0	124.861632
5	Jayashree Electron	56.485024	0	35.674752	29.72896	56.485024	178.37376
6	Power Formers Eng.	112.970048	0	35.674752	29.72896	56.485024	234.858784
7	Tri-o Enterprises	56.485024	0	53.512128	0	0	109.997152
8	Savm Electronics P. Ltd	56.485024	0	0	29.72896	0	86.213984
9	Prasad Mcab p Ltd.	0	0	71.349504	14.86448	0	86.213984
10	Asain Power system P. Ltd	56.485024	0	35.674752	0	0	92.159776
11	Alok Chemicle P. Ltd.	56.485024	0	35.674752	0	0	92.159776
12	Svs Industries	0	0	0	0	0	0
13	Zeutch Engineers P. Ltd	0	0	0	0	0	0
14	Mithsagar Electronic P. Ltd	0	0	17.837376	0	0	17.837376
15	Jabro Engineers	0	0	8.918688	0	0	8.918688
16	Power Win House	0	0	35.674752	29.72896	0	65.403712
17	Jaldoot material and handling P. Ltd	0	0	17.837376	0	0	17.837376
18	Sakshi metal and tools P. Ltd	0	0	53.512128	29.72896	0	83.241088
19	Jayashree Electric P. Ltd	0	0	17.837376	14.86448	0	32.701856
20	Frontline Electronics	0	0	17.837376	14.86448	0	32.701856
21	Deairj Tech India	67.7820288	160.5364	0	11.891584	118.6185504	358.8285472
22	Mitoubhi Electric	67.7820288	0	21.4048512	14.86448	112.970048	217.021408
23	Cpgemini	11.2970048	0	3.5674752	11.891584	28.242512	54.998576
24	Shree Industries	406.692173	0	53.512128	59.45792	203.3460864	723.0083072
25	Scope T and M Ltd	406.692173	240.8046	149.8339584	142.69901	50.8365216	990.8662368
26	Fablectiani Engineers	56.485024	0	32.1072768	0	112.970048	201.5623488
27	Try Engineers	0	160.5364	53.512128	14.86448	0	228.912992
28	Sru Tech Engineering	169.455072	256.8582	21.4048512	0	0	447.7181376

Table No. 6 -Electronic Zone Rooftop Area Calculation of RWH

Sr.No.	Name Of Industry	Roof Area In cum		Total In cum
		Slab	Cross Metal Sheet	
1	Rasco Industry	0	321.072768	321.072768
2	Mogora Cosmic Ltd	214.048512	0	214.048512
3	S H Pithkar Ortho tools	214.048512	0	214.048512
4	Lonlife Sciences Ltd.	160.536384	53.512128	214.048512
5	Jayashree Electron	214.048512	0	214.048512
6	Power Formers Eng.	107.024256	107.024256	214.048512
7	Tri-o Enterprises	0	107.024256	107.024256
8	Savm Electronics P. Ltd	214.048512	0	214.048512
9	Prasad Mcab p Ltd.	0	535.12128	535.12128
10	Asain Power system P. Ltd	214.048512	160.536384	374.584896
11	Alok Chemicle P. Ltd.	107.024256	0	107.024256
12	Svs Industries	0	160.536384	160.536384
13	Zeutch Engineers P. Ltd	0	160.536384	160.536384
14	Mithsagar Electronic P. Ltd	214.048512	107.024256	321.072768
15	Jabro Engineers	0	535.12128	535.12128
16	Power Win House	214.048512	0	214.048512
17	Jaldoot material and handling P. Ltd	0	267.56064	267.56064
18	Sakshi metal and tools P. Ltd	0	267.56064	267.56064
19	Jayashree Electrical P. Ltd	214.048512	0	214.048512
20	Frontline Electronics	214.048512	0	214.048512
21	Deairj Tech India	642.145536	0	642.145536
22	Mitoubhi Electrical	385.2873216	0	385.2873216
23	Cpgemini	128.4291072	0	128.4291072
24	Shree Industries	770.5746432	0	770.5746432
25	Scope T and M Ltd	2408.04576	449.5018752	2857.547635
26	Fablectiani Engineers	0	288.9654912	288.9654912
27	Try Engineers	0	642.145536	642.145536
28	Sru Tech Engineering	288.9654912	80.268192	369.2336832

Following Table no. 7 shows total calculation of harvestable rainwater in electronic zone

Table No. 7 - Electronic Zone Total calculation of RWH					
Sr. No.	Name Of Industry	Campus Area In cum	Rooftop Area In cum	Total In cum	Total In Ltr.
1	Rasco Industry	17.837376	321.072768	338.910144	338910.14
2	Mogora Cosmic Ltd	164.995728	214.048512	379.04424	379044.24
3	S H Pithkar Ortho tools	205.129824	214.048512	419.178336	419178.34
4	Lonlife Sciences Ltd.	124.861632	214.048512	338.910144	338910.14
5	Jayashree Electron	178.37376	214.048512	392.422272	392422.27
6	Power Formers Eng.	234.858784	214.048512	448.907296	448907.3
7	Tri-o Enterprises	109.997152	107.024256	217.021408	217021.41
8	Savm Electronics P. Ltd	86.213984	214.048512	300.262496	300262.5
9	Prasad Mcab p Ltd.	86.213984	535.12128	621.335264	621335.26
10	Asain Power system P. Ltd	92.159776	374.584896	466.744672	466744.67
11	Alok Chemicle P. Ltd.	92.159776	107.024256	199.184032	199184.03
12	Svs Industries	0	160.536384	160.536384	160536.38
13	Zeutch Engineers P. Ltd	0	160.536384	160.536384	160536.38
14	Mithsagar Electronic P. Ltd	17.837376	321.072768	338.910144	338910.14
15	Jabro Engineers	8.918688	535.12128	544.039968	544039.97
16	Power Win House	65.403712	214.048512	279.452224	279452.22
17	Jaldoot material and handling P.Ltd	17.837376	267.56064	285.398016	285398.02
18	Sakshi metal and tools P. Ltd	83.241088	267.56064	350.801728	350801.73
19	Jayashree Electric P. Ltd	32.701856	214.048512	246.750368	246750.37
20	Frontline Electronics	32.701856	214.048512	246.750368	246750.37
21	Deairj Tech India	358.8285472	642.145536	1000.974083	1000974.1
22	Mitoubhi Electric	217.021408	385.2873216	602.3087296	602308.73
23	Cpgemini	54.998576	128.4291072	183.4276832	183427.68
24	Shree Industries	723.0083072	770.5746432	1493.58295	1493583
25	Scope T and M Ltd	990.8662368	2857.547635	3848.413872	3848413.9
26	Fablectiani Engineers	201.5623488	288.9654912	490.52784	490527.84
27	Try Engineers	228.912992	642.145536	871.058528	871058.53
28	Sru Tech Engineering	447.7181376	369.2336832	816.9518208	816951.82

As a part of industrial water management and future water need industries should consider the alternative of rainwater harvesting. The fingers of harvestable water potential definitely provide the path of future industrial water use and their development. Following table shows the annual water requirement and rainwater harvesting potential for each industry. (Ref. Table no. 8)

Table No. 8 - Rainwater Harvesting Potential in Electronic Zone

Sr.No.	Name Of Industry	Annual Water use In Liters	Rain water potential in liters
1	Rasco Industry	912500	338910.144
2	Mogora Cosmic Ltd	2190000	379044.24
3	S H Pithkar Ortho tools	1460000	419178.336
4	Lonlife Sciences Ltd.	1387000	338910.144
5	Jayashree Electron	1825000	392422.272
6	Power Formers Eng.	1095000	448907.296
7	Tri-o Enterprises	547500	217021.408
8	Savm Electronics P. Ltd	912500	300262.496
9	Prasad Mcab p Ltd.	1460000	621335.264
10	Asain Power system P. Ltd	730000	466744.672
11	Alok Chemicle P. Ltd.	1825000	199184.032
12	Svs Industries	547500	160536.384
13	Zeutch Engineers P. Ltd	912500	160536.384
14	Mithsagar Electronic P. Ltd	730000	338910.144
15	Jabro Engineers	839500	544039.968
16	Power Win House	912500	279452.224
17	Jaldoot material and handling P. Ltd	1460000	285398.016
18	Sakshi metal and tools P. Ltd	1533000	350801.728
19	Jayashree Electrical P. Ltd	1460000	246750.368
20	Frontline Electronics	1460000	246750.368
21	Deairj Tech India	1095000	1000974.083
22	Mitoubhi Electrical	547500	602308.7296
23	Cpgemini	730000	183427.6832
24	Shree Industries	730000	1493582.95
25	Scope T and M Ltd	1642500	3848413.872
26	Fablectiani Engineers	255500	490527.84
27	Try Engineers	912500	871058.528
28	Sru Tech Engineering	255500	816951.8208

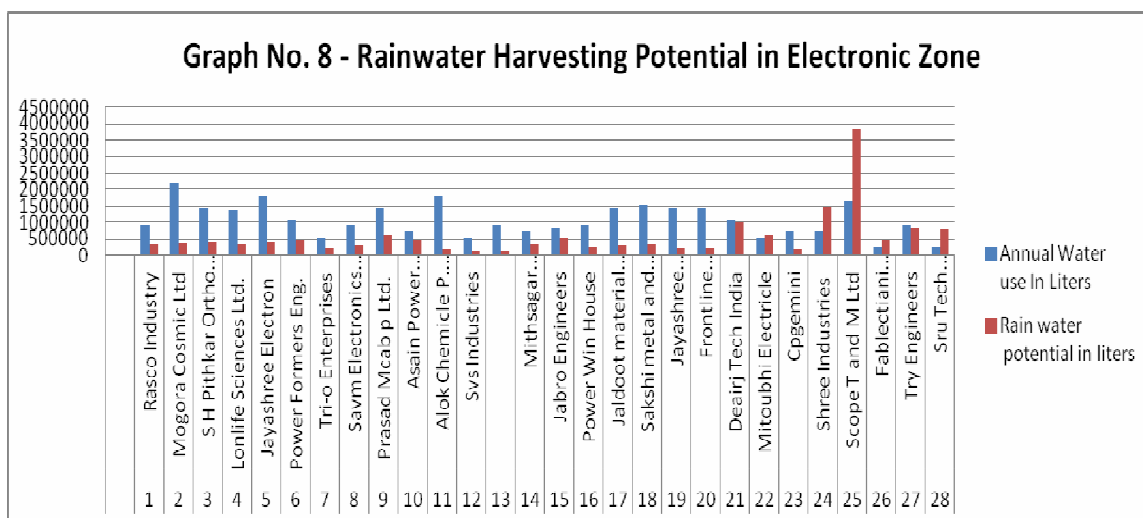
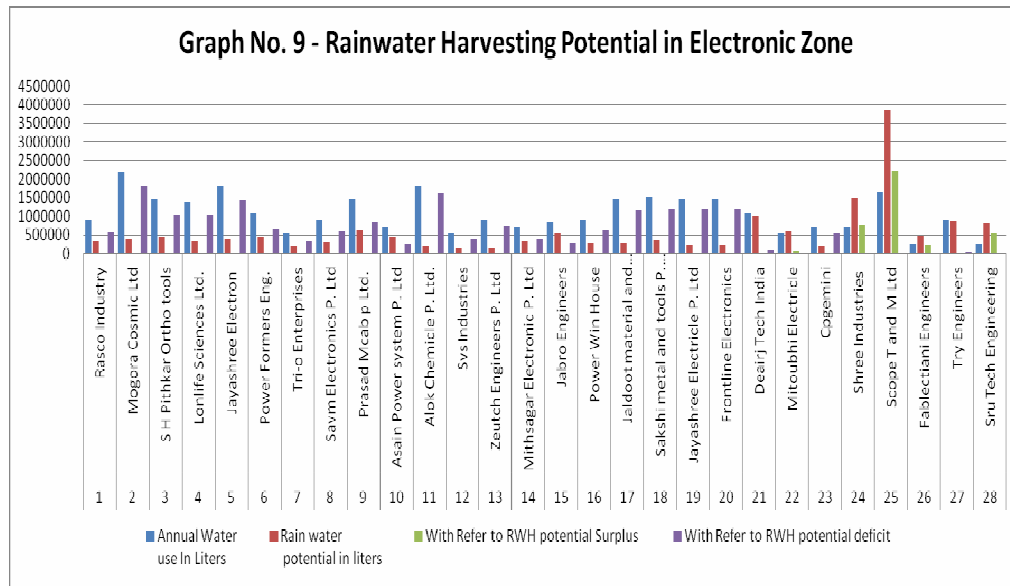


Table No. 9 - Rainwater Harvesting Potential in Electronic Zone

Sr.No.	Name Of Industry	Annual Water use In Liters	Rain water potential in liters	With Refer to RWH potential		Remark
				Surplus	deficit	
1	Rasco Industry	912500	338910.144	0	573589.856	Minus
2	Mogora Cosmic Ltd	2190000	379044.24	0	1810955.76	Minus
3	S H Pithkar Ortho tools	1460000	419178.336	0	1040821.664	Minus
4	Lonlife Sciences Ltd.	1387000	338910.144	0	1048089.856	Minus
5	Jayashree Electron	1825000	392422.272	0	1432577.728	Minus
6	Power Formers Eng.	1095000	448907.296	0	646092.704	Minus
7	Tri-o Enterprises	547500	217021.408	0	330478.592	Minus
8	Savm Electronics P. Ltd	912500	300262.496	0	612237.504	Minus
9	Prasad Mcab p Ltd.	1460000	621335.264	0	838664.736	Minus
10	Asain Power system P. Ltd	730000	466744.672	0	263255.328	Minus
11	Alok Chemicle P. Ltd.	1825000	199184.032	0	1625815.968	Minus
12	Svs Industries	547500	160536.384	0	386963.616	Minus
13	Zeutch Engineers P. Ltd	912500	160536.384	0	751963.616	Minus
14	Mithsagar Electronic P. Ltd	730000	338910.144	0	391089.856	Minus
15	Jabro Engineers	839500	544039.968	0	295460.032	Minus
16	Power Win House	912500	279452.224	0	633047.776	Minus
17	Jaldoot material and handling P. Ltd	1460000	285398.016	0	1174601.984	Minus
18	Sakshi metal and tools P. Ltd	1533000	350801.728	0	1182198.272	Minus
19	Jayashree Electric P. Ltd	1460000	246750.368	0	1213249.632	Minus
20	Frontline Electronics	1460000	246750.368	0	1213249.632	Minus
21	Deairj Tech India	1095000	1000974.083	0	94025.9168	Minus
22	Mitoubhi Electric	547500	602308.7296	54808.7296	0	Gain
23	Cpgemini	730000	183427.6832	0	546572.3168	Minus
24	Shree Industries	730000	1493582.95	763582.9504	0	Gain
25	Scope T and M Ltd	1642500	3848413.872	2205913.872	0	Gain
26	Fablectiani Engineers	255500	490527.84	235027.84	0	Gain
27	Try Engineers	912500	871058.528	0	41441.472	Minus
28	Sru Tech Engineering	255500	816951.8208	561451.8208	0	Gain

Above Table No. 9 shows the rainwater harvesting potential. Only 5 industries are surplus potential of harvestable rainwater. And another twenty three industries are deficit potential of harvestable rainwater.



CONCLUSION –

- 1) It is observed that most of industries were doest have their own ideal water management system To develop the awareness of domestic water use among the worker and implement action of controlled use of water is essential in all the industries. Out of all the industry under the study does not have the automatic flushing mechanism. This observation indicates the over flushing cannot be save water and excess or extra use of water is increasing as compare to requirement.
- 2) Industry does not have regulatory mechanism of water use in process. Few industries use the traditional method of water use which leads to wastage of water in huge amount. There should be controlled water use in industrial process by using advance technique. Where seven industries are moderately aware with the controlled water use method for garden water supply.
- 3) Industry does not have any recycling mechanism of used water. why water requirement is increasing in industry.
- 4) Only five industries having excess rain water harvesting potential more than its requirement. In near future industry should consider this water potential for their development .Water management is essential subject to fulfillment of the future planning
- 5) Another twenty three industry having good rainwater harvesting potential but they should prepare the water management system and to develop water use awareness in workers, and apply the automatic flushing system in domestic water uses. In industrial process water supply should be optimized by regulatory mechanism.
- 6) Demand for water is continuously increasing in industries. Once the water is utilized by the industry this used water should be processed from purification and reused it , but all the industries under the study does not have recycling mechanism . Such strategies may be determined for industrial areas in the country so that their demand is also fulfilled and availability of water is also maintained. For this, pressure will have to be built on industries for reuse of water. A limit for taking water from water sources may be fixed so that reuse

and recycling gain importance. Stress has to be laid on conservation of rain water. Industrial units can use rain water in different forms. This water supply can be complementary to the traditional supply of water and it would save water. It can also be implemented through study of water management.

Abbreviations -

- 1) Ltr. – Liter
- 2) Sqm. – Square Meter
- 3) Cum. – Cubic Meter
- 4) RWH – Rainwater Harvesting

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