



**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
INDIA METEOROLOGICAL DEPARTMENT**

Met Monograph No.: ESSO/IMD/Hydrology/03(2016)/21

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FOR DIFFERENT LOCATIONS
IN THE STATE OF MAHARASHTRA**

P. Guhathakurta, K. J. Ramesh and S. D. Sangale

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DOCUMENT AND DATA CONTROL SHEET**

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16	Abstract	India is in the tropical monsoon zone and receives plenty of rainfall during the monsoon season every year. Though most of the rainfall is received during southwest monsoon, many parts of the country receive rainfall during other seasons too including northeast monsoon season. Though the Monsoon system brings adequate rainfall as a whole, yet there are large swathes of dry and drought prone areas. Also in many places the quality of groundwater is not good. Some areas having quite even rainfall but still have a problem of severe scarcity of drinking water. This is because we have rainfall in short spells of high intensity. Due to this intensity and short duration of heavy rain, most of the rain falling on surface tends to flow away rapidly, leaving very little for the recharge of ground. Therefore, it is necessary for users to collect and store rainwater. The present study has been undertaken to assess the potential of roof top rain water harvesting technique in the sustainable development of water resources of Maharashtra state.
17	Key Words	Rainfall normal, runoff coefficient, catchment area

PREFACE

Climate Division of Office of ADGM(R) has different activities leading to various climate services. Hydrometeorology is an important part of climate services. Water is an essential component in every aspect of life and must be valued and safeguarded. It is the most important resource for survival of human beings as much as food, air etc.

Though India is blessed with adequate rainfall as a whole, yet there are large swathes of dry and drought prone areas. In many places the quality of groundwater is not good. Some areas having quite even rainfall but even they have severe scarcity of drinking water. This is because we have rainfall in short spells of high intensity. Due to this intensity and short duration of heavy rain, most of the rain falling on surface tends to flow away rapidly and leaving very little for the recharge of ground water. Therefore, it is necessary for users to collect and store rainwater.

In view of above Rainwater harvesting through rooftops is an optimistic method of water conservation. RWH is the process of collecting and storing water for future productive use. Rooftop Rainwater harvesting is the technique through which rain water is captured from the roof catchments and stored in reservoirs. This method is particularly important in drought prone, hilly, urban and coastal areas. In this situation, rainwater harvesting is one of the crucial options that everybody should use on a personal as well as national level.

The present study has been undertaken to assess the potential of roof top rain water harvesting technique in the sustainable development of water resources in the state of Maharashtra. The normal rainfall data prepared by Climate Application Group, Climate Division, Pune, of 326 well distributed rain gauge stations for the period 1951-2000 is used for computation of rain water harvesting potential over the state Maharashtra. If rain water is harvested, the scarcity of water can be eliminated altogether. This is an ideal solution to overcome water problem where surface water sources are insufficient and groundwater supply is quantitatively and qualitatively inadequate.

November, 2016
New Delhi

K. J. Ramesh
Director General of Meteorology

ABSTRACT

Rain water harvesting is receiving increased attention worldwide as an alternative source of water. In the water budget rainfall is the only input parameter while there are many output parameters. India is lucky to be in the tropical monsoon zone and it receives plenty of rainfall during the monsoon season every year. Though most of the rainfall received during southwest monsoon rainfall, many parts of the country receive rainfall during other seasons also including northeast monsoon season. Though the Monsoon system brings plenty of India with adequate rainfall as a whole, yet there are large swathes of dry and drought prone areas. Also in many places the quality of groundwater is not good. Some areas having quite even rainfall but there is also problem of a severe scarcity of drinking water. This is because we have rainfall in short spells of high intensity. Due to this intensity and short duration of heavy rain, most of the rain falling on surface tends to flow away rapidly and leaving very little for the recharge of ground. Therefore, it is necessary for users to collect and store rainwater. The present study has been undertaken to assess the potential of roof top rain water harvesting technique in the sustainable development of water resources of Maharashtra state. The normal rainfall data of 326 well distributed rain gauge stations for the period 1951-2000 is used for computation of rain water harvesting potential for roof top over the state Maharashtra.

1. Introduction

Water is an essential component in every aspect of life and must be valued and safeguarded. It is the most important resources for survival of human being as much as food, air etc, but very few attentions are paid for its economical use and conservation of this precious resource. Due to over pumping of ground water, the water table is going down abnormally and if the problem is not given a serious look, then the future generations may have to face severe scarcity of water. Rainfall is the prime source of water.

India is blessed with adequate rainfall as a whole, yet there are large swathes of dry and drought prone area. In many places the quality of groundwater is not good. Some areas having quite even rainfall but there is also problem of a severe scarcity of drinking water. This is because we have rainfall in short spells of high intensity. Due to this intensity and short duration of heavy rain, most of the rain falling on surface tends to flow away rapidly and leaving very little for the recharge of ground. Therefore, it is necessary for users to collect and store rainwater. In the context of climate change several research studies including scientists of India Meteorological Department have reported significant increasing trends in the frequency of higher intensities rainfall events and decreasing trend of light to moderate intensity rainfall events. The ground water recharge is thus definitely affecting in future as an impact of climate change. Rainwater harvesting through rooftops is an optimistic method of water conservation. In India southwest monsoon season is the main rain producing season which gives around 75-80% of annual rainfall. The rainfall itself has high temporal and spatial variability resulting drought in some year and flood in another year over an area. Even within the monsoon season there is high intra seasonal variability resulting prolong dry spell and wet spell. There are many districts or smaller areas where deficient rainfall has been received for consecutive 2-3 years or more. Water scarcity is becoming very serious problem over these areas leading to affect human life in almost every sectors. If rain water is harvested, the scarcity of water can be eliminated altogether. This is an ideal solution to overcome water problem where

surface water sources are insufficient and inadequate groundwater supply quantitatively and qualitatively . RWH is the process of collecting and storing water for future productive use. Rooftop Rainwater harvesting (Fig.1) is the technique through which rain water is captured from the roof catchments and stored in reservoirs. Roof top Rainwater harvesting is essential for making water available for future use. This method is particularly important in drought prone, hilly, urban and coastal areas. In this situation, rainwater harvesting is one of the crucial options that everybody should use on a personal as well as national level.

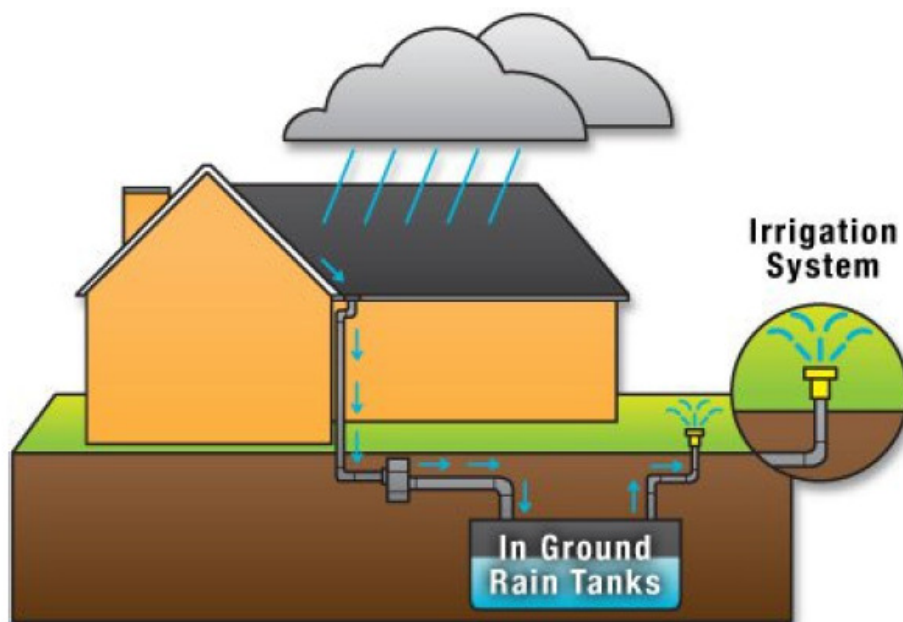


Fig.1 A simple sketch diagram of Rainwater Harvesting System

2. Advantages

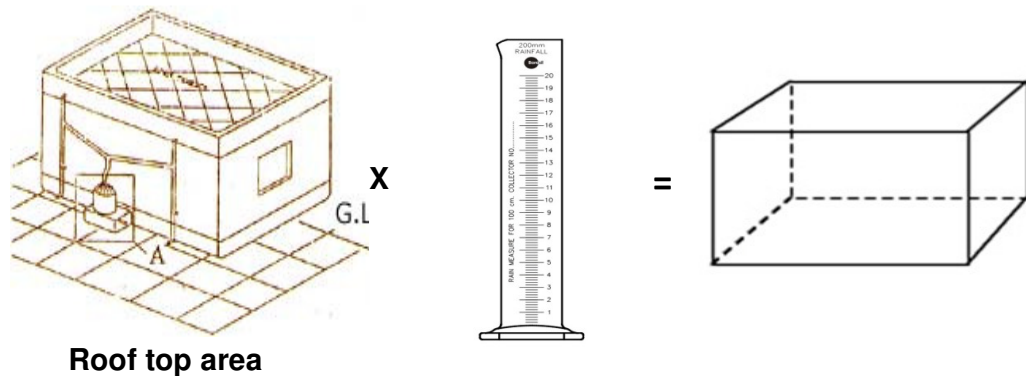
Rainwater harvesting technologies are simple to install and operate. Local people can be easily trained to implement such technologies, and construction materials are also readily available. Rainwater harvesting is convenient in the sense that it provides water at the point of consumption, and family members have full control of their own systems, which greatly reduces operation and maintenance problems. Running costs, also, are almost negligible. Water

collected from roof catchments usually is of acceptable quality for domestic purposes. As it is collected using existing structures not specially constructed for the purpose, rainwater harvesting has few negative environmental impacts compared to other water supply project technologies. Although regional or other local factors can modify the local climatic conditions, rainwater can be a continuous source of water supply for both the rural and poor. Depending upon household capacity and needs, both the water collection and storage capacity may be increased as needed within the available catchment area. From the vast advantages of rain water harvesting following three can be listed.

- I. Rainwater harvesting will improve water supply, food production, and ultimately food security.
- II. Water insecure households or individuals in rural areas will benefit the most from rainwater harvesting systems.
- III. Since rainwater harvesting leads to water supply which leads to food security, this will greatly contribute to income generation.

3. The Potential water

Area of Catchment X Amount of Rainfall = Volume of water received



The total amount of water that is received in the form of rainfall over an area is called the rainwater endowment of that area. Out of this, the amount that can be effectively harvested is called the water harvesting potential.

4. Information needed for knowing rain water harvesting potential

4.1 Mean Rainfall

To assess harvestable quantity of rainwater, we need average rainfall depth over some time period and hence the mean or normal rainfall of an area for the required duration is essential. Rainfall is measured through an instrument called rain gauge. Measured rainfall at a station is also called point rainfall. For simple understanding, mean or normal annual over a station is the statistical average calculated on the basis of measured rainfall over many years (usually 30 years or more). However, there is no guarantee that the same average value of rainfall will be achieved in a particular year as the rainfall has a high year to year variation. But the mean annual is generally accepted as the expected rainfall for that station. Mean Annual Rainfall value is also useful to estimate runoff. India Meteorological Department maintains record of rainfall data of more than 7 thousand rain gauge stations in India. There are around 3000 stations in the country for which average or normal rainfall has been calculated. For the state Maharashtra we have used 326 stations where normal rainfall based on the data for period 25/10 years or more is available.

4.2. Catchment area characteristics

Runoff depends upon the area and type of the catchment over which it falls as well as surface features. As mentioned earlier rainfall measured in depth and it is the point rainfall. In order to get the volume of water i.e. the rainwater endowment of that area we have to multiply the depth of the rainfall with the catchment area. For the Roof Top Rain Water Harvesting catchment area is the roof surface. The effective area of roof used for computing volume of water is called roof foot print. For plane horizontal rectangular or other shape roof, roof foot print is same as the roof and thus effective area is same. Followings are the

example of other commonly available roof types and their corresponding roof footprint.

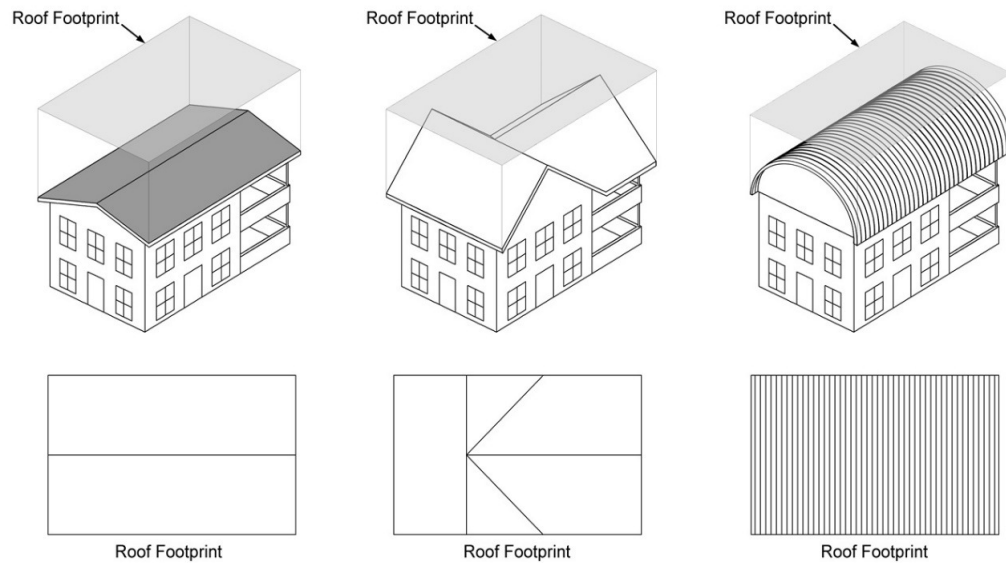


Fig.2 Some examples of Roof footprint requires for computing surface area.

4.3 Run-off and run-off coefficient

It is the water that flows away from a catchment after falling on its surface in the form of rain. Runoff depends upon the area and type of the catchment over which it falls as well as surface features. For example, normal concrete roof has highest run off value than the area with heavy vegetation. The amount of rainfall contributing to the runoff of a given area must be known. The runoff coefficient is the value that represents the ratio of the volume of water that runs off a surface to the volume of rainfall that falls on the surface

There are many parts of the hydrologic cycle that affect the runoff coefficient. These includes interception, evaporation, infiltration, slope, soil types (not applicable to roof top systems), etc. Thus run-off coefficient depends on roof type, slope, soil type, land use, degree of imperviousness, surface roughness and duration and intensity of rainfall.

Runoff coefficients for various catchment surfaces (Pacey and Cullins, 1989)

Type of Catchment	Coefficients
Roof Catchments	
<i>Tiles</i>	0.8 – 0.9
Corrugated metal sheets	0.7- 0.9
Ground surface coverings	
<i>Concrete</i>	0.6 – 0.8
<i>Brick pavement</i>	0.5- 0.6
Untreated ground catchments	
<i>Soil on slopes less than 10 per cent</i>	0.0 – 0.3
<i>Rocky natural catchments</i>	0.2 – 0.5

Based on the above factors the water harvesting potential of a site could be estimated using the formula given below.

Table -1

Sample calculation (Station Ahmednagar obsy)

**Annual Rainfall Normal of a sample station (Ahmednagar obsy)= 616.2 mm
= 0.6162 m**

Area = 1 sq ft = 0.0929sq m

Run-off coefficient = 0.85

**Rain water harvesting potential = Rainfall x Area of catchment x Runoff coefficient
= 0.6162 *0.0929*0.85 cu m
= 0.048658233 cu m
= 48.658233 litre
= 48.7 litre (Rounded upto one decimal)**

Table -2

Sample calculation (Station Ahmednagar)

**Run off volume of water (litre) for small size house = 48.658233 litre *1000
= 48658.233 litre
= 48658 litre (Rounded upto one decimal)**

**Run off volume of water (litre) for medium size house = 48.658233 litre *2000
= 97316.466 litre
= 97316 litre (Rounded upto one decimal)**

**Run off volume of water (litre) for large size house = 48.658233 litre *3000
= 145974.699 litre
=145975 litre (Rounded upto one decimal)**

Based on the normal rainfall for the period 1951-2000, Table 1 gives the rain water harvesting potential in litre per square feet of roof surface also during the southwest monsoon season (June- September) and also in a year. For computation we have considered run-off coefficient as 0.85 which is valid for tiles or concrete roof. Fig. 3 and 4 gives the rain water potential maps for the southwest monsoon season and annual in litre per square foot over Maharashtra. The highest concentration is seen over western parts of Maharashtra mainly over Raigad, Ratnagiri and Sindhudurg and lowest around 17-50 litre/sq. feet over western parts of central Maharashtra in Ahmednagar and Solapur district during S W Monsoon season. For Gadchiroli district in the eastern part of Maharashtra the rain water potential is 101 – 150 lit/sq. feet for Monsoon and Annual. For easier understand to know the total volume of water potential for different size of houses, we have categorize the house in three sizes viz. small, medium and large. The average areas of roof top terrace of the categories are considered as 1000 sqft, 2000 sqft and 3000 sqft respectively. Table 2 gives the total volume of water that can one get during SW monsoon season or in a year over each of the 326 locations. The minimum volume of water potential in small size house is around 17135 litre in Pusesauli (District – Satara) while maximum volume of water is around 436684 litre in Mahabaleshwar obsy (District – Satara) during southwest monsoon season.

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1. Pacey A. and Cullis, A. 1989 : Rainwater Harvesting: The collection of rainfall and runoff in rural areas, Intermediate Technology Publications, London, 216 pages.
2. IMD 2016 : Rainwater Harvesting Potential for different locations in the state of Madhya Pradesh, Met Monograph No. ESSO/IMD/Hydrology/02(2016)/20.

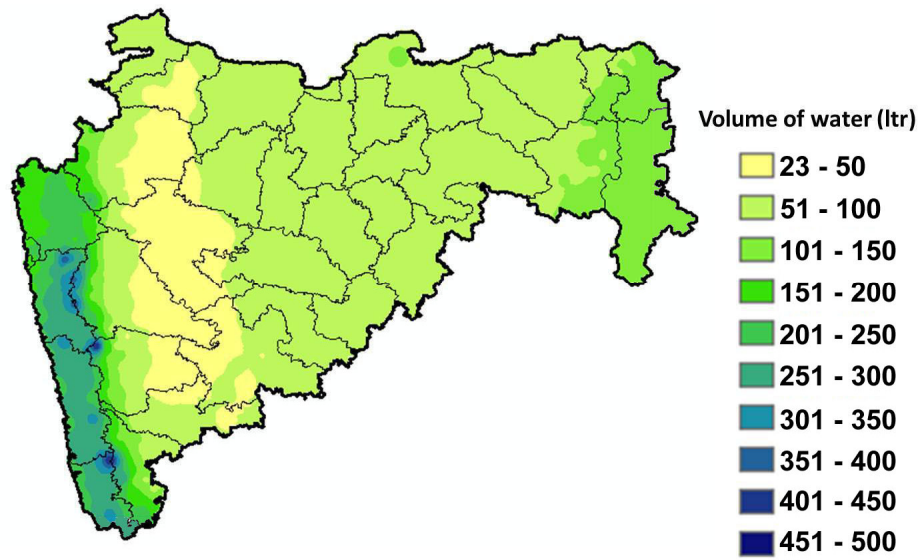


Fig. 3 Rain water potential in litre/sqft map for the southwest monsoon season

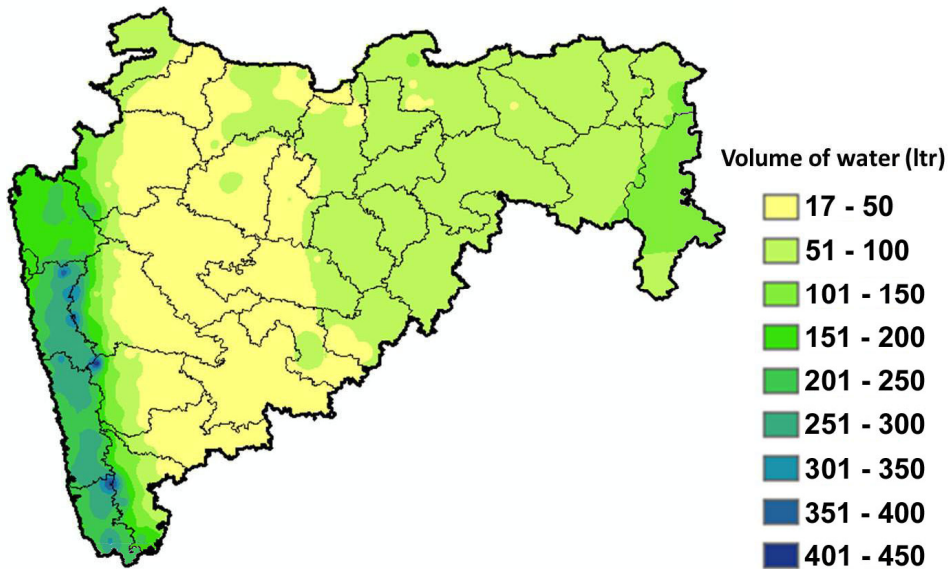


Fig. 4 Annual rain water potential in litre/sqft map

Table 1
Rain water potential over roof top per square feet of area
over different parts of Maharashtra

DISTRICT	S.No.	STATION	Run off volume of water (litre): SW Monsoon season (June- Sep)	Run off volume of water (litre) : Annual
Ahmednagar	1	Ahmednagar Obsy	36.4	48.7
Ahmednagar	2	Akola	34.3	43.9
Ahmednagar	3	Jamkhed	45.8	57.7
Ahmednagar	4	Karjat	33.5	46.0
Ahmednagar	5	Kopargaon	31.2	40.1
Ahmednagar	6	Nevasa	35.4	44.6
Ahmednagar	7	Parner	31.5	43.2
Ahmednagar	8	Pathardi	37.5	47.8
Ahmednagar	9	Rahuri	32.6	43.3
Ahmednagar	10	Sangamner	26.2	35.0
Ahmednagar	11	Shevgaon	37.6	46.7
Ahmednagar	12	Shrigonda	31.4	44.0
Ahmednagar	13	Shrirampur	36.4	48.3
Akola	14	Akola Obsy	56.5	66.0
Akola	15	Akola Aerodrome Obsy	53.9	64.1
Akola	16	Akot	52.5	60.4
Akola	17	Murtajapur	57.3	66.4
Akola	18	Patur	60.6	69.9
Akola	19	Telhara	51.9	58.9
Amravati	20	Achalpur	63.4	72.6
Amravati	21	Amraoti Obsy	58.5	70.1
Amravati	22	Anjangaon	46.6	54.2
Amravati	23	Barud%Warud	64.5	73.8
Amravati	24	Chandur Bazar	51.5	59.8
Amravati	25	Chandur Railway	56.5	66.3
Amravati	26	Chikhalda	115.3	125.0
Amravati	27	Daryapur	46.1	52.4
Amravati	28	Morsi	56.4	63.9
Aurangabad	29	Aurangabad Obsy	49.3	60.6
Aurangabad	30	Chikalthana Aero Obsy	46.6	57.9
Aurangabad	31	Gangapur	42.7	53.3
Aurangabad	32	Kannad	45.3	54.7
Aurangabad	33	Khaldabad	57.9	67.6
Aurangabad	34	Paithan	44.8	54.3
Aurangabad	35	Sillod	46.2	54.8
Aurangabad	36	Soegaon	55.5	63.9
Aurangabad	37	Vijapur (Vaijapur)	34.4	42.7
Beed	38	Ashti	41.2	52.3
Beed	39	Beed Obsy	46.5	59.3
Beed	40	Chowsala	45.3	57.1
Beed	41	Guorai	47.4	56.8
Beed	42	Manjlegaon	49.7	61.5
Beed	43	Momina/Ambejogai	51.2	61.0
Beed	44	Patoda	42.2	54.7
Beed	45	Roti	35.9	44.3
Bhandara	46	Bhandara	87.8	99.6
Bhandara	47	Chandpur	78.7	91.5

Bhandara	48	Chorkhamara	88.2	98.1
Bhandara	49	Paoni	92.3	106.3
Bhandara	50	Sakoli	101.7	114.7
Buldhana	51	Buldana Obsy	56.3	66.8
Buldhana	52	Chikhli	54.1	61.0
Buldhana	53	Deolgaon Raja	47.0	52.9
Buldhana	54	Dhamangaon	51.1	59.1
Buldhana	55	Jalgaon	48.9	56.4
Buldhana	56	Khamgaon	49.5	57.4
Buldhana	57	Malkapur	48.8	55.2
Buldhana	58	Mehkar	57.7	66.6
Buldhana	59	Nandura	50.6	59.2
Buldhana	60	Shegaon	46.8	54.7
Chandrapur	61	Asola	92.4	102.4
Chandrapur	62	Brahmapuri	93.8	106.3
Chandrapur	63	Bramhapuri Obsy	95.9	110.2
Chandrapur	64	Chandrapur Obsy	88.7	101.4
Chandrapur	65	Chimur	86.9	97.9
Chandrapur	66	Ghorajheri	87.7	96.8
Chandrapur	67	Khairee	82.8	92.0
Chandrapur	68	Nalesar	87.4	95.4
Chandrapur	69	Sindewahi	97.7	110.1
Chandrapur	70	Warora	80.0	91.5
Dhule	71	Dhulia	41.1	47.9
Dhule	72	Pimpelner	42.8	50.8
Dhule	73	Sakri	35.0	41.7
Dhule	74	Shirpur	49.8	56.1
Dhule	75	Sindkheda	38.1	43.2
Gadchiroli	76	Ahiri	102.5	112.1
Gadchiroli	77	Armori	97.9	108.4
Gadchiroli	78	Gadchiroli	120.3	132.1
Gadchiroli	79	Kunghari	113.3	124.6
Gadchiroli	80	Sironcha	90.5	102.8
Gadchiroli	81	Sironcha Obsy	92.7	106.4
Gondia	82	Bodalkasa	97.4	107.5
Gondia	83	Deori	105.9	116.4
Gondia	84	Gondia Obsy	96.1	109.2
Gondia	85	Tirora	88.6	99.2
Hingoli	86	Hingoli	68.8	78.7
Hingoli	87	Kalmanoori	65.1	75.3
Jalgaon	88	Amalner	48.2	54.9
Jalgaon	89	Bhadgaon	53.2	60.5
Jalgaon	90	Chalisgaon	51.1	60.5
Jalgaon	91	Chopda	52.3	57.7
Jalgaon	92	Edalabad	44.0	50.6
Jalgaon	93	Erandol	47.3	53.2
Jalgaon	94	Jalgaon Obsy	52.3	59.5
Jalgaon	95	Jamner	55.3	62.9
Jalgaon	96	Pachora	54.5	61.9
Jalgaon	97	Parola	48.5	55.1
Jalgaon	98	Raver	50.5	58.8
Jalgaon	99	Yaval	50.6	56.5
Jalna	100	Ambad	47.2	57.1
Jalna	101	Bhokardan	43.9	52.8
Jalna	102	Jafferabad	45.7	56.0

Jalna	103	Jalna	50.1	59.9
Jalna	104	Partur	52.4	62.3
Kolhapur	105	Ajra	139.9	159.1
Kolhapur	106	Chandgad	210.6	234.9
Kolhapur	107	Gadhinglaj	63.8	86.2
Kolhapur	108	Gaganbawada	417.9	448.1
Kolhapur	109	Gargoti	109.8	129.8
Kolhapur	110	Hatkanangale	40.1	57.6
Kolhapur	111	Kagal	49.8	69.6
Kolhapur	112	Kolhapur Obsy	65.4	84.9
Kolhapur	113	Panhala	113.0	129.8
Kolhapur	114	Radhanagari	275.6	292.9
Kolhapur	115	Shahuwadi	126.5	143.0
Kolhapur	116	Shirol	34.0	52.2
Latur	117	Ahmedpur	60.5	71.9
Latur	118	Udgir	58.2	71.3
Mumbai City	119	Bombay Colaba Obsy	162.1	170.3
Mumbai City	120	Bombay Santacruz Obsy	176.2	185.8
Nagpur	121	Katol	62.6	73.7
Nagpur	122	Nagpur Aerodrome Obsy	75.2	89.1
Nagpur	123	Nagpur Meyo Hosp Obsy	75.0	88.6
Nagpur	124	Perseoni	71.9	82.0
Nagpur	125	Ramtek	78.6	89.6
Nagpur	126	Saoner	68.4	78.4
Nagpur	127	Umrer	79.0	89.1
Nanded	128	Billoli	69.8	82.4
Nanded	129	Degloor	62.6	75.8
Nanded	130	Kandhar	58.8	68.8
Nanded	131	Nanded	67.1	78.5
Nanded	132	Nanded Obsy	64.1	74.3
Nandurbar	133	Akkalkuwa	78.5	82.7
Nandurbar	134	Nandurbar	51.4	56.8
Nandurbar	135	Navapur	85.8	91.3
Nandurbar	136	Shahada	51.6	57.0
Nandurbar	137	Taloda	59.8	64.1
Nashik	138	Chandor	39.9	48.5
Nashik	139	Dindori	51.8	60.7
Nashik	140	Igatpuri	242.3	254.4
Nashik	141	Kalvan	47.1	57.5
Nashik	142	Kolegaon Mal	27.2	34.5
Nashik	143	Malegaon Obsy	35.5	44.5
Nashik	144	Nasik Obsy	44.8	53.7
Nashik	145	Niphad	32.6	41.2
Nashik	146	Peint	162.2	170.5
Nashik	147	Satna	33.5	43.2
Nashik	148	Sinnar	38.6	49.4
Nashik	149	Surgana	147.2	156.6
Nashik	150	Yeola	33.5	43.0
Osmanabad	151	Kallam	50.0	61.5
Osmanabad	152	Osmanabad	52.5	65.1
Osmanabad	153	Parenda	39.3	51.0
Osmanabad	154	Tuljapur	55.0	68.0
Parbhani	155	Jintoor	57.8	67.7
Parbhani	156	Parbhani Obsy	64.9	76.9
Parbhani	157	Pathri	58.6	70.3

Parbhani	158	Sidheshwar Camp	57.7	68.0
Pune	159	Baramati Obsy	27.6	41.0
Pune	160	Bhor	73.2	86.8
Pune	161	Dhond	26.8	39.7
Pune	162	Ghoda Ambegaon	52.6	64.7
Pune	163	Indapur	31.7	43.8
Pune	164	Jejuri	26.4	37.0
Pune	165	Junnar	46.3	55.3
Pune	166	Khandala Obsy	345.5	360.3
Pune	167	Khed	41.8	53.8
Pune	168	Paud	119.7	132.0
Pune	169	Pune Obsy	44.7	58.4
Pune	170	Sasvad	36.7	50.8
Pune	171	Sirur	28.7	40.0
Pune	172	Talegaon D-Dhera	27.7	39.1
Pune	173	Vadgaon %Maval	90.0	100.6
Raigad	174	Alibag Obsy	168.7	178.2
Raigad	175	Bhira Obsy	370.4	386.8
Raigad	176	Karjat	258.1	269.3
Raigad	177	Khalapur	271.2	285.6
Raigad	178	Mahad	262.2	278.3
Raigad	179	Mangaon	257.8	274.5
Raigad	180	Mhasla	266.0	277.4
Raigad	181	Murud	187.0	197.3
Raigad	182	Panvel	220.7	232.0
Raigad	183	Pen	226.9	238.3
Raigad	184	Poladpur	278.3	295.8
Raigad	185	Roha	255.4	267.8
Raigad	186	Shriwardhan	208.9	220.1
Raigad	187	Sudhagad	289.0	304.4
Raigad	188	Uran	171.7	178.3
Ratnagiri	189	Chiplun	280.4	299.8
Ratnagiri	190	Dapoli	287.2	300.6
Ratnagiri	191	Guhagarh	209.0	221.9
Ratnagiri	192	Harnai Obsy	186.6	198.8
Ratnagiri	193	Khed	280.2	298.6
Ratnagiri	194	Lanja	265.7	286.3
Ratnagiri	195	Mandangad	314.1	329.4
Ratnagiri	196	Rajapur	273.7	293.5
Ratnagiri	197	Ratnagiri Obsy	221.4	237.9
Sangli	198	Islampur	39.9	58.1
Sangli	199	Jath	31.8	48.4
Sangli	200	Sangli Obsy	35.0	52.8
Sangli	201	Shirala	64.7	83.1
Sangli	202	Tasgaon	34.8	53.8
Sangli	203	Vita %Khanapur	34.3	49.4
Satara	204	Dahiwadi/Man	31.2	48.7
Satara	205	Karad	43.9	59.8
Satara	206	Khandala	29.1	43.4
Satara	207	Koregaon	46.1	62.5
Satara	208	Mahabaleshwar Obsy	436.7	459.5
Satara	209	Mhaswad	24.0	37.9
Satara	210	Patan	125.6	141.7
Satara	211	Phaltan	26.9	39.8
Satara	212	Satara Obsy	58.5	75.6

Satara	213	Vaduj	28.1	41.8
Satara	214	Wai	53.9	71.8
Sindhudurg	215	Devgad Obsy	192.3	208.7
Sindhudurg	216	Kankavli	274.9	298.2
Sindhudurg	217	Kudal	244.7	262.4
Sindhudurg	218	Malvan	183.5	198.8
Sindhudurg	219	Sawantwadi	309.1	333.0
Sindhudurg	220	Vengurla Obsy	227.0	247.8
Solapur	221	Akalkot	46.9	61.3
Solapur	222	Akluj	27.6	40.9
Solapur	223	Barsi	42.2	53.4
Solapur	224	Jeur Obsy	36.1	48.9
Solapur	225	Karmala	36.8	49.8
Solapur	226	Madha	37.4	50.7
Solapur	227	Malsiras	32.8	45.7
Solapur	228	Mangalvedha	32.8	46.3
Solapur	229	Mohol	36.8	49.6
Solapur	230	Pandharpur	38.3	52.4
Solapur	231	Sangola	36.8	53.9
Solapur	232	Sholapur Obsy	45.0	60.0
Thane	233	Bhiwandi	190.5	199.2
Thane	234	Dahanu Obsy	151.5	157.8
Thane	235	Jawhar	222.7	232.5
Thane	236	Kalyan	193.2	202.4
Thane	237	Mokhada	176.9	187.4
Thane	238	Murbad	185.9	195.9
Thane	239	Shahapur	193.0	201.1
Thane	240	Thane	198.4	207.4
Thane	241	Vada	213.3	222.9
Wardha	242	Arvi	65.1	75.7
Wardha	243	Hinganghat	74.8	85.3
Wardha	244	Wardha	65.7	76.5
Wardha	245	Wardha Obsy	72.4	86.2
Washim	246	Mangrulpir	59.9	68.7
Washim	247	Washim	70.4	79.2
Yavatmal	248	Darwha	59.6	67.3
Yavatmal	249	Digras	64.4	71.5
Yavatmal	250	Pusad Obsy	62.2	74.4
Yavatmal	251	Umerkhed	71.7	82.5
Yavatmal	252	Wani	73.6	84.1
Yavatmal	253	Yeotmal Obsy	73.7	85.9
Ahmednagar	254	Mirajgaon	25.7	35.3
Akola	255	Balapur	50.4	56.9
Akola	256	Karanja	57.1	65.1
Akola	257	Risod	61.9	69.6
Amraoti	258	Badnera	57.9	66.7
Amraoti	259	Chikhaldha hydro	117.1	131.8
Amraoti	260	Daryapur hydro	43.3	51.5
Amraoti	261	Dharni	90.2	95.9
Amraoti	262	Kholapur	48.9	56.7
Amraoti	263	Talegaon	62.4	68.4
Beed	264	Beed	48.3	60.3
Bhandara	265	Gondia	87.9	99.8

Bhandara	266	Khyrbund	89.5	99.0
Bhandara	267	Pangree	83.6	89.7
Bombay City	268	Bombay Podar M.C O	146.0	151.7
Bombay Suburban	269	Andheri	199.2	205.6
Bombay Suburban	270	Borivali	193.1	199.3
Buldhana	271	Buldana	59.2	68.0
Buldhana	272	Donegaon	59.8	67.4
Buldhana	273	Yerli hydro	45.7	55.3
Chandrapur	274	Mul	85.2	97.0
Dhulia	275	Dhadgaon hydro	61.0	66.9
Dhulia	276	Gidhade hydro	39.7	46.1
Dhulia	277	Nandurbar Obsy	50.9	57.0
Dhulia	278	Visarwadi hydro	77.0	82.9
Gadchiroli	279	Dhanora	124.8	135.4
Gadchiroli	280	Garmuri	104.3	113.7
Jalgaon	281	Bhusaval	48.0	54.3
Kolhapur	282	Kapashi	65.0	90.1
Kolhapur	283	Kolhapur	70.1	90.1
Latur	284	Ausa	48.5	62.6
Latur	285	Nilanga	49.0	62.4
Nagpur	286	Deolapur	79.8	91.8
Nagpur	287	Kindsi	81.2	91.7
Nagpur	288	Nagpur Govt.Farm	72.5	84.9
Nagpur	289	Tharsa	77.8	91.3
Nanded	290	Kinwat	77.7	87.6
Nasik	291	Bolthan	40.9	51.3
Nasik	292	Mulher hydro	47.9	57.5
Nasik	293	Nandgaon	37.7	46.9
Nasik	294	Nasik	46.5	54.7
Nasik	295	Ozar Aerodrome Obs	39.4	47.7
Nasik	296	Pimpalgaon	41.4	49.1
Nasik	297	Somthane	24.9	32.0
Nasik	298	Trimbak	164.9	174.1
Osmanabad	299	Osmanabad Obsy	49.1	66.1
Pune	300	Alandi	41.8	51.7
Pune	301	Baramati	29.3	42.3
Pune	302	Lonavala	348.8	360.5
Pune	303	Velhe	188.0	201.9
Pune	304	Wanorie Afmc Obsy	38.4	49.7
Raigarh	305	Matheran	387.9	403.0
Ratnagiri	306	Devrukh	298.7	321.2
Ratnagiri	307	Ratnagiri	229.8	245.2
Sangli	308	Miraj	31.0	47.8
Sangli	309	Miraj Obsy	31.3	51.8
Sangli	310	Sangli	48.8	71.2
Satara	311	Aundh	34.1	48.4
Satara	312	Medha/Jaoli	111.7	129.2

Satara	313	Panchgani	146.0	173.8
Satara	314	Pusesauli	17.1	23.6
Satara	315	Satara	65.4	84.4
Sindhudurg	316	Devgad	187.3	201.3
Sindhudurg	317	Vengurla	223.5	242.5
Thane	318	Bassein	174.2	181.4
Thane	319	Dahanu	154.5	160.7
Thane	320	Mahim	169.3	175.8
Wardha	321	Arvi hydro	66.2	77.8
Wardha	322	Kharangha	46.2	56.4
Yeotmal	323	Ner	60.4	70.5
Yeotmal	324	Pandherikawara	80.6	91.1
Yeotmal	325	Pusad	63.7	73.9
Yeotmal	326	Yeotmal	70.0	79.4

Table - 2
Rain water potential over roof top for small, medium and large size houses
over different parts of Maharashtra

DISTRICT	S.No.	STATION	Run off volume of water (litre) :			Run off volume of water (litre) :		
			S W Monsoon season (June - Sept)			Annual		
			Small size	Medium size	Large size	Small size	Medium size	Large size
			house	house	house	house	house	house
Ahmednagar	1	Ahmednagar Obsy	36363	72727	109090	48658	97316	145975
Ahmednagar	2	Akola	34279	68557	102836	43873	87746	131619
Ahmednagar	3	Jamkhed	45808	91615	137423	57739	115478	173218
Ahmednagar	4	Karjat	33505	67010	100515	46037	92073	138110
Ahmednagar	5	Kopargaon	31160	62319	93479	40059	80118	120177
Ahmednagar	6	Nevasa	35400	70800	106200	44584	89167	133751
Ahmednagar	7	Parner	31491	62982	94474	43186	86372	129558
Ahmednagar	8	Pathardi	37493	74985	112478	47845	95690	143535
Ahmednagar	9	Rahuri	32628	65257	97885	43320	86640	129961
Ahmednagar	10	Sangamner	26185	52370	78554	34997	69995	104992
Ahmednagar	11	Shevgaon	37556	75112	112667	46724	93447	140171
Ahmednagar	12	Shrigonda	31412	62825	94237	43984	87967	131951
Ahmednagar	13	Shrirampur	36363	72727	109090	48303	96606	144909
Akola	14	Akola Obsy	56515	113031	169546	65967	131935	197902
Akola	15	Akola Aerodrome Obsy	53878	107756	161633	64120	128239	192359
Akola	16	Akot	52472	104944	157417	60385	120769	181154
Akola	17	Murtajapur	57336	114673	172009	66417	132835	199252
Akola	18	Patur	60566	121132	181698	69931	139863	209794
Akola	19	Telhara	51872	103744	155616	58892	117784	176676
Amravati	20	Achalpur	63377	126755	190132	72585	145169	217754
Amravati	21	Amraoti Obsy	58489	116979	175468	70074	140147	210221
Amravati	22	Anjangaon	46589	93179	139768	54241	108482	162723
Amravati	23	Barud (Warud)	64538	129076	193614	73785	147570	221355
Amravati	24	Chandur Bazar	51525	103049	154574	59824	119648	179472
Amravati	25	Chandur Railway	56523	113046	169569	66283	132566	198850
Amravati	26	Chikhaldra	115273	230546	345819	124962	249924	374886
Amravati	27	Daryapur	46108	92215	138323	52362	104723	157085
Amravati	28	Morsi	56444	112888	169333	63875	127750	191624
Aurangabad	29	Aurangabad Obsy	49329	98659	147988	60621	121243	181864
Aurangabad	30	Chikalthana% Aero Obsy	46566	93131	139697	57881	115763	173644
Aurangabad	31	Gangapur	42657	85314	127971	53254	106508	159762
Aurangabad	32	Kannad	45271	90541	135812	54715	109430	164145
Aurangabad	33	Khaldabad	57929	115857	173786	67610	135220	202829
Aurangabad	34	Paithan	44757	89515	134272	54273	108545	162818
Aurangabad	35	Sillod	46187	92373	138560	54778	109556	164334
Aurangabad	36	Soegaon	55481	110962	166442	63898	127797	191695
Aurangabad	37	Vijapur (Vaijapur)	34389	68779	103168	42657	85314	127971

Beed	38	Ashti	41228	82455	123683	52346	104692	157038
Beed	39	Beed Obsy	46463	92926	139389	59326	118653	177979
Beed	40	Chowsala	45310	90620	135930	57107	114215	171322
Beed	41	Guorai	47379	94758	142137	56807	113615	170422
Beed	42	Manjlegaon	49732	99464	149196	61498	122996	184494
Beed	43	Momina/Ambejogai	51240	102481	153721	60993	121985	182978
Beed	44	Patoda	42167	84335	126502	54746	109493	164239
Beed	45	Roti	35858	71716	107574	44315	88630	132945
Bhandara	46	Bhandara	87825	175650	263475	99614	199229	298843
Bhandara	47	Chandpur	78720	157440	236161	91473	182946	274419
Bhandara	48	Chorkhamara	88243	176487	264730	98067	196133	294200
Bhandara	49	Paoni	92350	184699	277049	106303	212605	318908
Bhandara	50	Sakoli	101699	203398	305097	114705	229409	344114
Buldhana	51	Buldana Obsy	56318	112636	168954	66796	133593	200389
Buldhana	52	Chikhli	54059	108119	162178	60977	121954	182930
Buldhana	53	Deolgaon Raja	47024	94047	141071	52930	105860	158791
Buldhana	54	Dhamangaon	51106	102212	153318	59105	118211	177316
Buldhana	55	Jalgaon	48919	97838	146756	56365	112730	169096
Buldhana	56	Khamgaon	49543	99085	148628	57415	114831	172246
Buldhana	57	Malkapur	48761	97522	146283	55181	110361	165542
Buldhana	58	Mehkar	57747	115494	173241	66591	133182	199774
Buldhana	59	Nandura	50577	101154	151731	59192	118384	177576
Buldhana	60	Shegaon	46850	93700	140550	54746	109493	164239
Chandrapur	61	Asola	92357	184715	277072	102410	204819	307229
Chandrapur	62	Brahmapuri	93818	187637	281455	106311	212621	318932
Chandrapur	63	Bramhapuri Obsy	95903	191806	287709	110196	220391	330587
Chandrapur	64	Chandrapur Obsy	88670	177340	266009	101415	202829	304244
Chandrapur	65	Chimur	86854	173707	260561	97893	195786	293679
Chandrapur	66	Ghorajheri	87730	175460	263190	96811	193622	290433
Chandrapur	67	Khairree	82763	165526	248290	91978	183957	275935
Chandrapur	68	Nalesar	87383	174765	262148	95421	190843	286264
Chandrapur	69	Sindewahi	97711	195423	293134	110069	220139	330208
Chandrapur	70	Warora	80031	160062	240093	91497	182993	274490
Dhule	71	Dhulia	41070	82139	123209	47869	95737	143606
Dhule	72	Pimpelner	42767	85535	128302	50798	101596	152395
Dhule	73	Sakri	34958	69916	104873	41749	83498	125246
Dhule	74	Shirpur	49819	99638	149457	56120	112241	168361
Dhule	75	Sindkheda	38061	76122	114183	43225	86451	129676
Gadchiroli	76	Ahiri	102481	204962	307442	112146	224292	336438
Gadchiroli	77	Armorli	97885	195770	293655	108356	216712	325067
Gadchiroli	78	Gadchiroli	120327	240654	360981	132124	264248	396373
Gadchiroli	79	Kunghari	113307	226614	339921	124575	249150	373726
Gadchiroli	80	Sironcha	90462	180925	271387	102820	205641	308461
Gadchiroli	81	Sironcha Obsy	92689	185378	278067	106382	212763	319145
Gondia	82	Bodalkasa	97411	194822	292234	107527	215053	322580
Gondia	83	Deori	105932	211863	317795	116450	232899	349349
Gondia	84	Gondia Obsy	96077	192153	288230	109169	218338	327507

Gondia	85	Tirora	88599	177197	265796	99212	198423	297635
Hingoli	86	Hingoli	68786	137573	206359	78736	157472	236208
Hingoli	87	Kalmanoori	65146	130292	195438	75285	150570	225856
Jalgaon	88	Amalner	48153	96306	144459	54889	109777	164666
Jalgaon	89	Bhadgaon	53183	106366	159549	60535	121069	181604
Jalgaon	90	Chalisgaon	51082	102165	153247	60542	121085	181627
Jalgaon	91	Chopda	52275	104550	156824	57747	115494	173241
Jalgaon	92	Edalabad	44023	88046	132069	50624	101249	151873
Jalgaon	93	Erandol	47347	94695	142042	53207	106413	159620
Jalgaon	94	Jalgaon Obsy	52346	104692	157038	59492	118984	178477
Jalgaon	95	Jamner	55268	110535	165803	62864	125728	188592
Jalgaon	96	Pachora	54525	109051	163576	61853	123707	185560
Jalgaon	97	Parola	48500	97001	145501	55110	110219	165329
Jalgaon	98	Raver	50522	101044	151565	58766	117532	176297
Jalgaon	99	Yaval	50640	101281	151921	56476	112952	169427
Jalna	100	Ambad	47229	94458	141687	57115	114231	171346
Jalna	101	Bhokardan	43865	87730	131595	52843	105687	158530
Jalna	102	Jafferabad	45713	91426	137139	55994	111988	167982
Jalna	103	Jalna	50127	100254	150381	59887	119774	179661
Jalna	104	Partur	52385	104771	157156	62256	124512	186768
Kolhapur	105	Ajra	139886	279773	419659	159051	318103	477154
Kolhapur	106	Chandgad	210560	421120	631681	234889	469779	704668
Kolhapur	107	Gadhinglaj	63788	127576	191364	86182	172365	258547
Kolhapur	108	Gaganbawada	417914	835829	1253743	448118	896237	1344355
Kolhapur	109	Gargoti	109840	219681	329521	129842	259684	389526
Kolhapur	110	Hatkanangale	40114	80228	120343	57573	115147	172720
Kolhapur	111	Kagal	49780	99559	149339	69560	139121	208681
Kolhapur	112	Kolhapur Obsy	65359	130719	196078	84911	169822	254733
Kolhapur	113	Panhala	113023	226045	339068	129755	259511	389266
Kolhapur	114	Radhanagari	275556	551113	826669	292905	585810	878715
Kolhapur	115	Shahuwadi	126494	252988	379482	142998	285995	428993
Kolhapur	116	Shirol	34026	68052	102078	52227	104455	156682
Latur	117	Ahmedpur	60511	121022	181533	71937	143874	215811
Latur	118	Udgir	58237	116473	174710	71250	142500	213750
Mumbai City	119	Bombay Colaba Obsy	162123	324246	486369	170343	340687	511030
Mumbai City	120	Bombay Santacruz Obsy	176218	352437	528655	185805	371609	557414
Nagpur	121	Katol	62572	125144	187716	73698	147396	221094
Nagpur	122	Nagpur Aerodrome Obsy	75175	150349	225524	89120	178240	267360
Nagpur	123	Nagpur Meyo Hosp Obsy	74985	149970	224955	88591	177182	265773
Nagpur	124	Perseoni	71858	143716	215574	82005	164010	246015
Nagpur	125	Ramtek	78554	157109	235663	89570	179140	268710
Nagpur	126	Saoner	68439	136878	205317	78357	156714	235071
Nagpur	127	Umrer	79028	158056	237085	89073	178145	267218
Nanded	128	Billoli	69758	139515	209273	82424	164847	247271
Nanded	129	Degloor	62611	125223	187834	75759	151518	227277
Nanded	130	Kandhar	58813	117626	176439	68771	137541	206312
Nanded	131	Nanded	67136	134272	201408	78452	156903	235355

Nanded	132	Nanded Obsy	64104	128208	192311	74251	148502	222752
Nandurbar	133	Akkalkuwa	78475	156951	235426	82653	165305	247958
Nandurbar	134	Nandurbar	51359	102718	154077	56792	113583	170375
Nandurbar	135	Navapur	85811	171623	257434	91331	182662	273993
Nandurbar	136	Shahada	51612	103223	154835	57029	114057	171086
Nandurbar	137	Taloda	59832	119664	179495	64127	128255	192382
Nashik	138	Chandor	39901	79802	119703	48485	96969	145454
Nashik	139	Dindori	51777	103555	155332	60700	121401	182101
Nashik	140	Igatpuri	242320	484640	726960	254409	508819	763228
Nashik	141	Kalvan	47142	94284	141426	57534	115068	172602
Nashik	142	Kolegaon Mal	27235	54470	81705	34531	69063	103594
Nashik	143	Malegaon Obsy	35542	71084	106626	44536	89073	133609
Nashik	144	Nasik Obsy	44813	89625	134438	53720	107440	161160
Nashik	145	Niphad	32589	65178	97767	41228	82455	123683
Nashik	146	Peint	162170	324341	486511	170478	340955	511433
Nashik	147	Satna	33513	67025	100538	43241	86482	129724
Nashik	148	Sinnar	38630	77259	115889	49448	98896	148344
Nashik	149	Surgana	147175	294350	441525	156572	313144	469715
Nashik	150	Yeola	33489	66978	100467	43044	86088	129131
Osmanabad	151	Kallam	50024	100049	150073	61537	123075	184612
Osmanabad	152	Osmanabad	52464	104929	157393	65115	130229	195344
Osmanabad	153	Parenda	39317	78633	117950	50964	101928	152892
Osmanabad	154	Tuljapur	54983	109967	164950	68013	136025	204038
Parbhani	155	Jintoor	57842	115684	173526	67673	135346	203019
Parbhani	156	Parbhani Obsy	64917	129834	194751	76865	153729	230594
Parbhani	157	Pathri	58553	117105	175658	70303	140605	210908
Parbhani	158	Sidheshwar Camp	57739	115478	173218	67997	135994	203990
Pune	159	Baramati Obsy	27630	55260	82890	41030	82060	123091
Pune	160	Bhor	73232	146464	219696	86790	173581	260371
Pune	161	Dhond	26840	53680	80521	39688	79376	119063
Pune	162	Ghoda Ambegaon	52614	105229	157843	64712	129424	194135
Pune	163	Indapur	31720	63440	95161	43755	87509	131264
Pune	164	Jejuri	26382	52764	79147	37003	74006	111009
Pune	165	Junnar	46258	92515	138773	55283	110567	165850
Pune	166	Khandala Obsy	345488	690975	1036463	360302	720603	1080905
Pune	167	Khed	41757	83513	125270	53823	107645	161468
Pune	168	Paud	119735	239469	359204	131990	263980	395970
Pune	169	Pune Obsy	44718	89436	134154	58426	116852	175279
Pune	170	Sasvad	36695	73390	110085	50846	101691	152537
Pune	171	Sirur	28688	57376	86064	39988	79976	119964
Pune	172	Talegaon D-Dhera	27677	55354	83032	39064	78128	117192
Pune	173	Vadgaon Maval	90044	180088	270131	100562	201124	301686
Raigad	174	Alibag Obsy	168653	337307	505960	178208	356416	534625
Raigad	175	Bhira Obsy	370449	740897	1111346	386834	773667	1160501
Raigad	176	Karjat	258105	516210	774315	269271	538541	807812
Raigad	177	Khalapur	271221	542442	813663	285632	571264	856897
Raigad	178	Mahad	262180	524359	786539	278273	556545	834818

Raigad	179	Mangaon	257844	515689	773533	274467	548933	823400
Raigad	180	Mhasla	265994	531987	797981	277380	554761	832141
Raigad	181	Murud	186973	373947	560920	197341	394683	592024
Raigad	182	Panvel	220660	441320	661979	232023	464046	696069
Raigad	183	Pen	226859	453717	680576	238332	476664	714996
Raigad	184	Poladpur	278296	556593	834889	295834	591669	887503
Raigad	185	Roha	255412	510825	766237	267818	535635	803453
Raigad	186	Shriwardhan	208933	417867	626800	220115	440230	660345
Raigad	187	Sudhagad	288965	577929	866894	304410	608820	913230
Raigad	188	Uran	171678	343356	515033	178342	356685	535027
Ratnagiri	189	Chiplun	280405	560809	841214	299830	599660	899490
Ratnagiri	190	Dapoli	287196	574391	861587	300588	601176	901765
Ratnagiri	191	Guhagarh	208965	417930	626895	221907	443815	665722
Ratnagiri	192	Harnai Obsy	186626	373252	559878	198834	397668	596502
Ratnagiri	193	Khed	280239	560478	840717	298646	597291	895937
Ratnagiri	194	Lanja	265749	531498	797246	286288	572575	858863
Ratnagiri	195	Mandangad	314067	628135	942202	329371	658742	988113
Ratnagiri	196	Rajapur	273677	547354	821031	293521	587042	880562
Ratnagiri	197	Ratnagiri Obsy	221386	442773	664159	237937	475875	713812
Sangli	198	Islampur	39933	79865	119798	58118	116236	174355
Sangli	199	Jath	31768	63535	95303	48421	96843	145264
Sangli	200	Sangli Obsy	35005	70010	105016	52780	105560	158341
Sangli	201	Shirala	64696	129392	194088	83134	166269	249403
Sangli	202	Tasgaon	34839	69679	104518	53791	107582	161373
Sangli	203	Vita %Khanapur	34318	68636	102955	49361	98722	148083
Satara	204	Dahiwadi/Man	31152	62303	93455	48650	97301	145951
Satara	205	Karad	43936	87872	131808	59840	119679	179519
Satara	206	Khandala	29075	58150	87225	43407	86814	130221
Satara	207	Koregaon	46076	92152	138228	62540	125081	187621
Satara	208	Mahabaleshwar Obsy	436684	873369	1310053	459521	919042	1378563
Satara	209	Mhaswad	23990	47979	71969	37911	75822	113733
Satara	210	Patan	125570	251140	376710	141718	283437	425155
Satara	211	Phaltan	26935	53870	80805	39790	79581	119371
Satara	212	Satara Obsy	58458	116916	175373	75633	151265	226898
Satara	213	Vaduj	28127	56255	84382	41804	83608	125412
Satara	214	Wai	53854	107708	161562	71827	143653	215480
Sindhudurg	215	Devgad Obsy	192303	384607	576910	208665	417330	625995
Sindhudurg	216	Kankavli	274925	549849	824774	298196	596391	894587
Sindhudurg	217	Kudal	244657	489315	733972	262424	524849	787273
Sindhudurg	218	Malvan	183523	367045	550568	198755	397510	596265
Sindhudurg	219	Sawantwadi	309148	618296	927444	332995	665991	998986
Sindhudurg	220	Vengurla Obsy	227016	454033	681049	247816	495632	743448
Solapur	221	Akalkot	46945	93889	140834	61348	122696	184044
Solapur	222	Akluj	27638	55276	82913	40864	81729	122593
Solapur	223	Barsi	42207	84414	126620	53412	106824	160236
Solapur	224	Jeur Obsy	36142	72285	108427	48879	97759	146638
Solapur	225	Karmala	36774	73548	110322	49764	99527	149291

Solapur	226	Madha	37350	74701	112051	50719	101438	152158
Solapur	227	Malsiras	32802	65604	98406	45689	91378	137067
Solapur	228	Mangalvedha	32794	65588	98382	46329	92658	138986
Solapur	229	Mohol	36837	73674	110512	49637	99275	148912
Solapur	230	Pandharpur	38314	76628	114941	52433	104866	157298
Solapur	231	Sangola	36821	73643	110464	53894	107787	161681
Solapur	232	Sholapur Obsy	44994	89989	134983	60037	120074	180111
Thane	233	Bhiwandi	190543	381085	571628	199237	398473	597710
Thane	234	Dahanu Obsy	151502	303004	454507	157756	315513	473269
Thane	235	Jawhar	222673	445347	668020	232473	464946	697419
Thane	236	Kalyan	193172	386344	579516	202403	404806	607209
Thane	237	Mokhada	176929	353858	530787	187360	374721	562081
Thane	238	Murbad	185915	371830	557746	195920	391840	587760
Thane	239	Shahapur	192951	385902	578853	201124	402248	603372
Thane	240	Thane	198415	396831	595246	207409	414819	622228
Thane	241	Vada	213292	426585	639877	222942	445884	668826
Wardha	242	Arvi	65083	130166	195249	75743	151486	227230
Wardha	243	Hinganghat	74764	149528	224292	85274	170549	255823
Wardha	244	Wardha	65683	131366	197049	76525	153050	229575
Wardha	245	Wardha Obsy	72411	144822	217233	86182	172365	258547
Washim	246	Mangrulpir	59871	119743	179614	68723	137446	206170
Washim	247	Washim	70437	140874	211310	79233	158467	237700
Yavatmal	248	Darwha	59579	119158	178737	67254	134509	201763
Yavatmal	249	Digras	64404	128808	193212	71511	143021	214532
Yavatmal	250	Pusad Obsy	62209	124417	186626	74417	148833	223250
Yavatmal	251	Umerkhed	71661	143321	214982	82526	165053	247579
Yavatmal	252	Wani	73627	147254	220881	84137	168274	252412
Yavatmal	253	Yeotmal Obsy	73674	147349	221023	85859	171717	257576
Ahmednagar	254	Mirajgaon	25664	51327	76991	35345	70689	106034
Akola	255	Balapur	50419	100838	151257	56878	113757	170635
Akola	256	Karanjia	57139	114278	171417	65051	130103	195154
Akola	257	Risod	61909	123817	185726	69608	139215	208823
Amraoti	258	Badnera	57881	115763	173644	66694	133388	200082
Amraoti	259	Chikhaldha hydro	117137	234273	351410	131824	263648	395473
Amraoti	260	Daryapur hydro	43328	86656	129984	51493	102986	154479
Amraoti	261	Dharni	90218	180435	270653	95911	191822	287733
Amraoti	262	Kholapur	48879	97759	146638	56705	113410	170114
Amraoti	263	Talegaon	62382	124765	187147	68431	136862	205293
Beed	264	Beed	48279	96558	144838	60266	120532	180798
Bhandara	265	Gondia	87872	175745	263617	99756	199513	299269
Bhandara	266	Khyrbund	89499	178998	268497	98967	197934	296901
Bhandara	267	Pangree	83561	167122	250682	89720	179440	269160
Bombay City	268	Bombay Podar M.C Obsy	146022	292044	438066	151715	303431	455146
Bombay Subu	269	Andheri	199205	398410	597615	205617	411234	616851
Bombay Subu	270	Borivali	193054	386107	579161	199308	398615	597923
Buldhana	271	Buldana	59247	118495	177742	68028	136057	204085
Buldhana	272	Donegaon	59840	119679	179519	67357	134714	202071

Buldhana	273	Yerli hydro	45705	91410	137115	55276	110551	165827
Chandrapur	274	Mul	85180	170359	255539	97040	194080	291120
Dhulia	275	Dhadgaon hydro	60953	121906	182859	66939	133877	200816
Dhulia	276	Gidhade hydro	39656	79312	118969	46139	92278	138418
Dhulia	277	Nandurbar Obsy	50917	101833	152750	56989	113978	170967
Dhulia	278	Visarwadi hydro	77038	154077	231115	82897	165795	248692
Gadchiroli	279	Dhanora	124812	249624	374436	135409	270818	406228
Gadchiroli	280	Garmuri	104257	208515	312772	113670	227340	341010
Jalgaon	281	Bhusaval	47987	95974	143961	54344	108687	163031
Kolhapur	282	Kapashi	65004	130008	195012	90115	180230	270345
Kolhapur	283	Kolhapur	70081	140163	210244	90115	180230	270345
Latur	284	Ausa	48485	96969	145454	62643	125286	187929
Latur	285	Nilanga	48966	97932	146899	62390	124780	187171
Nagpur	286	Deolapur	79778	159557	239335	91765	183530	275296
Nagpur	287	Kindsi	81200	162399	243599	91694	183388	275082
Nagpur	288	Nagpur Govt.Farm	72529	145059	217588	84864	169727	254591
Nagpur	289	Tharsa	77773	155545	233318	91260	182520	273780
Nanded	290	Kinwat	77725	155450	233176	87627	175255	262882
Nasik	291	Bolthan	40888	81776	122664	51280	102560	153840
Nasik	292	Mulher hydro	47900	95800	143701	57487	114973	172460
Nasik	293	Nandgaon	37714	75427	113141	46945	93889	140834
Nasik	294	Nasik	46542	93084	139626	54667	109335	164002
Nasik	295	Ozar Aerodrome Obsy	39427	78854	118282	47671	95342	143014
Nasik	296	Pimpalgaon	41386	82771	124157	49124	98248	147372
Nasik	297	Somthane	24858	49716	74575	31989	63977	95966
Nasik	298	Trimbak	164934	329868	494803	174126	348251	522377
Osmanabad	299	Osmanabad Obsy	49132	98264	147396	66141	132282	198423
Pune	300	Alandi	41796	83592	125389	51730	103460	155190
Pune	301	Baramati	29288	58576	87864	42286	84572	126857
Pune	302	Lonavala	348820	697640	1046460	360459	720919	1081378
Pune	303	Velhe	187952	375905	563857	201906	403811	605717
Pune	304	Wanorie Afmc Obsy	38432	76865	115297	49701	99401	149102
Raigarh	305	Matheran	387931	775863	1163794	402990	805980	1208970
Ratnagiri	306	Devrukh	298725	597449	896174	321159	642317	963476
Ratnagiri	307	Ratnagiri	229836	459671	689507	245234	490467	735701
Sangli	308	Miraj	30978	61956	92934	47813	95627	143440
Sangli	309	Miraj Obsy	31286	62572	93858	51809	103618	155427
Sangli	310	Sangli	48753	97506	146259	71234	142469	213703
Satara	311	Aundh	34066	68131	102197	48445	96890	145335
Satara	312	Medha/Jaoli	111728	223455	335183	129210	258421	387631
Satara	313	Panchgani	146038	292076	438114	173810	347620	521430
Satara	314	Pusesauli	17135	34271	51406	23555	47111	70666
Satara	315	Satara	65351	130703	196054	84382	168764	253146
Sindhudurg	316	Devgad	187337	374673	562010	201321	402643	603964
Sindhudurg	317	Vengurla	223495	446989	670484	242533	485066	727599
Thane	318	Bassein	174244	348488	522733	181446	362892	544337
Thane	319	Dahanu	154463	308927	463390	160662	321324	481987

Thane	320	Mahim	169333	338665	507998	175816	351631	527447
Wardha	321	Arvi hydro	66244	132487	198731	77788	155577	233365
Wardha	322	Kharangha	46210	92421	138631	56357	112715	169072
Yeotmal	323	Ner	60353	120706	181059	70500	141000	211500
Yeotmal	324	Pandherikawara	80623	161247	241870	91094	182188	273282
Yeotmal	325	Pusad	63717	127434	191151	73864	147728	221592
Yeotmal	326	Yeotmal	69995	139989	209984	79360	158720	238079