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भारत सरकार

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केन्द्रीय जल आयोग

Central Water Commission

सत्यमेव जयते

Tapi River at Surat

बाढ पूर्वानुमान मूल्यांकन रिपोर्ट तापी , नीचली नर्मदा और दमनगंगा बेसिन – 2012

Flood Forecasting Appraisal Report Tapi, Lower Narmada, & Damanganga Basin 2012

TAPI DIVISION , Surat

HYDROLOGICAL OBSERVATION CIRCLE, GANDHINAGAR

JANUARY – 2013

अमुख

भारत मे हर साल सभी प्रमुख नदियो मे आमतोर पर मानसून के दौरान बाढ आती है। यह बाढ धन सम्पदा मानव जीवन पशु जीव आदि को गंभीर क्षती पहुचाती है।किसी भी तरह की प्राकृतिक घटना को रोका नही जा सकता किन्तु बाढ, से होने वाली क्षति को सही एवं समय पर दी जानेवाली बाढ पूर्व चेतावनी के द्ववारा कुछ हद तक कम किया जा सकता है।बाढ, के संदर्भ मे पूर्व जानकारी होने पर अग्रिम अहतियात के लिए उपाय अच्छी तरह से किए जा सकते है।इस तरह बाढ का पूर्वानूमान विभिन्न जलाश्यो एवं परियोजनाओ के लिए उपलब्ध जल संसाधनो के समग्र प्रबंधन आदि के लिए महत्वपूर्ण है।केन्द्रीय जल आयोग ने सभी बडी अंतरराज्जीय नदीय बेसिन मे बाढ, पूर्वानुमान / एवं प्रवाह पूवांनुमान नेटवर्को का विकास किया है।

तापी मण्डल केन्द्रीय जल आयोग सूरत की स्थापना मार्च **1969** मे नर्मदा नदी पर भरूच एवं तापी नदी पर सूरत शहर के लिए बाढ चेतावनी जारी करने हेतु की गई थी। बाद मे बाढ पूर्वानुमान सेवाओ को दमन गंगा बेसिन तक विस्तारीत किया गया। वर्तमान मे तापी मण्डल द्वारा पॉच स्थलो पर बाढ स्तर का का पूर्वानुमान किया जाता है एवं तीन बांध स्थलो के लिए प्रवाह पूर्वानुमान जारी कीया जाता है।

यह रिपोर्ट तापी दमनगंगा एवं नीचली नर्मदा बेसिन मे मानसून **2012** मे बाढ पूर्वानुमान के कार्य के मुल्यांकन एवं पिछले **10** वर्षो के प्रदर्शन को प्रदार्शित करती है।

मानसून **2012** मे तीनो नदिय बेसिनो मे जून **2012** के अंतिम सप्ताह मे सक्रिय हो गया था एवं मानसून **2012** के दौरान लोअर नर्मदा तापी एवं दमन गंगा बेसिन मे प्राप्त वर्षा क्रमशः **754.6** मीमी **769.1** मी मी और **1646** मी मी मापी गई जबकी पीछले **10** वर्षो की औसत वर्षा क्रमशः **1084.1** मीमी **860.7** मी मी और **2410.5** मी मी रही थी।

मानसून **2012** के दौरान **4** स्पेल आये जिनमे मध्यम से अधिक वर्षा जुलाई अगस्त एवं सितम्बर माह के दौरान मापी गई ।उकाई बॉध का जल स्तर दिनांक 25-09-12 को अपने एफ आर एल **105.16** मीटर के निकटतम **104.305** मी रहा। जबकी हथनूर डेम ने अपना एफ आर एल **214.000** मी दिनांक 05-10-12 को छुआ।इस वर्ष **260** पुर्वानुमान तापी मण्डल कार्यलय के अधिकार क्षेत्र के अतर्गत आने वाले बाढ पूर्वानुमान स्थलो के लिये जारी किये गये जिनका परिणाम 99.23 प्रतिशत रहा।IMD भारतीय मौसम विभाग द्ववारा मौसम की **24**।**48** घण्टो का मौसम पूर्वानुमान एवं उपग्रह द्ववारा एकत्रित चित्रो का आधीकारीक वेबसाइट पर प्रदार्शन बाढ पूवांनुमान के दौरान सहायक रहा।

तापी मण्डल द्ववारा किये गये बाढ पूर्वानुमान को उपयोगकर्ता एजैंसियो द्ववारा सराहा गया है एवं आगामी वर्षो मे बाढ पूर्वा नुमान की सेवा मे और सूधार का प्रयास किया जायेगा। बाढ पूर्वानुमान के दौरान आने वाली समस्याओ आदि का वर्णन इस रिर्पोट मे संक्षेप रूप मे दिय गया है।

ma ma#ya AiBayata namada tapl baisana gaanQalnagar eva AiQaxaNa AiBayata jalava&analk pxaNa pirmaNDla gaaQalnagar ka baht AaBaarl h ijanak natIva ma gajarat sarkar Aar maharaYT/sarkar k jala sasaaQana sagaznaa k saaqa bazk ka Aayaajana ikyaa gayaa. जिसमे अंतरराज्यीय स्थलो के वर्षा एवं जल प्रवाह के आंकड़ो को परस्पर प्रदान करने एवं maharaYT/sarkar k jala sasaaQana AiQakarl Apna AQalkar xa~ ma maajada barajaa k saBal gaT 15 jana sa 30 isatmbar tk Kalana k ilae sahmat he. jaakl]ka[baaQa ht baaZpvaanamaana tyaarl k ilae baht]pyaagal h.

ma taapl maNDla k saBal AiQakairyaa eva kmacaairyaa k pIyaxa yaa ApIyaxa $p sa ikya gaya kaya eva irpaT k saklana ma ikya gae sarahnalya pyaasaa k ilae AaBaarl h.

एस.के.मिश्र
30.1.13
(एस. के. मिश्रा)
अधिशाषी अभियंता

Preface

In India, all major rivers generally get flooded every year during monsoon. These floods cause sever losses to property, human lives, cattle etc. no one can stop the natural phenomenon like floods but flood damage can be reduced to a considerable extent by issuing correct and timely flood warning of the incoming floods to the civil as well as Engineering authorities who in turn can take precautionary measures well in advance against the onslaught of expected floods. Thus flood forecasting is the most effective non structural measure and plays a vital role in minimizing the flood Damages, regulation of reservoirs and overall management of the available water resources for various purposes. Therefore central water commission has developed a flood forecasting net work to issue inflow/level forecast in all the major interstate river basins.

Tapi division, CWC, Surat was established in March 1969 for the purpose of issuing flood warning for Bharuch in Narmada and Surat in Tapi Basin. Later on, flood forecasting services were extended for Damanganga Basin also. Presently, Tapi division has been entrusted to issue flood level forecast for five sites viz. Garudeshwar, Bharuch, Surat, Vapi and Daman and inflow forecast for three Dam viz. Hathnur Dam, Ukai Dam and Madhuban Dam.

This report presents an appraisal of performance of flood forecasting works in Tapi Damanganga and Lower Narmada River basin for the monsoon 2012 and its comparison with 10 years. During this season, south west monsoon active during the last week of June 2012 in all the three basins. The average rainfall received in Lower Narmada, Tapi and Damanganga basin during monsoon 2012 is 754.6 mm, 769.1 mm and 1646.0 mm against last 10 years monsoon average of 1084.1 mm 860.7 mm and 2410.5 mm respectively.

During monsoon four flood spells were observed commencing with moderate rainfall activity during the month of July, August and September 2012.

The Ukai Dam recorded maximum level of 104.305m on 25.09.2012 against its FRL of 105.16m. Hathnur Dam touched its FRL of 214.00 m on 05-10-2012.

A total of 260 inflow and level forecasts were issued to various reservoirs under the jurisdiction of this office, with performance of 99.23%.

Current weather information, 24 / 48hrs Weather forecast and satellite pictures provided by IMD on their official website were very useful for advancement of upcoming weather condition in our jurisdiction.

Flood forecasting services rendered by Tapi Division have been appreciated by various users' agencies in minimizing flood damages or regulation of reservoirs. Efforts have been made to improve the overall performance and utility of forecasting during the subsequent years. Difficulties faced and further improvements needed have also been described briefly.

I am very thankful to the Chief Engineer NTBO, Gandhinagar and Superintending Engineer (HOC) for conducting meeting with the water resource organisations of Govt. of Gujarat and Govt. of Maharashtra regarding to provided the rainfall data with interstate W.R. department and short out the problems during the monsoon period. The officer of Maharashtra Govt. WOR Department agree to open all gates on 15th June and closed on 30th September of every year, that is very helpful for formulation of forecast to Ukai Dam.

I am thankful to the all officers and staff members of Tapi Division who contributed directly or indirectly for their outmost efforts in compilation of this report.

30.1.13

(S.K. Mishra)

Executive Engineer

Continent

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Chapter-1: Introduction

1.1 General

Since time immemorial, floods have been responsible for untold misery in major portions of the word and India is also no exception. Valuable property, crops, human lives and livestock continue to get washed away during flood times and fear or epidemic afterwards. Due to ever increasing pressure of population and due to economic considerations, encroachments on flood plains have gone almost unabated. This is causing progressive increase in flood damage.

The floods are caused by excessive rainfall in the catchment area while the magnitude and the severity thereof depends on the nature and the extent of rainfall and characteristics of the specific water sheds. The factors influencing incidence of floods are mainly the intensity and the duration of rainfall and failure of structural measures due to breaches in the embankments of the rivers. Floods may also get aggravated due to excessive release of water beyond from the reservoirs in the upstream beyond the carrying capacity of river downstream.

Along with structural measures, the Government of India lays parallel emphasis on no structural measures for flood damage reduction like flood forecasting, flood plain zoning etc. The work of flood forecasting in different river basins is one of the major activities being done by Central Water Commission. Initially, a cell was created at Delhi in late fifties to issue flood warnings in the Yamuna Basin and this cell has now been expanded into Flood Forecasting Organisation of the Commission to cover almost all the major / important interstate rivers. Tapi Division situated in Surat is presently entrusted with flood forecasting (inflow forecast for reservoirs and level forecast for cities / towns) in the river Tapi, Lower Narmada and Damanganga.

1.2 Preparations before flood season of 2012

Under the division, All sites, sub divisions and division office were operated on 24 X 7 bases from 15th June 12 to 15th Oct 12. Entire unite of division office were directed to by this office for initiating activities to required for gear up the machinery and keeping fully up to date for use during ensuing floods. Desired hydrometerological data of the base stations were sent to FFM Directorate, C.W.C., New Delhi, in addition to the Daily Flood Bulletin, in the specified proforma by wireless and fax/email. Temporary landline telephone connections were provided at all base station of Tapi basin and also field staff

were asked to use the personal mobiles, PCO facility or even nearby police station wireless in emergency. Work charge staff was engaged for wireless operation at sites and in division office also. Tapi Division, Surat had made all arrangement required for activities connected with flood forecasting works made in advance.

The telemetry system has also installed under this division office during this monsoon period the data was also received from the remote station to modeling center, but the data received at modeling center was half hour (30 minute) delayed from the required real time data for Flood forecasting work.

Chapter -2: Flood Forecasting Set up

2.1 Flood forecasting setup of Tapi Division:

Tapi Division, Surat was established in March, 1969 with one Control Room at Bharuch and the other Control Room attached to the Division Office at Surat for issuing flood warning forecast to the concerned State authorities for Surat and Bharuch City in Tapi and Narmada Basins respectively. Another flood forecasting scheme for Damanganga Basin was sanctioned in 1978 and forecast for the first time was issued in 1986 in this Basin.

These services were later extended to other cities and reservoirs in the three river basins at the request of concerned State Government as per criteria given by them and at present this Division is issuing flood level and Inflow forecast for 8 places viz.

Table-1: Forecasting Stations under Tapi Division

1.	Tapi river basin	Inflow forecast for Ukai & Hathnur Dam
		Level forecast for Surat City.
2.	Lower Narmada river basin	Level forecast for Garudeshwar and Bharuch.
3.	Damanganga river basin	Inflow forecast for Madhuban Dam
		Level forecast for Vapi and Daman

Under the Hydrological Observations (HO/FF Set up) Gauge, Discharge, silt and Water quality are being observed at 45 stations are as under.

Table -2: Details of HO/FF stations under Tapi Division.

Name of Sub Division	Gauge	Gauge , Discharge & Water Quality	Gauge, Discharge & Silt	Gauge, Discharge, silt & water Quality	Only Rainfall	Total
Upper Tapi sub Division	5	--	1	2	3	11
Middle Tapi Sub division	4	1	--	1	3	9
Lower Tapi sub Division	3	--	2	--	1	6
Damanganga Sub Division	6	2	1	--	3	12
Lower Narmada Sub Division	3	2	--	2	--	7
Total	21	5	4	5	10	45

The data of 4 Gauge / Gauge discharge/ Rainfall Sites in Lower Narmada basin, 18 Nos. Gauge / Gauge discharge/ Rainfall sites in Tapi basin and 11 Nos. Gauge / Gauge discharge / Rainfall sites in Damanganga basin are received through wireless on real time and are being utilised for formulation of forecasts.

The work of collection of data for formulation of level / inflow forecast for Tapi, Lower Narmada, & Damanganga Basin is manned by the following Sub Division

1. Upper Tapi Sub Division, Bhusawal

2. Middle Tapi Sub Division, Dhule.

3. Lower Tapi Sub Division, Surat.

4. Damanganga Sub Division, Silvassa.

5. Lower Narmada Sub Division, Bharuch

The location of Division Office, Sub Division Office and field stations has been indicated in statement No.1 and the details of communication Net work and Rivers Gauge net work are shown in statements Nos. 2 and 3 respectively. Plate No.1 shows the sites under the jurisdiction of this office, Plate Nos.2, 3 and 4 show the locations of all the Gauge, Gauge discharge, and Wireless and rainfall stations under F.F.Net work in Tapi, Lower Narmada and Damanganga basins respectively. Plate No.5 shows the communication Diagram of Wireless net work and Line diagrams of Tapi, Lower Narmada and Damanganga basins are shown in Plate Nos. 6, 7, 8, respectively.

2.2 Dissemination of forecasts.

Any forecast is of no value though it may be very accurate until it is disseminated in time to the users / beneficiaries. Hence dissemination of forecasts should be quick without loss of time. Dissemination is, therefore, made on top priority by Wireless / Telephone / E– Mail or by giving 000 Telegram / or by sending special messenger to the Civil authorities as per the guidelines given in Flood Memorandum of State Government.

In addition to dissemination of forecast to the user agencies, messages are conveyed to newspapers also over telephone if required by them. Based on our forecast, the State Government authorities arrange the rescue work in well in advance to broadcast / telecast the flood messages over Radio / T.V. so as to inform the people of the region about the situation of coming floods well in advance.

As per decision of higher authorities all hydrological data of all sites under Tapi Division was made available to Ukai Dam authorities for CWC wireless station at Ukai and to SE, SIC, Surat government of Gujarat who is focal officer for Tapi for Divisional office through their representative, who remained present in our Division office. Also personals deputed by Ukai authorities were allowed to present at our sites in Tapi Basins as per direction of higher authorities.

2.3. Methodology.

The methodology used for both level and Inflow forecast, is as per the C.W.C. manual on flood forecasting. Mainly graphical technique is used for most of the Sites. In graphical techniques various co-relation diagrams depicting the effect of basin parameters are prepared and tested for accuracy. Rainfall runoff methods is also used for the issuing inflow forecast for Madhuban Dam and also try to same for Ukai Dam but the result was not much appreciable. This Division had prepared a number of co-relation diagrams, stage discharge curves/tables, Travel time curves for different forecasting Sites based on 10 to 15 years data. These curves are updated every year and used for flood level forecasts. Inflow forecasts / flood level forecasts are issued as per criteria fixed by State Govt.

The criteria and procedure followed for all the sites are described below:

2.3.1 Garudeshwar and Bharuch.

a) Criteria

Whenever Narmada River is expected to cross Warning level of 30.48 m. at Garudeshwar and warning level of 6.70 m. at Bharuch, flood level forecast is to be issued for the respective sites.

b) Procedure

Previously Hoshangabad was considered alert station (under Narmada Division, Bhopal) and Mortakka was considered as base station for formulating the flood level forecast for Garudeshwar and Bharuch. Flood level forecast were formulated by using various S.D.

Curves / Tables, Gauge co-relations, Time lag, diagrams etc. These forecasts were monitored and revised (if required) based on real time Data of Barwani /Garudeshwar and Rainfall data of intermediate catchments.

Presently the level forecast for site Golden Bridge Bharuch based on the outflow of Sardar Sarovar Dam and level of the site Garudeshwar.

Co-relation curves are shown in statement no.21

2.3.2. Hathnur Dam

a) Criteria

Inflow forecast for Hathnur Dam is being issued as per following criteria.
When reservoir level is –

1. From 209.000m to 213.000m	For a flood of peak discharge of 1000 m^3/sec & above.
2. Above 213.000 m	For a peak discharge of 250 m^3/sec & above.

b) Procedure

6 Hourly regular Inflow forecasts are issued for Hathnur Dam. Burhanpur and Yerli G-D sites have been considered as base stations for issue of inflow forecast. Travel time from Burhanpur and Yerli is taken 6 hours. The past 6 hours stages of Yerli and Burhanpur are converted into discharge (by using SD Curves of respective site). The averages of these discharges are multiplied with time [6 hrs] to get expected volume of Inflow in million cubic metres at Hathnur dam in next 5 or 6 hours. Due consideration is given to the contribution of rainfall received or the loss due to infiltration in the intermediate catchment before arriving at the final Inflow forecast.

These forecasts are monitored during the period of forecasts and revised (if necessary) depending on the conditions developed in the Intermediate catchment between Burhanpur / Yerli to Hathnur Dam. Co-relation curves are shown in statement no.21

2.3.3. Ukai Dam

a) Criteria

Criteria for issuing Inflow forecast for Ukai Dam is as under. A flood situation shall be said to have been created when the Ukai reservoir is expected to receive inflows at the rate of 1000 m^3/sec. Following three situations.

1. For Normal Situation

2. For High alert situation &

3. For Emergency Situation

are defined for issuance of regular Inflow forecast and advance warning.

For Normal situation

The flood situation is considered as normal when –

i) Water level in Ukai reservoir is less than 336 ft (102.41 m)

ii) a) Average daily rainfall recorded at 0830 IST at 8 (Eight) Key rain gauge stations in Upper Tapi catchment up to Hathnur Dam is less than 65mm and.

b) Average daily rainfall recorded at 0830 IST at all 16 Key rain gauge stations up to Ukai dam is less than 50mm.

The Inflow forecast will be issued starting from June 15 to Oct.15 in the format "Form N" whenever Inflow into Ukai reservoir is expected more than 35315 cusecs (1000 m^3/sec)

For High alert situation

High alert situation is implied when condition i) and any one of the conditions ii (a) and ii (b) mentioned in 2.3.3. are violated. In this situation, high alert warning shall be issued in the format "Form H".

For Emergency situation

An emergency situation is said to have been created when the Ukai reservoir level is above 336 ft. (102.41m) and

i) Combined estimated discharge at Burhanpur and Yerli is above 14000 m3/sec. or

ii) Average daily rainfall in Middle Tapi between Hathnur to Ukai (8 rain gauge stations is above 65mm or

iii) The situation when there is failure of forecasting system.

In this situation, emergency situation warning shall be issued in the format shown in 'Form E" depending upon the availability of data in Upper Tapi Basin with the forecasting Agency. From – N, Form – H and Form – E are attached as Annexure I, II and III respectively.

b) Procedure

In normal situation, 12 hourly regular Inflow forecast is issued for which Gidhade has been considered as base station. Travel time from Gidhade to Ukai is taken 12 hours. All the real time stages of past 12 hours of Gidhade are converted into discharges by using S-D Curve. These discharges are added together and multiplied with time to get the

expected volume of Inflow in million cubic metre at Ukai in next 12 hours. contribution of Rainfall received or the loss due to infiltration in the intermediate catchment and also release of Prakasha, Sarangkheda and Sulwada barrage when gate operated are also considered before arriving at final Inflow forecast.

These forecasts are monitored during the period of forecast and revised, if necessary, depending upon the conditions developed in the intermediate catchment between Gidhade to Ukai.

2.3.4 Surat

a) Criteria

Flood level forecast for Surat is to be issued whenever it is expected that water level at Nehru Bridge Surat may cross warning level 8.50m.

b) Procedure

Based on the releases of water from Ukai Dam and Hydrometeorological data of downstream of Ukai, flood level forecasts for Surat city are formulated by using various correlation, S-D Curve, Time lag curve etc. and issued to user agencies by about 6 to 8 hours in advance. Co-relation curves are shown in statement no.21

2.3.5. Madhuban Dam

a) Criteria

Inflow forecast for Madhuban Dam is to be issued for expected Inflow of 1500 m3/sec or above irrespective of reservoir level.

b) Procedure

i) As and when average rainfall in the catchment is above 100 mm based on 6 key stations Harsul, Mokheda, Dhandore, Nanipalsan, Ozerkheda and Madhuban Dam for inflow forecast for Madhuban Dam, hourly rainfall – run off relationship (mathematical model) had been developed and is being used since last 10 years and the results are encouraging .

ii) 6 hourly regular inflow forecasts are issued for Madhuban Dam. Nanipalsan and Ozerkheda G-D sites have been considered as base stations for issue of inflow forecast. Travel time from Nanipalsan and Ozerkheda is taken 6 hours. The past 6 hours stages of Nanipalsan and Ozerkheda are converted into discharge [by using SD curve of respective site]. The average of these discharge are multiplied with time [6 hrs] to get expected volume of inflow in million cubic metres at Madhuban Dam in next 5 to 6

hours. Due consideration is given to the contribution of rainfall received or the loss due to infiltration in the intermediate catchment before arriving at the final inflow forecast. Co-relation curves are shown in statement no.21

2.3.6. Vapi & Daman

a) Criteria

Based on the releases of water from Madhuban Dam and the Hydrometer logical data of downstream of Madhuban Dam, flood level forecast for Vapi and Daman are formulated by using various co-relation curves and issued to user agencies by about 2 to 3 hour in advance. In this year Madhuban Dam authority informed about the high release from the Dam before 2-3 hours in advance therefore the travel lag time was increases and such information give sufficient time to issue flood level forecast 4-6 hours in advance.

Chapter-3: Basin Physiography, River system and Basin Rainfall

3.1 Lower Narmada Basin

3.1.1. General

Lower Narmada Basin extends over an area of about 98796 sq km and lies between East Longitude 730 00' 26" to 760 02' 20" and North Latitude 210 41' 22" to 220 13' 50" lying in Northern extremity of Deccan plateau. The basin covers large area in the States of Madhya Pradesh and Gujarat and a comparatively smaller area in Maharashtra. The State wise distribution of drainage area is as under table no.3

Table -3 state wise distribution of Narmada River Basin

S. No	Name of States	Drainage area in sq km	Percentage
1.	Madhya Pradesh	85,859	86.9
2.	Maharashtra	1,538	1.6
3.	Gujarat	11,399	11.5
Total		98,796	100.0

The Narmada basin is bounded on the North by the Vindhyas, on the east by Maikal range, on the South by Satpuras and on the West by the Arabian Sea. The basin has an elongated shape with a maximum length of 953 km from East to West and maximum width of 234 km North to South. The basin has five well defined physiographic regions as given in the table No.4

Table-4: Physiographic region of Narmada Basin

Sl No	Regions	Length (km)	Fall in (m)	Average Bed slope	Name of Dist. covered fully or partly.
1.	Upper hills	378	690	1 in 548	1.Shahdol 2. Mandla 3.Durg 4.Balaghat 5. Seoni
2.	Upper	462	190	1 in 2430	1.Jabalpur 2. Narsinghpur

	Plains.				3.Sagar 4. Chindwara 5.Hoshangabad 6. Betul 7. Raisen 8. Sehora 9. Damoh.
3.	Middle Plains	206	72	1 in 2860	1. Khandwa 2.Khargaon 3. Dewas 4.Indore 5. Dhar
4.	Lower Hills	105	86	1 in 1221	1.Khargaon 2.Jambughoda 3.Baroda 4.Dhulia
5.	Lower plains	161	19	1 in 8474	1. Bharuch 2. Narmada 3. Baroda 4. Surat 5. Panchmahal
	TOTAL:	1312	1057		

The hilly regions are well forested. The upper middle and lower plains are broad and fertile areas well suited for cultivation.

Salient features of Lower Narmada Basins from Hoshangabad to Bharuch are furnished in the table given Table no.5

Table -5: Sailent features of Lower Narmada Basin .

Name of Sub Basin	Bank	Length km	Catchment Area sq km	% with reference to total area	10 years average of Monsoon rainfall in mm including 2012
Lower Narmada from Hoshangabad to confluence to sea near Bharuch	Main	636	54248	54.9	1068.3

In general the soils are red, yellow, shallow black and skeletal in upper Narmada, medium black in middle Narmada and medium and deep black in lower reaches of the basin.

3.1.2. River System

River Narmada is the fifth largest river of India. It originates at Amarkantak (M.P.) in Maikal Hills of Vindhya Range at an elevation of 1057 m. It flows from East to West between Vindhya and Satpura ranges in a long and narrow catchment. It falls into Gulf of Cambay downstream of Bharuch (Gujarat) and has a total length of 1312 km. For the first 1079 km, it runs in Madhya Pradesh and forms the common boundary for Madhya Pradesh and Maharashtra for 35 km and Maharashtra and Gujarat for 39 km. In Gujarat State it stretches for 159 km.

There are 41 important tributaries of the Narmada River. The Major tributaries joining from left are the Burhner, the Banjar, the Sher, the Shakkar, the Dudhi, the Tawa, the Ganjal, the Chhota Tawa, the Kundi, the Goi, and the Karjan.

The major tributaries joining from right are the Gaur, the Hiran, the Barna, the Tindoni, the Kolar, the Chankeshwar, the Kanar, the Man, the Uri and the Orsang.

3.1.3 Rain gauge net work in Lower Narmada Basin

At present about 7 SRRG / ORG had been installed by I.M.D. in Lower Narmada Basin Daily rainfall data recorded at the Wireless Stations are transmitted to Sub Division / Division on real time twice a day or even at shorter intervals like hourly / 3 hourly if required. By giving due weightage to heavy rainfall warnings, QPF, movement of depression and rainfall data when ever received from I.M.D. on real time the flood level forecast / inflow forecast could be formulated more accurately and well in advance for various forecasting sites.

3.1.3.1 Rainfall

The South West monsoon sets in by the middle of June and withdrawn by middle of October. The average Monsoon rainfall of last 10 years (2002-2011) in the Lower Narmada basin (from Garudeshwar to Bharuch) is 1084.1 mm. The average rainfall received in Lower Narmada Basin during Monsoon 2012 is 754.8 mm.

3.2 Tapi Basin.

3.2.1. General

The Tapi is the second largest west ward draining interstate river basin. It covers large area in the state of Maharashtra besides areas in the States of Madhya Pradesh and Gujarat. The Tapi basin is the Northern most basin of the Deccan Plateau and is situated between North Latitude 200 to 220 East longitudes 720 to 780 approximately. The Satpura range forms its Northern boundary whereas the Ajanta and Satmala hills form its Southern extremity. Mahadeo hills form its Eastern boundary. The basin finds its outlet in the Arabian Sea in the West. Surrounded on the three sides by the hilly ranges, the Tapi along with its tributaries more or less flows over the plains of Vidharbha, Khandesh and Gujarat.

The drainage area of Tapi is 65145 sq km out of which nearly 80 percent lies in Maharashtra. The state-wise distribution of drainage area is shown as Table-6

Table -6: state wise distribution of Tapi River Basin

Sl.No.	Name of State	Drainage Area (sq km)	Percentage of Total
1.	Madhya Pradesh	9,804	15.0
2.	Maharashtra	51,504	79.1
3.	Gujarat	3,837	5.9
	TOTAL:	65,145	100.0

No systematic soil survey of the Tapi basin has been carried out so far. Reconnaissance soil surveys have been done by the Central Water Commission in connection with the Ukai and Kakrapar Projects. These surveys and the general data regarding the soils of India indicate that the Tapi basin consists mainly of black soils. The coastal plains in Gujarat recomposed of alluvial clays with a layer of black soil in the surface.

3.2.2. River System

The Tapi River rises near Multai in Betul district at an elevation of 752 m. above M.S.L. The total length of this West flowing river from its origin to its out fall into the sea is 724 km. For the first 282 km., the river flows in Madhya Pradesh, out of which 54 km. form the common boundary with Maharashtra State. It flows for 228 km in Maharashtra before entering Gujarat. Traversing a length of 214 km in Gujarat, the Tapi joins Arabian sea in Gulf of Cambay after flowing past the Surat city. The river receives tidal influence for a length of about 20 km upstream from mouth i.e. up to Singanapore weir.

The Tapi receives several tributaries on both banks. There are 14 major tributaries having a length more than 50 km. On the right bank 4 tributaries namely, the Vaki, the Gomai, the Arunavati and the Aner join the Tapi. On the left bank, 10 important tributaries namely the Nesu, the Arunavati, the Buray, the Panjhra, the Bori, the Girna, the Vaghur, the Purna, the Mona and the Sipna drain into the main channel. The drainage system on the left bank of the Tapi is therefore, more extensive as compared to the right bank area.

The Purna and the Girna, the two important left bank tributaries together account for nearly 45 percent of the total catchment area of the Tapi. The Purna is one of the principal tributaries of the Tapi, starts in Betul district in Gawilgar hills of the Satpura range and mostly drains through three districts of Vidharbha namely Amravati, Akola and Buldhana. The Girna another Major tributary rises in the Western Ghats and drains Nasik and Jalgaon districts of Maharashtra. The Tapi basin has been divided into 5 (five) Sub basins.

Salient features of Tapi Basin from Teska to Surat are furnished in the table -no. 7

Table -7: Salient features of Tapi Basin .

SALIENT FEATURES OF TAPI BASIN.						
Sl. No.	Name of Sub Basin	Bank	Length km	Catchment Area sq km	% with reference to total area.	10 years average of Monsoon rainfall in mm including 2012
1.	Upper Tapi upto Hathnur	Main	290	10471	16.1	961.5
2.	Purna	Left	274	18929	29.1	667.6
3.	Middle Tapi, Bhusawl to Ukai excluding Girna.	Main	305	22734	34.9	784.4
4.	Girna	Left	260	10061	15.4	618.5
5.	Lower Tapi-from Ghala to confluence to sea near Surat	Main	129	2920	4.5	1394.8

3.2.3 Rain Fall

The South West monsoon sets in by the last week of June and withdraws by middle of October. The average monsoon rainfall of 10 years [2002– 2011] in the Tapi Basin is 860.7 mm. The average rainfall received in Tapi Basin during monsoon 2012 is 769.1 mm.

Salient Features of Hathnur Dam

A. Location of Dam				
Salient Features of Hathnur Dam is furnished below.				
	1.	State	:	Maharashtra
	2.	District	:	Jalgaon
	3.	Taluka	:	Bhusawal
	4.	River	:	Tapi
	5.	Village	:	Hathnur
	6.	Latitude	:	210 04' 19"
	7.	Longitude	:	750 56' 46"
B. Hdrology				
	1.	Catchment Area	:	29430 sq km
	2.	Mean annual runoff at the dam site	:	5700 MCM
	3.	Design flood	:	14.8 Lakhs cumecs
C	Reservoir			
	1.	Gross capacity	:	388 MCM
	2.	Dead storage	:	133 MCM
	3.	Live storage	:	255 MCM
	4.	Area under submerge at FRL214.000 m	:	4816 ha
.	Weir Details			
	1.	Type of weir	:	Ogee
		(a)Length of masonry	:	717 m
		(b)Length of earth dam	:	1863 m
		Total length	:	2580 m
	2.	Maximum height of the weir from River bed	:	25.50 m

D.	Spillway			
	1.	Masonry ogee spill way with No. of gates	:	41 Nos.
	2.	Size of each gates	:	12 x 6.50 m.
	3.	Depth over crest	:	8.00 m
E.	Out Let			
	1.	Location	:	Non over flow portion in right bank
	2.	Type	:	RCC free flow conduct rectangular in section
	3.	Full supply discharge	:	3000 cumecs
	4.	Max. Discharge which can be passed	:	3600 cumecs
	5.	R.L. of the out let spill	:	204.975 m
F.	Canals			
	1.	Full supply discharge	:	1225 cumecs
	2.	Command Area Irrigable	:	37838 Ha.

Salient Features of Ukai Dam

II) Salient features of Ukai Dam is furnished below				
A. Location of Dam				
	1.	State	:	Gujarat
	2.	District	:	Surat
	3.	Taluka	:	Fort Songadh
	4.	River	:	Tapi
	5.	Village	:	Ukai
	6.	Latitude	:	210 15' N
	7.	Longitude	:	730 35' E
B. Hydrology				
	1.	Catchment Area		
		(a)At Ukai	:	62225 km^2 (24025 sq mile)
		(b)At Kakrapar	:	62308 km^2 (24057 sq mile)
		(c)At Kathor Bridge	:	63823 km^2 (24642 sq mile)
		(d)At Surat	:	64100 km^2 (24749 sq mile)
	2.	Mean annual rainfall in the watershed	:	785 mm
	3.	Maximum annual rainfall in the watershed	:	1191 mm
	4.	Minimum annual rainfall	:	270 mm
	5.	Mean annual runoff at the dam site	:	17220Mm^3 (14 Maft.)
	6	Observed maximum flood at dam (Aug1968.)	:	42470 m^3/s (15 lakh cusecs)
	7.	Observed maximum dry weather flow	:	0.03813 X 166
	8.	(a)Design flood	:	49490 m^3/s (17.48 lakh cusecs)
		(b)Probable flood	:	59920m3/s (21.16 lakh cusecs)
	9.	Max. regulated outflow from the reservoir	:	24100m3/s (8.50 lakh cusecs)

	10.	Mean annual rainfall in the command		
		North of Tapi river	:	889 mm to 1145 mm
		South of Tapi river	:	1524 mm to 2032 mm
	11	75 % Dependable Annual Yield	:	12750 MCM (9.18 Maft)
C	Reservoir			
	1.	Gross storage capacity at FRL	:	8511 MCM (6.90 Maft)
	2.	Dead storage below R.L.82.296 m	:	1142 MCM (0.926Maft)
	3.	Live storage	:	7369 MCM (5.974 Maft)
	4.	Full Reservoir Level	:	105.156 (345ft)
	5.	Water spread at R.L.105.156 m	:	60095 ha.
	6.	(a) Cultivated land submerged	:	30350 ha.
		(b)Other land submerged	:	7485 ha.
		(c)Forest land submerged	:	22260 ha
	7.	Village affected by submergence	:	170 No.
	8.	High Flood Level (HFL)	:	106.99 m (351 ft.)
	9.	Length of Reservoir	:	112 km (70 Miles)

D.	Dam			
	1.	Length of Dam		
		(a)Length of masonry section incl. spillway	:	868.83 m
		(b)Length of earth dam section	:	4057.96 m
		Total length	:	4926.79 m
	2.	Maximum height of main dam		
		(a) Earth dam above river dam	:	68.58 m
		(b)Masonry dam above deepest foundation	:	80.772 m
	3.	Total earth work	:	23240 X 106 m^3
	4.	Total quantity of stripping	:	4950 X 106 m^3
	5.	Total quantity of masonry concrete		1484 X 106 m^3
	6.	Top of dam	:	111.252 m
	7.	Road width on spillway	:	6.706 m
E	Spill way			
	1.	Crest level of spillway	:	91.135 m
	2.	Length of spillway	:	425.195 m
	3.	Top of Crest level	:	105.461
	4.	Types of gates	:	Radial
	5.	Size of gates	:	15.545 m X 14.783 m (51 x 46ft)
	6.	No. of gates	:	22 Gates
	7.	Discharge Capacity from all 22 gates		
		(i) At F.R.L. 345 ft.	:	13.37 lakh cusecs(37859 cumecs)
		(ii)At H.F.L. 351ft.	:	16.34 lakh cusecs(46269 cumecs)

F.	Power section (Hydro)			
	1.	Size of penstock	:	4 Nos., 7.01 m Dia
	2.	Installation of 4 units of 75 MW each	:	300 M.W.
	3.	Generation at 35 load factor	:	193 M.W.
	4.	Annual energy (Units)	:	670 X106 K.WH
G.	Canal Based Power House			
	1.	Size of penstock	:	3.96 m X 2.05 m
	2.	Installation of 2 units of 2.5 MW each	:	5 M.W.
	3.	Type of hoist	:	Hydraulic hoist.
	4.	Discharge through each unit	:	550 cusecs
H.	Irrigation requirement			
	1.	Direct Uk ai Bank Main Canal	:	0.59 Maft
	2.	Kakrapar Left and Right Bank Main Canal	:	2.62 Maft.
		Total	:	3.21 Maft

3.3 Damanganga Basin

3.3.1.General

The Damanganga basin extends over a drainage area of about 2318 sq km and lies between East longitude 720^0 50' to 730^0 27' and north latitude 190^0 56' to 200^0 24'. The State-wise distribution of the drainage area is as under table no. 8

Table-8: state wise distribution of Damanganga River Basin

Sl. No.	Name of State	Length of River (km)	Drainage Area (sq km)	Percentage
1.	Maharashtra (Nasik)	61.15	1408	60.7
2.	Gujarat (Valsad)	33.00	495	21.4
3.	Union Territory of Dadara and Nagar Haveli.	37.15	415	17.9
	Total:	131.30	2318	100

Large area of Damanganga basin is characterised by deep dark brown fine textured soils, moderately deep gravely, very deep black calcareous clayey soils.

In addition to the above soils, poorly drained, dark brown and sandy clay, loamy soils with salty encrustation on the surface are present near coastal areas.

3.3.2. River System

The Damanganga River originates from Sahyadri hills ranges in Nasik district at an elevation of about 1014 m above M.S.L. The river flows through the dense forest of its major length in Maharashtra State. Then, it enters in the Gujarat State flows through Union Territory of Dadara and Nagar Haveli and finally meets into Arabian Sea near Daman. The catchment of the river is fan shaped and the river is prone to severe flashy floods.

The major tributaries of Damanganga are the Vag, the Sakkartond and the Piparia. The Salient features of the basin are shown in table no.9.

Table -9: Sailent features of Damanganga Basin .

Sl. No.	Name of Sub Basin	Bank	Length (km)	Catchment Area (sq km)	% with reference to total area	10 years average of Monsoon rainfall (mm) including 2012
1.	Damanganga as a whole	Main	131.3	2318	100	2384.5

Salient feature of Damanganga Project, Madhuban Dam

Project location			
Name of River	:	Damanganga	
Dam Location near village	:	Madhuban	
District	:	Valsad	
State	:	Gujarat	
Distance of Dam from Vapi	:	30 km	
Origin of Dam	:	Latitude 200 10' N	
Distance from Valsad	:	60 km	
Project Basin and hydrology			
Drainage area			
Total up to sea	:	2290 sq km	
Up to Dam site in Maharashtra	:	1318 sq km	
Up to Dam site in Gujarat	:	376 sq km	
Up to Dam site in Union Territory	:	119 sq km	
Total	:	1813 sq km	
Elevation at Origin of the river	:	930.5 m msl	
Average elevation at Dam site	:	41.00 m msl	
Average Rain fall	:	2202 mm	
Maximum Rain fall	:	3780 mm	
75 % Drainagable runoff up to Dam			
Entire catchment	:	2210.3 mm^3	
Gujarat & U.T. Area only	:	603.1 mm^3	
Maximum observed flood	:	15007 cumecs	
Peak at Vapi Weir July , August (1976)			
100 years at Vapi	:	14158 cumecs	

Design in flow Flow peak			:	26856 cumecs			
Routed out flow			:	22040 cumecs			
Reservoir Data		Elevation			Area		storage
Dead Area	:	61.6 m	:	11.30 mm2		:	65 mm3
Live Storage	:	----	:	35.35 mm2		:	502 mm3
Gross Storage	:	79.85 m	:	46.60 mm2		:	567 mm3
Spill Way Crest	:	65.83 m	:	18.00 mm2		:	140 mm3
Maximum Water Level (R.W.L.)	:	82.40 m	:	60.2 mm2		:	680 mm3
Top of Dam			:	85.60 m			
Submergence at F.R.L.			:	4660 Hect.			
Dam							
Type			:	Composite			
Length : Masonry			:	352.00 m			
: Earthen			:	2376.00m			
Total			:	2728.00m			
Maximum Height form Deepest Foundation							
To the Road way on the top							
Masonry			:	48.74 m			
Earthen			:	57.50 m			
Free board above R.W.L.			:	4.2 m			
Elevation top of Dam			:	86.6 m			
Spillway							
Type			:	Masonry with Gates			
Location			:	Main Gorge			
Length			:	191.11 m			

Crest elevation	:	65.83 m
Maximum head over the crest	:	14.0 m
Shape on crest	:	Ogle
Number of Gates	:	10 (Ten)
Size and Type of Gates : 15.55 m X 14.02 m		
Gates operation	:	Radial tainier gates
		Electricity operated. Rope drum type hoist with manually operated system in case of power failure.
Side by generator	:	2 Nos
Right Bank	:	45.54 km
Left Bank	:	33.40 km
Vapi Branch	:	14.54 km
Type	:	Lined
Capacity	:	29.35 cumecs
Benefits		
Gujarat	:	41278 ha
Dadra Nagar Haveli	:	6788 ha
Daman	:	3072 ha
Total	:	51138
Water Supply		
Gujarat	:	40.00 MGD
Dadra Nagar Haveli	:	12.75 MGD
Daman	:	5.25 MGD
Total	:	58.00 MGD
Power	:	2.00 MW
NOTE:-		
Madhuban Dam Danger Level	:	82.400 m
Warning Level	:	79.860 m

Chapter -4: Meteorological Data

4.1 Role of Meteorological data

In flood forecasting, weather forecast and the actual rainfalls received in the basin both play vital role in the formulation of correct forecast. Although weather forecasts do not indicate the magnitude of flood, yet they are useful to anticipate the probability of floods in their respective areas. Actual rainfall received in the basin help in assessing the correct magnitude of the floods. Hence an adequate net work of rain gauges with wireless facilities to transmit rainfall data on real time and the arrangements for obtaining weather forecasts like Quantitative Precipitation Forecast (QPF) / Inference / etc. are the basic need of flood forecasting net work.

4.2 Arrangements for receiving weather forecast

Flood Met office Ahmedabad is helping this office in the field of weather forecast, F.M.O., Ahmedabad and Tapi Division are connected by Telephone/fax and internet for communication of weather warnings, storm movements QPF/Warning Daily rainfall. Heavy rainfall warnings are also received by Email from I.M.D., Bombay / Ahmedabad. As such this Office is getting following weather information from I.M.D. from last year.

1. Heavy rainfall warnings.
2. Regional weather summary.
3. Weightage Average rainfall of Sub Basins.
4. Q.P.F for next 12 / 24 hrs.
5. Gridded 3 day rainfall through FFM directorate CWC New Delhi
6. Inference information about the movement of depression / storm formed in Bay of Bengal / Arabian Sea.

4.3 Rain gauge network in Tapi, Lower Narmada and Damanganga Basin

At present about 22 SRRG/ORG in Tapi basin, 7 SRRG/ORG in Lower Narmada Basin and 6 SRRG/ORG in Damanganga basin had been installed by I.M.D. The locations of all these rain gauge stations have been shown in the Index maps of respective basins vide Plate Nos.2, 3, 4 respectively.

Daily rainfall data recorded at all the Wireless Stations are transmitted to Controlling Sub Division / Division on real time twice a day or even at shorter intervals like hourly / 3 hourly if required. Arrangements for rainfall by telegram to our nearest Wireless Stations are also made by I.M.D. for some Key Rain-gauge Stations. By giving due weightage to

heavy rainfall warnings, QPF, movement of depression and rainfall data received on real time, the flood forecast / Inflow forecast are formulated more accurately and well in advance for various forecasting Sites.

Telemetry system has been installed at all FF sited of FF network under this division for in prompt to receive the real time data.

Chapter-5: Brief description of Hydrological and meteorological events during monsoon 2012

During the period of Monsoon 2012, the Tapi Division, Central Water Commission, Surat has been entrusted with the works of formulating, issuing and disseminating Flood Level forecast for 5 [five] stations and Inflow forecast for 3 (three) Reservoirs in three interstate river basins as given in table no. 10 & 11

Table-10: Flood Level Forecast sites (FF)

Sl. No.	Name of			Warning level (m)	Danger level (m)	No. of forecast issued during 2012
	State	River	Forecasting Station			
1	Gujarat	NARMADA	Garudeshwar	30.48	31.09	NIL
2	Gujarat	-do-	Bharuch	6.705	7.315	13
3	Gujarat	TAPI	Surat	8.50	9.50	1
4	Gujarat	DAMANGANGA	Vapi	18.20	19.20	NIL
5	Gujarat	-do-	Daman	2.60	3.40	NIL
					Total	14

Table-11: Inflow Forecast sites(IF)

Sl. No.	Name of			Criteria for issuing forecast	Crest level (m)	Full Reservoir level (m)	No. of forecast issued during 2012
	State	River	Forecasting Station				
1	Maharashtra	TAPI	Hathnur*	1000 m3/sec	207.5	214.00	170
2	Gujarat	TAPI	Ukai**	1000 m3/sec	91.135	105.16	73
3	UT of DNH	DAMANGANGA	Madhuban***	1500 m3/sec	65.83	79.86	3
Total							246

*As per criteria supplied by Hathnur Authorities.
(a) When reservoir Water level is between 209.00 m to 213.00 m for a flood of peak discharge of 1000m3/sec or above.
(b) When reservoir Water level is above 213.00 m inflow forecast warnings are required for a flood of peak discharge of 250m3/sec. and above.
** As per criteria supply by Ukai authorities "for all flood of peak discharge of 1000 m3/sec and above irrespective of water level of Reservoir"
***As per criteria supplied by Madhuban Dam authorities "for a flood of peak discharge of 1500 m3/sec and above.

A jurisdiction map showing all Hydro-meteorological stations under this division during monsoon 2012, is enclosed as Plate No.1, and the basin map for Tapi, Lower Narmada and Damanganga are enclosed as Plate No. 2, 3, and 4 respectively.

The line diagram of river Tapi is appended as Plate No. 6, and that of River Lower Narmada & Damanganga are as Plate No 7 & 8 respectively.

Flood situation

During the onset of monsoon period of 2012, the south west monsoon was inactive up to 1st week of July 2012, and got energized in the second week of July month with moderate rainfall occurred for couple of days in the basins. The basin wise flood events, in brief, are described as under:-

Tapi Basin

During the monsoon of 2012, Tapi Basin experienced four spells during the months of July to September 2012. The flood spells were of normal nature during the season. The Tapi basin experienced increased rainfall activities from 6th July to 10th July 2012 with moderate intensity.

During the second spell from 22nd July to 1st August, isolated heavy rain falls occurred in the upper reaches of Tapi resulting enhanced in inflows into Hathnur Dam, and Ukai Dam.

Further, during the third spell, moderate rainfall had occurred from 10th to 14th of August 2012 with few intermittent isolated heavy rain falls.

During the 4th spell again rainfall activity increased in upper reaches of Tapi basin from 27th August to 12th September 2012 with heavy rainfall resulting enhanced in inflows in to Hathnur Dam and Ukai Dam.

Flood situation created on The Tapi River, during the first week of September 2012. Water level at Ukai Dam is above Warning level and the discharge from Burhanpur was more than 14000 cumecs on 5th September 2012, due to heavy rainfall activity in upper Tapi water level at Burhanpur was substantially increased up to 238.00 m and the corresponding discharge was 27100 cumecs.

High alert warning was issued for Ukai dam before 48 hrs well In advance from this office ,and the out flow were substantially increased and was about 4968 cumecs at 1600 hrs of 5th September 2012 and were further increased up to 9490 cumecs at 0100 hrs of 8/9/2012.

The water level observed at Nehru Bridge was 5.700m at 0500hrs on 5th September but started rising and touch warning level 8.650 m, at 0200 hrs on 8th September 2012.
During the monsoon 2012, 170 numbers inflow forecasts were issued for Hathnur Dam , 73 numbers of inflow forecasts were issued for Ukai Dam and 1 no of forecast was issued for Surat.
The rainfall stations namely Nandurbar, Nizmpur, Khetia for improvement of inflow forecast of Ukai Dam were installed during the monsoon 2010, the Telemetry system had been installed at these sites. the rainfall of stations Nizer and Ucchal were collected from district disaster control authorities of district Tapi and Narmada.

The statement showing the chief amount of rainfall associated with the spells in the Tapi Basin during the monsoon period of 2012 is appended as statement-5. The statement showing maximum water level and maximum rainfall in a day of all stations in Tapi Basin is appended as statement-9

Damanganga Basin

Due to increased rainfall activity from 5th July 2012 and its persistence up to 19th July 2012, the inflows in to Madhuban Dam were substantial.

Again, as a second spell, during last week of July 2012 from 24th July to 12th August 2012, wide spread moderate rainfall occurred and the inflows in to Madhuban Dam increased.

The third spell of moderate rainfall activities was from 28th August which persisted / continued up to 06th September 2012 with widespread moderate rains.

The maximum level recorded during the above spell at Madhuban Dam was 80.050.

3 inflow forecasts were issued for Madhuban Dam as per criteria during the monsoon 2012.

The statement showing the chief amount of rainfall associated with in the Damanganga Basin during the spells of monsoon 2012 is appended as statement-5.

The maximum water level attained during the season at Vapi was 16.450 m and at Daman was 2.000 m respectively.

The statement showing maximum water level of all stations in Damanganga basin is appended as statement-9.

Lower Narmada Basin

During first week of August 2012, moderate rainfall occurred in lower reaches of Narmada on 7th August 2012 to 14th August ,Due to release of about 12.00Lac ft3/s of water from indra sagar project, sardar sarovar Dam is over flow up to 128.9m on 9/8/2012 at 0400 hrs. water level at Garudeshwar reach up to 29.70m on 9/8/2012 at 0600hrs and water level of Bharuch was 8.400m on 9/8/2012 at 1600 hrs

Further, from 04th September to 12th September 2012, due to release of about 10.50 Lac ft3/s from Indra sagar project, sardar sarovar dam again overflow up to 129.20 mt at 0100 hrs of 07/09/2012.The maximum water level attained during the period at Garudeshwar was 29.790 m and at Bharuch it was 9.200m respectively.

During the monsoon period of 2012, no Level forecasts were issued for Garudeswar and 13 forecasts were issued for Bharuch station.

The statement showing the chief amount of rainfall associated with the spells in the basin is appended as statement -5.

The statement showing maximum water level of all stations in Narmada basin is appended as statement -9.

Forecast performance

Total 260 Flood level and inflow forecasts were issued by this division, the overall forecast performance; during this season 2012 is 99.23 %. The station wise forecast performances are attached as statement No16 respectively.

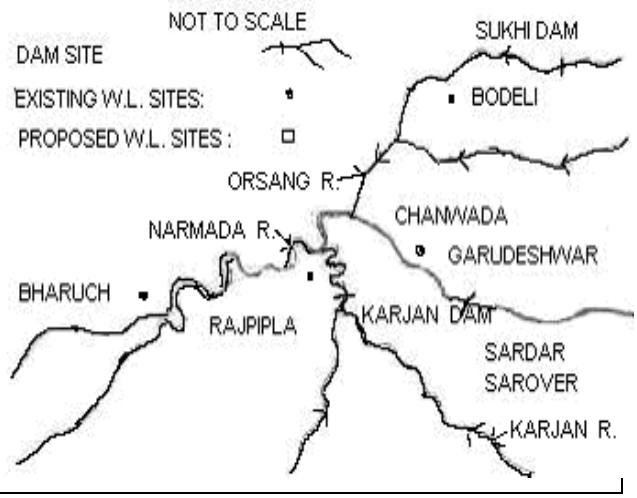
Chapter-6: Difficulties encountered during Monsoon 2012.

During monsoon 2012, total 246 Inflow forecasts and 14 Flood Level forecasts were issued. The uncertainties existing over various reaches experienced at the time of forecast formulation during 2012 for the reach of Garudeshwar to Bharuch (Lower Narmada Basin), and Gidhade to Ukai in Tapi Basin are being highlighted.

6.1 Garudeshwar to Bharuch (Lower Narmada Baisin)

Outline of the catchment area between Garudeshwar to Bharuch.

Catchment area in Sq. Km.	
1. Up to Garudeshwar	87892
2. Up to Bodeli	2300
3. Up to Chanwada	3846
4. Up to Rajpipla	1440
5. Up to Bharuch	98796



Once the Sardar Sarovar Dam construction is completed with gated spillways, the possibility of attending warning level at the downstream Garudeshwar station is least. Till than the present arrangement of issuing flood warning whenever the out flow /releases from Sardar Sarovar Dam exceeds discharges of 28000 cumec. The gate operation schedule in respect of Sardar Sarovar Dam, when ever readied, will be of help for formulation of level forecast for Bharuch station with more travel time component, when compared to the present setup.

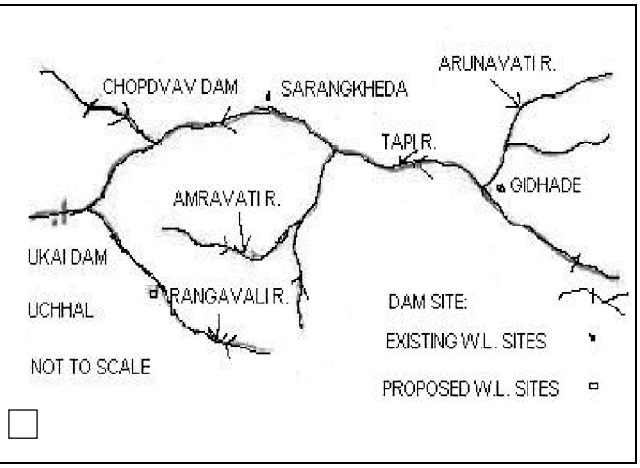
Presently the level forecast for site Golden Bridge Bharuch is based on outflow of Sardar Sarovar Dam and level of the site Garudeshwar.

State Government authority of Sardar Sarovar project issued forecast for expected out flow of sardar sarovar dam and level of site Garudeshwar in advance, considering this forecast issued by state Govt. authority advisory warning for warning level touch/cross has been issued by this office and the regular forecast issued on the basis of real time data received from Garudeshwar site the travel time of Garudeshwar to Bharuch is 8 to 10 hours.

6.2 Gidhade to Ukai: Outline of catchment area from Gidhade to Ukai.

{Tapi Basin}

Catchment area in sq km	
1. Up to Gidhade	54750
2. Up to Sarangkheda	58400
3. Up to Ukai	62225



Real time stations and data available -

1. Gidhade : - Hourly gauge, discharge and daily rainfall / 3 hourly rainfall.

2. Sarangkheda : - Hourly gauge, discharge and daily rainfall / 3 hourly rainfall From 1999.

3. Ukai : - Hourly gauge / daily rainfall.

In the Maharashtra state Sulwade barrage, Sarangkheda Barrage and Prakasha Barrage are existing in between Site Gidhade and Ukai Reservoir, gate operation from those Barrages creating problem in formulation of inflow forecast for Ukai Dam because back water affected our base stations (Gidhade and Sarangkheda), barrages are likely to be closed by 1st of October every year and will be opened to next monsoon, it is decided in the interstate pre monsoon preparedness meeting before monsoon 2012. The state authority of Maharashtra informed that the gates of all three barrages will be opened during monsoon period from 15th June to 30th September.

Six new rain gauge stations were installed under Telemetry system in Tapi river basin for the improvement of inflow forecast for Ukai Dam and the rainfall of stations Nizer, Ucchal and Chopdavav were also collected from district disaster control authorities of district Tapi and Narmada were received from ukai dam authorities almost regularly. In addition the daily rainfall data of stations namely Sahada and Prakasha also arranged when ever required. This additional information, as and when made available, was also incorporated for formulation of inflow forecast for Ukai Dam.

Madhuban to Vapi – Daman

In Damanganga Basin, at Vapi and Daman, forecasting stations have very less travel time between Madhuban Dam to Vapi i.e. 2 hrs which is insufficient for compilation, formulation and dissemination of forecast to the concerned user agencies. As per norms for flood level forecasting, used by the department, a time lag of 3 hrs is considered.

In the case of Vapi and Daman stations the above norm does not hold good or applicable. It has been experienced that issuing level forecast for Vapi and Daman on the above lines within the travel time 2 hours by manual computation is very difficult.

Chapter -7: Forecast Performance with reasons of beyond limit variations

During Monsoon 2012, 14 Flood Level Forecast and 246 Level Forecast were issued in Narmada, Tapi and Damanganga Basins. Total of 260 level and Inflow Forecasts were issued, 258 forecasts were found within the admissible limit Site-wise level and inflow forecast performance is shown in statement no 15 and forecast performance for last 10 years of all the flood level / inflow forecast sites have been shown in statement no. 16.

Details of the inflow and level forecast with actual appended in statement no 13 & 14.

Table-12: Performance of Inflow Forecast

Hathnur Dam – Tapi River		
		Remarks
Total forecast	170	Forecasts issued with warning time of 6 hrs. were revised before 3 hours and the forecast with warning time 12 hrs were revised before 4 to 6 hrs (if required)
Forecast within Limits (+/-) 20%	170	-
Beyond limits	NIL	-
Ukai Dam – Tapi River		
		Remarks
Total forecast	73	Forecasts were revised before 6 to 12 hrs, if required.
Forecast within Limits (+/-) 20%	72	-
Beyond limits	1	-
Madhuban Dam – Damanganga River		
		Remarks.
Total forecast	3	Forecasts were revised before 3 hrs, if required.
Forecast within Limits (+/-) 20%	3	-
Beyond limits	NIL	

Table-13: Performance of Level Forecast

River Lower Narmada At Bharuch -

Total forecast	13	
Forecast within Limits (+/-) 15 cm	12	
Forecast Beyond the Limits (+/-) 15 cm	1	

River Lower Narmada At Garudeshwar

Total forecast	Nil	
Forecast within Limits (+/-) 15 cm	Nil	
Forecast Beyond the Limits (+/-) 15 cm	Nil	

River Tapi At Nehru Bridge Surat

Total forecast	1	
Forecast within Limits (+/-) 15 cm	1	
Forecast Beyond the Limits (+/-) 15 cm	Nil	

River Damanganga :At Vapi

Total forecast	Nil	
Forecast within Limits (+/-) 15 cm	Nil	
Forecast Beyond the Limits (+/-) 15 cm	Nil	

River Damanganga At Daman

Total forecast	Nil	
Forecast within Limits (+/-) 15 cm	Nil	
Forecast Beyond the Limits (+/-) 15 cm	Nil	

Chapter -8: Use of Mathematical model

Presently, conventional methods of flood level / Inflow forecast are being used for most of the Sites. Most of the work is being done manually and the performance is very good. In order to modernise the flood forecasting technique and to improve forecast performance the Mathematical Model developed for Hathnur Dam and the work of Mathematical model for Ukai Dam and Madhuban Dam are in under progress. Information regarding the mathematical models are given below.

1. Flood Forecasting model for Hathnur Dam was prepared by FCA Directorate, and a short tanning about the model also given to the Shri S.K. Mishra Executive Engineer and Shri D.K Jawle Scintific Assistant of this office during the Month November 2011. Dongle of Mike11 old version (1999) also provided to this office. the mathematical model of Hathnur Dam was developed in the latest version of Mike 11 at FCA , new Delhi and the provided version of Mike 11 to Tapi Division office is older(1999) therefore the mathematical midel of Hathnur Dam was not run , same as informed at Directore FCA, new Delhi by this Office Ltr. No. तामसू। मेट। जनरल । 2012 । 2841-42 दिनांक 15/06/2012. Director FCA deputed an officer at Division office Surat in the month of September 2012 for short out the problem but the Mathematical model of Hathnur Dam was not run and show Error during the operation.

2. Work of Mathematical model for Ukai Dam and Hathanur Dam are in under progress in the supervision of Director FCA, and P & D New Delhi.

3. Data of Mathematical model for Ukai Dam and all the required information for the set up of model submitted to Directorate P&D New Delhi vide this office ltr. No. TDS/MET/MIKE-II/4156-58 Dated 31 /08/ 2012.

4. Data of Mathematical modle for Madhuban Dam and all the required information for the set up of model submitted to Hydrology south New Delhi via Email. hydsouth@cwc.delhi.nic.in dt. 1/03/2012, River data directorate New Delhi via email, rdcdte.cwc@nic.in dt. 16/06/2012 and the data resubmitted on dated 2/11/2012 via email to rdcdte.cwc@nic.in for model study.

Chapter -9: Telemetry station under Tapi Division

Real-time data denotes information that is delivered immediately after collection. There is no delay in the timeliness of the information provided. Real-time data is often used for the flood forecasting Purpose. For the improvement of Forecasting work and availability of data through out the year 24x7 Telemetry system introduced in Central water commission.

During the XI th Five Year plan the Telemetry system at 38 remote staions had installed with two model stations under Tapi Division surat on three important river basin Namely Tapi, Lower Narmada and Damanganga river Basin.

1. Model Stations

   a). Tapi Division CWC Surat

   b). Upper Tapi Sub Division Bhusawal

2. Telemetry Stations:

   a). Tapi Basin 24 Telemetry stations

   b). Lower Narmada Basin 04 Telemetry stations

   c). Damanganga Basin 10 Telemetry stations

Data received form Earth receiving stations (ERS) to Modeling center Surat is 30 minute late from the real time data.

During the monsoon 2012 data received through the telemetry system was compaired with the regular data collected by CWC sites manually.data received through the telemetry system at modeling center show very difference from the actual received data by cwc this is also informed to higher officers and the ESSEL Shyam Tecnology Ltd. Actual data of CWC sites and data received by telemetry system at modeling center was send to ESSAL shyam Technology system for validation of data vide this office Ltr. No. तामसू । दुरमिति। 4। 2012। 5612-.5615 दिनांक 21-12-2012.

Details of Telemetry stations are given in the Table no.14

Table-14: Details of Telemetry stations under Tapi Division Surat

SN.	Name of Site	District	River	Type of Site A/B/C/D	Status of Initial survey	Status of Design and Drawing	Status of Construction of Rain Gauge Block	Status of Installation of DCU & other equipment	Status of Communication of Data from site to ERS	Wire mesh fencing and gate with lock
1	Chikaldara	Amrawati	Tapi	A	C	C	C	C	C	C
2	Chiklod	Jalgaon	Tapi	A	C	C	C	C	C	C
3	Shelgaon	Buldhana	Tapi	A	C	C	C	C	C	C
4	Nandurbar	Nandurbar	Tapi	A	C	C	C	C	C	Roof
5	Khetia (Pansamal)	Barwani	Tapi	A	C	C	C	C	C	Roof
6	Dusane (Nizampur)	Dhue	Tapi	A	C	C	C	C	C	Roof
7	Sagbara	Narmada	Tapi	A	C	C	C	C	C	C
8	Harsul	Nashik	Daman Ganga	A	C	C	C	C	C	C
9	Mokheda	Thane	Daman Ganga	A	C	C	C	C	C	C
10	Dhandore (Peint)	Nahik	Daman Ganga	A	C	C	C	C	C	C
11	Gopalkheda	Akola	Purna	B	C	C	C	C	C	C
12	Teska	Betul	Tapi	B	C	C	C	C	C	Roof
13	Dedtalai	Khandwa	Tapi	B	C	C	C	C	C	C
14	Burhanpur	Khandwa	Tapi	B	C	C	C	C	C	C
15	Yerli	Buldhana	Purna	B	C	C	C	C	C	C
16	Lakhpuri	Akola	Purna	B	C	C	C	C	C	C
17	Morane	Dhule	Girna	B	C	C	C	C	C	Roof
18	Sarangkheda	Nandurbar	Tapi	B	C	C	C	C	C	C
19	Savkheda	Jalgaon	Tapi	B	C	C	C	C	C	Nil
20	Gidhade	Dhule	Tapi	B	C	C	C	C	C	Nil

21	Ghala	Surat	Tapi	B	C	C	C	C	C	**C**
22	Surat	Surat	Tapi	B	C	C	C	C	C	C
23	Daman	UT	Daman Ganga	B	C	C	C	C	C	Roof
24	Ozerkheda	Nashik	Wag	B	C	C	C	C	C	C
25	Nanipalsan	Valsad	Daman Ganga	B	C	C	C	C	C	C
26	Solachar	DN&H UT	Daman Ganga	B	C	C	C	C	C	C
27	Silvassa	DN&H UT	Daman Ganga	B	C	C	C	C	C	C
28	Bharuch	Bharuch	Narmada	B	C	C	C	C	C	C
29	Garudeshwar	Narmada	Narmada	B	C	C	C	C	C	C
30	Bodeli	Vadodara	Orsang	B	C	C	C	C	C	C
31	Rajpipla	Narmada	Karjan	B	C	C	C	C	C	C
32	Hathnur	Jalgaon	Tapi	C	C	C	C	C	C	C
33	Girna Dam	Nashik	Girna	C	C	C	C	C	C	Roof
34	Dahigaon	Jalgaon	Girna	C	C	C	C	C	C	C
35	Ukai Dam	Surat	Tapi	C	C	C	C	C	C	C
36	Maduban Dam	Valsad	Daman Ganga	C	C	C	C	C	C	Roof
37	Vapi	Valsad	Daman Ganga	C	C	C	C	C	C	C
38	Bhusawal	Jalgaon	Tapi	D	C	C	C	C	C	C

Note: Write following notation for providing status:

C-Completed UP-Under Progress/Process A=Rainfall B=Rainfall+WL C=Rainfall+reservoir

Chapter-10 Comparison of Forecast performance with previous years

The forecast performance during 2012 is much encouraging. Overall performance of the Division was 99.23% as indicated in the statement No. 15 and last 10 years (2001 – 2011) forecast performance depicted graphically vide plate no. 12.

This year, Monsoon was effective in all river basins. Total 246 nos. inflow forecasts with performance accuracy 99.6 % within limits and 14 nos. level forecasts were issued in monsoon 2012 with 92.9% accuracy.

The inflow forecast performance of Hathnur Dam, Ukai Dam and Madhuban Dam for 2012 is indicated in respectively in statement no. 13.

Ten years average forecast performance of all Flood Level Forecast / Inflow Forecast sites including monsoon 2012 is shown in statement no 16.

The comparison of site-wise forecast (Inflow & Level) performance for last 10 years (2002 – 2011)average v/s current and (2003 – 2012) is shown in the statement no. 17 and site wise forecast performance of last 10 years inflow and level forecast are depicted graphically as bar chart vide plate nos. 13 & 14 respectively.

Bar chart of inflow forecast issued V/s actual inflow reached into Hathnur, Ukai and Madhuban reservoirs during monsoon 2012 are shown in plate's no. 15, 16 & 17 respectively.

A statement showing the details of weather telegrams as received from FMO, (IMD), Mumbai, Bhopal and Ahmedabad is also appended as statement no. 6.

A statement showing synoptic situation as received from FMO, Ahmedabad is appended at statement no 7.

Chapter -11: Problems Faced and Deficiencies noticed in the network during the monsoon 2012

Some of the main deficiencies and difficulties faced during Monsoon 2012 are as given below:

Though this Division is entrusted with the various types of works like flood forecasting, conducting hydrological observation, water quality observations etc., and has wide spread jurisdiction in three States of Gujarat, Maharashtra and Madhya Pradesh & Union territory Daman & Dadra Nagar Haveli, yet the staff strength provided is inadequate, even the sanctioned posts are not filled. The Hydromet cadre is mainly assigned the duty of assisting for formulation, issue and dissemination of forecast. It has already been brought to notice of senior officers of Central Water Commission before the onset of monsoon to get filled up the vacant 3 posts of Scientific Assistant [HM] is very essential to cope up during floods of this magnitude and severity. Hence it is requested to fill up all the vacancies of Hydromet cadre and strengthen the HM section of this office, as three posts of Scientific Assistant [H.M.], are lying vacant.

Lower Narmada Basin

Due to construction of Sardar Sarovar Dam the forecast for Bharuch is based on outflow of Sardar Sarovar Dam and water level at Garudeshwar there for in this season no particular problem was faced in Narmada basin. 13 flood level forecast were issued for Bharuch on the base of outflow of Sardar Sarovar Dam and Water Level of Garudeshwar.

Tapi Basin

The Maharashtra state Government has informed that three barrages namely Sulwada barrage, Saranngkheda Barrage and Prakasha Barrage are existing in between Site Gidhade and Ukai Reservoir, gate operation of those Barrages was creating problem in formulation of inflow forecast for Ukai Dam therefore before monsoon 2012 Chief Engineer NTBO arranged a meeting with the Water resource Department authorities of State Govt. of Maharashtra and Gujarat at VIP Guest house Ukai Dam Ukai. The state authority of Maharashtra informed that the gates of all three barrages will be opened during monsoon period from 15th June to 30th September. Therefore this year no any problem was faced due to construction of Barrages. as per the direction of the higher officer of CWC one person were posted at each barrages for watch the situation , water level and rainfall at barrages to passed this office time to time.

Damanganga Basin

In case of Inflow forecast for Madhuban Dam, no particular problem is faced. Performance for this Site is very good. But in case of Vapi, travel time is only 2 hour and even 1 hour for high floods of about 10000 m^3/ Sec. The travel time of 2 hours is utilised in forecast formulation and dissemination as such the forecast does not serve the requisite purpose for taking precautionary measures in advance. Daman Site is affected by the tide of sea.

Chapter-12: Appreciation of Forecasts

Tapi Division is entrusted with the works of issue of the flood level / Inflow forecasts for 8 sites in Lower Narmada, Tapi and Damanganga Basin. The flood forecasting services rendered by this office during Monsoon 2012 and also in past years has been appreciated by various user agencies. Some of them had sent appreciation letters in this year also. The appreciation letters received from the following authorities are here with attached

Government of India
Central Water Commission
Narmada & Tapi Basin Organisation

सत्यमेव जयते

R K Suryawanshi
Chief Engineer

नर्मदा तापी भवन,
Narmada Tapi Bhavan
सेक्टर 10 अ Sec – 10A,
गाँधीनगर Gandhinagar–382010
e-mail: cwc_ntbo@rediffmail.com

No. NTBO/TS-37/2010/ 2559-61

31/12/2012

To,
Shri S.K. Mishra,
Executive Engineer,
Tapi Division, CWC,
Surat

Sub: Letter of Appreciation.

The flood events in Tapi Basin during Monsoon 2012 were comparatively quite severe in nature. During the period, it is seen that the situations were tackled in a scientific manner issuing quality & timely forecasts for appropriate operation of storage reservoirs as well as administrative measures by respective State/Municipal authorities including sustained & effective coordination with all involved.

I would like to state that the efforts made by officers and staff of Tapi Division, Surat deserve appreciation. Similar zeal, alertness & coordination should be continued in future as well.

EAD (H.M.)
4/1/13
E.E.

EAD
mob
46
21/1

31/12/12
(R.K. Suryawanshi)
Chief Engineer
NTBO

Copy to:

1. PPS to Member(RM), CWC, New Delhi-110066
2. Superintending Engineer, HOC, CWC, Gandhinagar. Under your control flood situation in Tapi Basin was managed effectively during Monsoon-2012. Such alertness and zeal to be continued in future as well.

No: Disaster/Flood/ws/ 3243
Office of the Collector
Disaster Branch
Bharuch: 23 -10-2012

To
Executive Engineer,
Central Water Commission,
Tapi Division,
Opp Kshetrapal Health Center,
Sagrampura,
Surat 395002

Sub:- Regarding Appraisal Letter (Utility Certificate) of flood forecast.

Ref:- Your letter No ता म सू। मेट। जनरल। 2012 /4838–39 दिन।क 10/10/12

I am happy to put on record that Tapi Division of Central Water Commission at Surat has rendered good services during monsoon of the year 2012. Timely and speedy communication has helped a lot to Collectorate to take precautionary measures.

This is issued in view of the request made.

Resident Additional Collector
Bharuch

D:\2012\Flood-2012.doc

C. Y. Bhatt
Deputy Commissioner

Gordhandas Chowkhawala Marg,
Surat Municipal Corporation,
Muglisara
Surat - 395003

No. DC/Out/32
Dt : 03 -01-2013

To,
Shri S. K. Mishra
Executive Engineer,
Central Water Commission,
Tapi Division,
Opp :- Kshetrapal Health Centre, Sagrampura,
Surat - 395002

Sub : Utility Certificate & Damage Report for Monsoon - 2012
Ref : Your letter No.TMS/MAT/General/2012/4836-37, Dt.10.10.2012

I am happy to put on record that Tapi Divison of Central Water Commission at Surat is rendering good services during monsson period of 2012-13. Timely and speedly communication and transmitting of messages during emergency time has helped a lot to SMC.

This is issued in view of the request made.

Yours faithfully
03/Jan/13
(C. Y. Bhatt)
Deputy Commissioner
Surat Municipal Corporation

Phone : (o) 2435958, 2423751 to 56, Ex. No.337 Fax : 0261-2451935/
Visit us at - www.suratmunicipal.gov. in
email - cybhatt@yahoo.co.in

NARMADA WATER RESOURCES WATER SUPPLY & KALPSAR DEPARTMENT		
નર્મદા,જળસંપતિ,પાણી પુરવઠા અને કલ્પસર વિભાગ,ગાંધીનગર		
Near M.T.B.College	Superintending Engineer	એમ.ટી.બી.કોલેજની બાજુમાં
Athwalines,Surat-395001	અધિક્ષક ઈજનેર	અઠવાલાઈન્સ,સુરત:૩૯૫૦૦૧
Tel.: (Off)0261-2668760,2667426	Surat Irrigation Circle,Surat	ફોન નં.(ક): ૦૨૬૧-૨૬૬૮૭૬૦
Resi. : 0261-2669825	સુરત સિંચાઈ વર્તુળ,સુરત	: ૦૨૬૧-૨૬૬૭૪૨૬
Per. : 0261-2667469		રહેઠાણ: : ૦૨૬૧-૨૬૬૯૮૨૫
Fax: 0261-2997950		અંગત : : ૦૨૬૧-૨૬૬૭૪૬૯
E-mail: sesicsurat@gmail.com		ફેક્ષ: : ૦૨૬૧-૨૬૬૭૯૫૦

No. SIC / PB-1 / Flood Warning-2012 / Message / Monsoon-2012 / F-19 / 65

Date: 02-01-2013

3 JAN 2013

To,
Executive Engineer
Tapi Division
CWC-Kshetrapal,
Sagrampura ,Surat-395002

Sub :- Regarding Appraisal letter (Utility Certificate) of flood forecast.
Ref :- Yours letter No.TMSU/Met/General/4834-35 dtd.10-10-2012

As desired vide letter under reference it is to inform You that the flood forecast, rainfall data for upper Tapi basin and advisory warning received from your office well in time helped this office to convey the flood related messages timely to all the concerned Authorities of Surat city & nearby area and release of flood water was planned according to advisory warning in advance so that least low lying city area was affected with flood water for shorter period in downstream of Ukai dam.

(A.D.Kanani)
Superintending Engineer
Surat Irrigation Circle-Surat

D(Hyd Met.)
4/1/13
EE.

Met
क्रमांक 83
क्रमांक 5/1

-2012-13\પૂરનિયંત્રણ ચોમાસુ-૨૦૧૨\flood warning utility-2012.docx

Narmada W.R.W.S. & Kalpsar Department
GOVERNMENT OF GUJARAT
SUPERINTENDING ENGINEER
UKAI CIRCLE [CIVIL]
UKAI DAM – 394 680
DIST : TAPI
E-Mail: seuccukai52@gmail.com

FAX – 02624/233239
TELEGRAM: SUPENGER
Telephone [O]:- 233270 & 233239
[R] :- 233218
નર્મદા જળસંપત્તિ પાણી પુરવઠા અને કલ્પસર વિભાગ
અધિક્ષક ઇજનેરશ્રીની કચેરી
ઉકાઇ વર્તુળ(સીવીલ) ઉકાઇ
ઉકાઇ ડેમ- ૩૯૪૬૮૦, જી. તાપી.

તારીખ:

NO. C/Ukai Dam/Flood forecast/2012/PB-2/ 3340 [- 5 NOV 2012

To,
The Executive Engineer
Central Water Commission
Tapi Division
Opp.Kshetrapal Health Centre,
Sagrampura,
Surat. – 395002

SUB:- Regarding Appraisal Letter (Utility Certificate) of flood forecast.

REF:- Your office letter No. Ta M Su/Met/General/2012/4830-31 Dt.10/10/2012.

The flood forecasts issued by Central Water Commission in respect of Ukai Reservoir during monsoon – 2012 are as under.

(1)	Forecast issued.	73 Nos
(2)	Revised forecast issued.	18 Nos
	Total.	91 Nos

Above forecasts remained useful in operation of Ukai Reservoir during Monson-2012.

The Co-operation extended by Central Water Commission is highly appreciated.

(N.H.Kapadi)
Superintending Engineer
Ukai Circle (civil),Ukai

Telephone
(02632) 254501(O)
254502
254503
254504
253307(P)
242903(R)
253308
(FAX)
Mobile No.:9978405573
E-Mail

se-dgpc-val@gujarat.gov.in

GOVERNMENT OF GUJARAT
NARMADA,WATER RESOURCES,
WATER SUPPLY AND KALPSAR
DEPARTMENT
ગુજરાત સરકાર
નર્મદા, જળસંપતિ, પાણી પુરવઠા અને
કલ્પસર વિભાગ.

Office of The Superintending Engineer,
Damanganga Project Circle,
2nd Floor, Damanganga Bhavan,
Behind Jilla Seva Sadan -1,
VALSAD - 396 001
અધિક્ષક ઇજનેરની કચેરી,
દમણગંગા યોજના વર્તુળ,
બીજો માળ,દમણગંગા ભવન,
જિલ્લા સેવા સદન-૧ ની પાછળ,
વલસાડ - ૩૯૬ ૦૦૧

No.DMN/PB-1/Flood General/ 3088 DATE :- 18/10/2012

To,
The Executive Engineer,
Central Water Commission,
Tapi Division, Opp. Kshetrapal Health Centre,
Sagrampura,
SURAT.

Sub.: Regarding appraisal letter (utility certificate) of flood forecast.
Ref.: Executive Engineer, Central Water Commission, Tapi Division, Surat's vernacular letter No.Tapi Division Surat/Mef/General/ 2012/ 4832-33,Dt..10/10/2012

In connection to the letter cited under reference it is to furnish that the flood forecasting services rendered for Madhuban dam were to satisfaction and are hereby acknowledged.

However in this regard if possible, it is requested to convey the inflow forecast well before 6 hrs. through all electronic communication i.e. E-mail, fax and mobile, so that sufficient time to take prompt action to negotiate the flood may be availed to dam authority.

Hoping for rendering such complementary services in coming years.

(S.R.MAHAKAL)
Superintending Engineer.

Mel- 3941 23/10

Copy to Executive Engineer, Damanganga Project Division No.1, Madhuban Colony and Executive Engineer, Damanganga Canal Distry. Divn.No.2, Valsad for information.

Office of the
Executive Engineer
Jalgaon Irrigation Division
Jalgaon

No :- 190 Dated :- 22/ 11 / 2012

To,
The Assistant Engineer,
Upper Tapi Sub division,
Central Water Commission,
Bhusawal.

Sub :- Appreciation / Utility letter for Flood Fore casting services rendered by CWC, Tapi Division, Surat – regarding.

Sir,

As desired by you, it is to inform you that, the flood fore casting services rendered by the Central Water Commission, Tapi Division, Surat and Upper Tapi Sub Division, Bhusawal are very much useful to Hatnur Dam.

The forecast and rainfall data details received well in time and helped us considerably in planning of reservoir storage optimizing, utilition of water for various purposes, flood routing and dam safety. Due to your forecast, gate operation can be done in time, so as to relase moderate flood or to maintain inflow and outflow as required. Hence no damages are observed during mansoon 2012.

It is requested to render such services, in future also.

Date :- / / 2012
Place :- Jalgaon.

Executive Engineer,
Jalgaon Irrigation Division
Jalgaon.

O. C. Signed by Ex. Engr

Chapter-13: Conclusion

The river Tapi at Nehru Bridge, Surat crossed warning level on 0200 hrs of 08-09-2012 and as such 1 no. level forecast was issued during this Monsoon season.

Total 13 no. level forecast issued for Golden Bridge Bharuch and no level forecast were issued for Garudeshwar, Vapi and Daman during monsoon 2012.

Total 170 numbers Inflow forecasts for Hathnur Dam, 73 numbers inflow forecast for Ukai Dam and 3 numbers inflow forecast for Madhuban Dam were issued during this monsoon.

Hathnur Dam filled up to FRL i.e. 214.000 m at 0700 hrs on 05-10-2012. The Ukai Dam was filled up to maximum water level of 104.305 m at 1200 hrs on 25-09-2012 and Madhuban Dam has remained at its FRL of 80.050 m from 1600 of 11-10-2012. Maximum releases of Hathnur Dam was 13552.41 cumec at 0500 hrs of 06-09-2012, Ukai Dam was 9507.84 at 2200 hrs of 07-09-2012 and Madhuban Dam was 2992.10 cumec at 1500 hrs on 11-09-2012.

Maximum Inflow of Hathnur Dam was 16763.4 cumec at 0200 hrs on 06-09-2012, Ukai Dam was 18227.3 cumec at 0300 hrs on 07-09-2012 and Madhuban Dam was 2755.50 cumec at 1000 hrs on 11-09-2012.

Total 260 numbers Inflow and level forecasts were issued of which all 258 numbers of forecasts were within the permissible limit of ± 20 % or ± 15 cm variation with overall performance 99.24 % is very much encouraging.

Statement No.1

Location of Division office, sub Division and field stations in Lower Narmada, Tapi and Damanganga Basin

Sl. No.	Code No.	Name of the Station.	Zero of Gauge	Location (Deg, Min. Sec.) Lat.			Long.			River/ Tributary.	District/State.
1	2	3	4	5(a)			(b)			6	7
I.	**Head Quarters of Dvn. Office.**			D	M	S	D	M	S		
	Tapi Division, Surat.			21	11	49	72	48	59		Surat / Gujarat
II.	**Head Quarters of Sub Dvn Office**										
1.	Lower Narmada Sub Division, Bharuch.			21	41	22	73	00	26		Bharuch / Gujarat.
2.	Upper Tapi Sub Division, Bhusawal.			21	04	06	75	46	49		Bhusawal / Mah.
3.	Middle Tapi Sub Division, Dhule.			20	54	33	74	42	04		Dhule / Mah.
4.	Lower Tapi Sub Division, Surat.			21	11	49	72	48	59		Surat / Gujarat
5.	Damanganga Sub Division, Silvassa.			20	16	05	72	59	08		Silvassa / D.& N.H.
III	**Field Stations.**										
[A]	**Narmada Basin.**										
1.	01 02 15 030	Garudeshwar	10.000	21	53	11	73	39	16	Narmada	Narmada/ Gujarat.
2.	01 02 15 031	Bodeli.	73.640	22	15	54	73	43	38	Orsang	Vadodara / Gujarat
3.	01 02 15 032	Chandwada	18.000	22	03	00	73	27	58	Orsang	Vadodara / Gujarat
4.	01 02 15 033	Rajpipla.	19.600	21	52	40	73	29	48	Karjan	Narmada / Gujarat
5.	01 02 15 034	Bharuch	0.000	21	41	22	73	00	26	Narmada	Bharuch / Gujarat

Statement No.1 Contd.

Sl.No	Code No.	Name of the Station.	Zero of Gauge	Location (Deg, Min. Sec.) Lat.			Long.			River/ Tributary.	District/State.
B]	**Tapi Basin.**			D	M	S	D	M	S		
1		Teska	-	21	48	54	77	46	25	Tapi	Betul / M.P.
2.		Chikaldara	-	21	23	59	77	19	11	Tapi	Amravati / Mah.
3.	01 02 17 001	Dedtalai.	270.00	21	30	47	76	45	26	Tapi	Khandwa / M.P.
4.	01 02 17 002	Burhanpur	213.000	21	17	54	76	14	10	-do-	-do-
5.	01 02 17 003	Lakhpuri.	259.000	20	50	44	77	21	38	Purna	Akola / Mah.
6.	01 02 17 004	Gopalkheda	236.000	20	52	27	76	59	29	-do-	-do-
7.	01 02 17 005	Yerli.	213.000	20	56	09	76	28	33	-do-	Buldana / Mah..
8.	01 02 17 006	Hathnur	193.500	21	04	19	75	56	46	Tapi	Jalgaon / Mah
9.	0`02 17 007	Bhusawal	174.070	21	04	06	75	46	49	-do-	-do-
10.	01 02 17 008	Girna Dam	373.380	20	28	38	74	42	59	Girna	Nasik / Mah
11.	01 02 17 009	Dahigaon	215.798	20	49	53	75	25	29	-do-	Jalgaon / Mah
12.	01 02 17 011	Savkheda.	141.000	21	08	53	75	14	27	Tapi.	-do-
13.	01 02 17 013	Morane(Dhulia	265.000	20	54	33	74	42	04	Panjra	Dhule / Mah
14.	01 02 17 014	Gidhade	119.000	21	17	41	74	48	33	Tapi	-do-
15.	01 02 17 015	Sarangkheda	108.000	21	25	42	74	31	38	-do-	-do-
16.	01 02 17 016	Ukai.	47.853	21	15	00	73	35	33	-do-	Tapi / Gujarat
17.	01 02 17 018	Ghala	1.870	21	17	50	73	01	31	-do-	-do-
18.	01 02 17 019	Surat	(-)5.000	21	11	49	72	48	59	-do-	-do-
19		Khetia [Pansamal]		21	39	00	74	42	06	Tapi/Bokar	Nandurbar/Mah
20		Nandurbar									
21		Chiklod		21	20	06	76	00	23	Tapi/Bokar	Bhusawal/Mah
22		Dusane [Nizampur]		21	06	49	74	19	47	Tapi	Nandurbar/Mah
23		Sagbara		21	32	35	73	47	42	-do-	Rajpipla/Gujarat
24		Shelgaon		20	47	33	76	08	07	Tapi/ Mohuganga	Buldhana/Mah

Sl.No	Code No.	Name of the Station.	Zero of Gauge	Location (Deg. Min. Sec.) Lat.			Long.			River/ Tributary.	District/State.
[C]	**Damanganga Basin.**			D	M	S	D	M	S		
1.		Harsul	-	20	06	46	73	27	07	Damanganga	Nasik / Mah..
2.		Mokheda	-	19	56	05	73	20	34	Damanganga	Thane / Mah
3.		Dhandore [pent]	-	20	13	47	73	27	16	Damanganga	Nasik / Mah
4.	01 02 24 001	Nanipalsan	95.000	20	12	10	73	16	52	Damanganga	Valsad / Gujarat
5.	01 02 24 002	Ozerkheda	80.100	20	06	01	73	16	16	Vag	Nasik / Mah..
6.	01 02 24 003	Madhuban	41.000	20	11	35	73	03	39	Damanganga	Valsad / Gujarat
7.	01 02 24 004	Solachar	24.000	20	12	32	72	59	26	Sakkartond	Silvassa /D. & N.H.
8.	01 02 24 005	Silvassa.	21.500	20	16	05	72	59	08	Damanganga	Silvassa /D. & N.H.
9.	01 02 24 006	Varrai.	23.000	20	17	03	73	00	00	Piparia.	Silvassa /D.N.H.
10.	01 02 24 007	Vapi.	13.720	20	20	11	72	54	40	Damanganga	Valsad / Gujarat.
11.	01 02 24 008	Daman.	0.000	20	24	41	72	50	11	Damanganga	Daman / U.T.

ABBREVIATION USED:- Mah. – Maharastra, MP – Madhya Pradesh, D & NH – Dadara & Nagar Haveli.

Statement No.2

Communication network

Sl. No	River/Stations	No. and type of Wireless Set.	No. and type of standby Set	Date of Functioning.
Tapi Basin				
1.	Tapi/Teska	LHP 228 15 Watts	Nil	June 2001 (Seasonal)
2.	Tapi / Chikhaldara	LHP 228 15 Watts	Nil	21.6.88
3.	Purna/Lakhpuri	LHP 228 15 Watts	Nil	15.6.2001
4.	Purna/Gopalkheda	LHP 228 15 Watts	Nil	13.7.87
5.	Tapi/Dedtalai.	LHP 228 15 Watts	Nil	8.2.78
6.	Tapi/Burhanpur	HNL - 501 Set	Nil	June1969
7.	Purna/Yerli.	LHP 228 15 Watts	Nil	28.4.78
8.	Tapi/Hathnur	LHP 228 15 Watts	Nil	26.7.79
9.	Tapi/Bhusawal	ICON 100 Watts	Alinco 100 Watts	June-1969
10.	Girna/Girna Dam	LHP 228 15 Watts	Nil	19.12.78
11.	Girna/Dahigaon	GE - 524 Set	Nil	24.5.78
12.	Tapi /Savkheda	LHP 228 15 Watts	Nil	17.12.98
13.	Panjra / Morane	LHP 228 15 Watts	Nil	26.7.79
14.	Tapi/Gidhade	Alinco 100 Watts	Nil	June-1969
15.	Tapi/Sarangkheda	LHP 228 15 Watts	Nil	16.12.98
16.	Tapi/Ukai.,	LHP-228 15 Watts	Nil	June-1969
17.	Tapi/Ghala	LHP-228 15 Watts	Nil	29.6.85
18.	Tapi/Surat.	1. Icom 100 Watts 1 LH P 228 15 Watts	Alinco 100 Watt Set	June-1969

Statement No.2 Contd.

Communication network

Sl.No	River/Stations	No. and type of Wireless Set.	No. and type of standby Set	Date of functioning.
DAMANGANGA BASIN.				
1.	Damanganga/Harsul	VHF 10 Watts	Nil	27.2.86
2.	Vag/Mokheda.	VHF 10 Watts	Nil	19.1.87
3.	Damanganga/Dhandore	VHF 10 Watts	Nil	17.6.87
4.	Damanganga/Nanipalsan	VHF 10 Watts	Nil	13.10.83
5.	Vag/Ozerkheda.	VHF 10 Watts	Nil	25.6.83
6.	Damanganga/Madhuban.	VHF 10 Watts	Nil	14.6.79
7.	Sakkartond/Solachar	VHF 10 Watts	Nil	24..3.85
8.	Damanganga/Silvassa	Alinco & VHF10 Watts	Nil	15.2.79
9.	Damanganga/Vapi	VHF 10 Watts	Nil	17.6.80
10.	Damanganga/Daman	VHF 10 Watts	Nil	7.5.80
NARMADA BASIN.				
Sl.No	River/Stations	No. and type of Wireless Set.	No.and type of standby Set	Date of functioning.
1.	Narmada/Garudeshwar	LHP-228 15 Watts	Nil	Aug.1969
2.	Karjan/Rajpipla	LHP-228 15 Watts	Nil	26.6.84
3.	Orsang/Bodeli.	LHP-228 15 Watts	Nil	26.6.84
4.	Narmada/Bharuch.	LHP-228 15 Watts	Nil	June-1969

Statement No.3

River- Gauge network – Tapi, Lower Narmada and Damanganga Basin

Sl. No	River/Site	Length of River to site (km)	Catchment area up to the site (km)	Bank of Station Gauge	Type of Observation/ Site.	Commencement year
1	Tapi at Teska (Temporary)	74	1486	Right	WGR	2001
2	Tapi at Chikaldara	---	---	Left	WR	1988
3	Tapi at Dedtalai	200	6660	Left	WGR	1977
4	Tapi at Burhanpur	241	9170	Right	WGDRSQ	1969
5	Purna at Lakhpuri.	128	3560	Left	WGR	1977
6	Purna at Gopalkheda.	170	9500	Left	WGDRSQ	1977
7	Purna at Yerli.	223	16517	Left	WGDRS	1971
8	Tapi at Hathnur	290	29430	Right	WGRI	1979
9	Tapi at Bhusawal	306	32478	Left	WGR	1969
10	Girna at Girna Dam	110	4729	Right	WGR	1979
11	Girna at Dahigaon.	202	8599	Left	WGR	1978
12	Tapi at Savkheda.	388	48136	Left	WGR	1972
13	Panjra at Morane (Dhulia)	95	1933	Right	WGR	1978
14	Tapi at Gidhade	420	54750	Right	WGDR	1969
15	Tapi at Sarangkheda.	488	58400	Right	WGDRSQ	1976
16	Tapi at Ukai.	595	62225	Left	WGRI	1969
17	Tapi at Ghala.	640	63325	Right	WGR	1977
18	Tapi at Surat.	708	63973	Left	WGRF	1969

Statement No.3 Contd.

River- Gauge network - Tapi , Lower Narmada and Damanganga Basin

Sl. No	River/Site	Length of River to site (km)	Catchment area up to the (km)	Bank of Station Gauge	Type of Observation/ Site.	Commence ment year
1.	Narmada at Garudeshwar	1188	87892	Right	WGDRSQF	1971
2.	Orsang at Chanwada	82	3846	Right	GDSQ	1979
3.	Karjan at Rajpipla.	70	1440	left	WGR	1962
4.	Orsang at Bodeli.	85	2300	Right	WGR	1978
5.	Narmada at Bharuch.	1271	98796	Left	WGRF	1969
	Damanganga Basin					
1.	Wagh at Ozerkheda.	75	640	Right	WGDR	1983
2.	Damanganga at Nanipalsan.	60	764	Right	WGDR	1982
3.	Damanganga at Madhuban.	93	1800	Right	WGRI	1979
4.	Sakkartond at Solachar.	45	266	Right	WGR	1984
5.	Damanganga at Silvassa.	108	2122	Right	WGR	1985
6.	Piparia at Varrai.	12.5	70	Left	G	1986
7.	Damanganga at Vapi.	116	2227	Right	WGRF	1980
8.	Damanganga at Daman.	131.3	2318	Left	WGRF	1980
9.	Harsul	-	-	-	RF	
10.	Mokheda	-	-	-	RF	
11.	Dhindhori	-	-	-	RF	

Note: - 1] Gauges are recorded hourly during Monsoon at all sites.

2] Gauges are recorded at 0800, 1300, 1800 hours during Non Monsoon

3] Discharge is being measured daily at 0800 hours.

4] Abbreviations used: - W: - Wireless, G: - Gauge, D: - Discharge, R - Rainfall, S: - Silt, Q: - Water Quality F: - Flood level forecast, I: - Inflow forecast.

5]Sediment sampling are done daily and Water quality analysis done fortnightly

Statement No.4.

[A] Salient features of River Basin

Sl. No.	Name of Sub Basin	Bank	Length in km	Catchment Area in sq km	% with reference to total area.	10 years average of Monsoon rainfall in mm including 2012
[A] SALIENT FEATURES OF TAPI BASIN						
1.	Upper Tapi up to Hathnur	Main	290	10471	16.1	961.5
2.	Purna	Left	274	18929	29.1	667.6
3.	Middle Tapi, Bhusawal to Ukai excluding Girna.	Main	305	22734	34.9	784.4
4.	Girna	Left	260	10061	15.4	618.5
5.	Lower Tapi - from Ghala to confluence to sea near Surat	Main	129	2920	4.5	1394.8
[B] SALIENT FEATURES OF LOWER NARMADA BASIN						
1.	Lower Narmada-from Hoshangabad to confluence to sea near Bharuch	Main	636	54248	54.9	1068.3
[C] SALIENT FEATURES OF DAMANGANGA BASIN						
1.	Damanganga as a whole	Main	131.3	2318	100	2384.5

Statement No – 5

Daily Rainfall data associated with flood spells

RAINFLL ASSOCIATED WITH 1ST, 2ND, 3RD & 4th FLOOD SPELLS IN TAPI BASIN

{06-07-12 TO 10 - 07-12, 22 - 07-12 to 01-08-12, 10-08-12 TO 14-08-12 AND 27-08-12 to 12- 09-12}

Sl No	Name of the Station	1ST SPELL					2nd SPELL									
		06/07	07/07	08/07	09/07	10/07	22/07	23/07	24/07	25/07	26/07	27/07	28/07	29/07	30/07	31/07	01/08
1	TESKA	7.0	28.4	19.0	1.6	7.0	16.6	99.0	16.8	14.0	2.0	41.2	45.9	62.0	21.2	37.6	23.0
2	LAKHPURI	26.0	4.6	12.0	2.6	25.8	30.2	33.2	3.4	7.2	3.0	8.8	76.0	14.8	3.2	9.0	9.0
3	CHIKALDA	14.6	20.2	37.2	2.2	8.0	44.6	124.8	91.2	24.0	15.0	20.0	55.8	74.0	46.0	27.6	79.6
4	GOPALKHEDA	8.0	17.0	16.0	3.8	24.2	11.8	21.0	7.4	7.0	0.0	8.4	44.0	4.6	2.6	6.0	17.4
5	DEDTALAI	22.2	18.4	51.0	0.4	18.2	3.4	62.8	56.6	1.4	0.0	11.2	64.6	12.2	22.4	5.8	19.2
6	BURHANPUR	23.0	9.8	40.0	13.0	14.6	4.0	44.6	41.4	2.4	2.8	10.0	47.2	12.4	13.4	18.2	10.2
7	YERLI	11.0	17.8	19.0	1.2	8.4	5.8	27.0	16.6	0.0	0.0	2.8	37.8	2.4	1.4	4.8	9.0
8	HATHNUR	6.2	9.0	14.2	7.8	2.0	0.2	14.6	25.0	0.0	1.2	1.6	25.0	0.6	0.0	7.0	11.0
9	BHUSAWAL	8.4	26.8	11.0	4.4	3.0	0.4	12.6	45.8	0.2	2.0	3.8	16.0	1.6	0.0	10.8	16.0
10	GIRNA DAM	1.2	0.0	0.0	0.0	10.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.2	5.0
11	DAHIGAON	5.0	11.4	2.0	4.2	33.8	0.0	3.4	17.4	6.8	0.0	1.8	7.4	0.0	0.0	9.4	2.2
12	DHULIA	22.2	3.2	2.1	34.9	0.0	0.0	1.6	6.0	0.0	0.0	0.0	0.3	0.0	0.0	9.0	6.0
13	SAVKHEDA	34.2	3.4	13.6	28.0	0.0	0.0	4.0	37.2	0.0	0.0	0.0	16.4	0.0	0.0	11.2	9.4
14	GIDHADE	12.2	7.0	7.4	14.0	0.0	0.0	1.4	33.0	0.2	0.8	0.0	10.0	1.2	0.0	5.6	1.1
15	SARANGKHEDA	1.0	28.0	35.8	32.2	0.0	0.0	0.0	14.8	0.0	1.6	0.0	1.8	1.2	0.0	9.0	4.0
16	UKAI	0.0	25.0	14.5	52.5	0.0	0.0	0.0	9.2	24.6	2.8	0.0	0.2	2.0	3.0	1.2	22.4
17	GHALA	8.2	48.0	3.0	13.8	3.4	0.0	1.0	0.0	21.8	0.0	0.0	0.0	1.0	0.0	0.0	7.8
18	SURAT	18.5	1.0	13.8	2.4	0.0	0.0	0.2	4.4	0.0	0.5	0.2	0.0	0.2	4.1	1.0	18.7

RAINFLL ASSOCIATED WITH 1ST, 2ND, 3RD & 4th FLOOD SPELLS IN TAPI BASIN

{06-07-12 TO 10 - 07-12, 22 - 07-12 to 01-08-12, 10-08-12 TO 14-08-12 AND 27-08-12 to 12- 09-12}

Sl No	Name of the Station	3rd SPELL				
		10/08	11/08	12/08	13/08	14/08
1	TESKA	8.2	30.0	57.0	6.0	1.0
2	LAKHPURI	0.4	2.8	5.6	19.8	1.8
3	CHIKALDA	19.6	34.6	45.6	20.2	6.6
4	GOPALKHEDA	0.0	25.2	13.4	4.2	5.0
5	DEDTALAI	11.4	5.2	44.8	2.0	1.2
6	BURHANPUR	50.0	5.0	97.0	3.6	0.0
7	YERLI	0.0	4.4	14.8	3.8	0.6
8	HATHNUR	6.4	0.0	23.8	7.6	0.8
9	BHUSAWAL	10.0	2.8	27.8	6.8	1.2
10	GIRNA DAM	6.4	6.8	7.0	1.0	0.0
11	DAHIGAON	2.2	8.4	7.6	8.4	0.4
12	DHULIA	8.4	13.0	16.0	1.8	0.0
13	SAVKHEDA	15.0	8.0	28.2	6.8	0.0
14	GIDHADE	2.8	15.2	50.0	3.6	1.6
15	SARANGKHEDA	9.4	30.4	36.8	3.4	1.6
16	UKAI	2.0	90.2	31.0	4.2	2.5
17	GHALA	4.0	8.4	20.0	9.0	0.0
18	SURAT	33.1	8.8	34.9	3.8	0.0

RAINFLL ASSOCIATED WITH 1ST, 2ND, 3RD & 4th FLOOD SPELLS IN TAPI BASIN

{06-07-12 TO 10 - 07-12, 22 - 07-12 to 01-08-12, 10-08-12 TO 14-08-12 AND 27-08-12 to 12- 09-12}

Sl No	Name of the Station	4th SPELL													
		27/08	28/08	29/08	30/08	31/08	01/09	02/09	03/09	04/09	05/09	06/09	07/09	11/09	12/09
1	TESKA	2.4	7.2	0.8	4.8	4.4	39.0	4.0	1.6	101.0	53.6	120.8	8.0	30.8	6.4
2	LAKHPURI	4.6	3.6	1.8	0.6	37.4	0.0	0.0	8.0	7.8	33.6	10.6	18.2	41.6	0.0
3	CHIKALDA	128.8	7.8	0.0	36.0	62.0	42.2	39.0	14.8	52.4	122.4	60.2	0.0	50.2	10.2
4	GOPALKHEDA	18.0	0.0	0.0	0.0	20.0	6.4	0.0	0.4	64.2	11.0	9.6	7.2	6.8	0.6
5	DEDTALAI	18.4	6.6	0.0	8.0	2.8	2.8	0.0	47.2	3.2	42.0	133.0	5.0	28.4	0.4
6	BURHANPUR	6.4	13.8	1.8	0.0	95.0	11.0	0.0	6.8	1.2	14.4	78.2	16.0	6.0	0.2
7	YERLI	0.8	6.6	0.0	0.0	14.0	2.2	0.0	2.8	81.8	4.2	34.3	11.8	14.0	0.0
8	HATHNUR	0.0	0.0	0.0	7.0	21.2	23.2	0.0	0.0	33.4	6.0	38.0	24.2	0.0	3.6
9	BHUSAWAL	1.0	1.6	0.6	2.4	15.2	8.8	0.0	0.0	10.0	4.0	28.0	23.0	1.0	12.4
10	GIRNA DAM	0.0	35.2	19.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	DAHIGAON	1.0	9.0	0.0	4.0	57.2	9.2	0.0	0.0	0.0	0.8	10.2	2.0	13.2	19.2
12	DHULIA	0.0	11.4	1.6	3.4	12.0	0.0	4.4	0.0	0.0	36.6	5.4	6.6	0.4	32.0
13	SAVKHEDA	0.0	1.2	0.0	0.0	29.0	8.8	0.0	0.8	2.4	1.2	23.0	17.2	1.2	11.2
14	GIDHADE	0.0	10.8	0.0	0.0	25.6	23.4	0.0	0.0	4.6	0.0	11.6	4.8	1.0	1.4
15	SARANGKHEDA	0.0	1.2	20.4	0.0	57.0	131.0	0.0	0.0	0.0	11.8	10.0	2.2	1.2	7.0
16	UKAI	6.4	73.0	3.0	0.0	12.0	24.0	2.0	0.0	11.5	0.5	31.0	39.2	65.0	32.4
17	GHALA	0.0	0.0	2.0	4.4	9.6	5.4	0.0	0.0	121.6	21.4	35.0	16.4	16.6	6.4
18	SURAT	0.0	0.0	0.0	5.2	0.0	17.2	0.0	0.0	137.5	72.0	32.7	13.3	5.4	20.0

RAINFLL ASSOCIATED WITH 1ST & 2ND FLOOD SPELLS IN LOWER NARMADA BASIN

{ Period 07-08-12 TO 14 - 08-12 AND 04- 09-12 to 12 -09-12}

Sl No	Name of the Station	1st SPELL								2nd SPELL								
		07/08	08/08	09/08	10/08	11/08	12/08	13/08	14/08	04/09	05/09	06/09	07/09	08/09	09/09	10/09	11/09	12/09
1	GARUDESHWAR	0.0	2.0	14.0	7.8	17.4	80.0	52.4	24.0	72.4	17.2	7.2	35.4	1.2	2.6	6.4	58.0	41.4
2	RAJPIPLA	0.0	15.4	13.0	8.4	8.2	72.4	33.0	23.2	127.8	13.2	7.6	17.0	1.0	5.4	23.6	63.8	2.6
3	BODELI	0.0	0.6	11.6	46.6	0.0	41.2	127.0	35.2	17.2	21.4	24.6	29.2	9.4	14.2	20.2	72.4	10.2
4	BHARUCH	0.0	0.0	4.8	0.6	11.2	41.0	28.8	20.0	30.6	26.8	10.4	26.2	7.0	8.8	68.0	65.4	10.2

RAINFLL ASSOCIATED WITH 1ST, 2ND & 3RD FLOOD SPELLS IN DAMANGANGA BASIN

{ Period 05-07-12 TO 19 – 07-12, 24- 07-12 to 12 -08-12 AND 28-08-12 TO 06-09-12}

Sl No	Name of the Station	1ST SPELL														
		05/07	06/07	07/07	08/07	09/07	10/07	11/07	12/07	13/07	14/07	15/07	16/07	17/07	18/07	19/07
1	HARSUL	23.8	12.8	39.2	3.8	9.8	40.8	6.0	15.4	9.6	16.8	11.0	3.6	3.6	27.8	96.6
2	MOKHEDA	24.0	34.8	16.2	37.6	22.4	39.2	39.0	53.2	11.6	12.0	7.4	9.2	4.0	88.4	117.6
3	DHANDORE	12.2	31.8	18.8	9.8	11.8	26.8	22.4	16.2	6.4	7.2	32.8	3.4	8.6	31.8	47.8
4	NANIPALSAN	15.4	25.4	21.6	8.0	25.8	23.6	29.8	7.4	17.8	17.0	21.0	6.8	4.8	26.2	47.8
5	OZERKHEDA	35.8	13.6	35.0	10.7	9.0	15.4	18.4	23.2	17.2	37.6	15.4	1.8	8.0	46.2	134.0
6	MADHUBAN DAM	12.6	29.8	23.4	2.2	49.4	16.2	21.4	5.4	50.6	31.6	4.2	6.2	7.8	37.6	50.0
7	SILVASSA	4.2	30.0	4.6	5.2	20.2	24.0	22.4	18.2	47.2	20.6	4.6	0.0	2.8	34.6	62.0
8	VAPI	10.0	20.4	3.4	4.9	13.0	9.2	15.4	4.0	20.8	5.8	3.4	0.6	10.6	20.0	58.0
9	SOLACHAR	6.6	35.6	16.6	2.0	50.8	17.6	20.0	11.4	12.6	39.2	8.4	3.6	3.0	36.4	42.8
10	DAMAN	56.0	72.2	0.0	9.0	2.2	40.0	70.4	6.8	12.0	12.8	15.0	6.4	6.2	20.8	52.2

Sl No	Name of the Station	2nd SPELL																			
		24/07	25/07	26/07	27/07	28/07	29/07	30/07	31/07	01/08	02/08	03/08	04/08	05/08	06/08	07/08	08/08	09/08	10/08	11/08	12/08
1	HARSUL	16	8	6.2	1.2	4.6	6.6	17.2	112.6	136.2	4.2	11.4	3.8	11.0	9.6	12.2	6.8	39.8	31.2	22.0	20.0
2	MOKHEDA	33.4	29	5.6	4.0	8.6	17.4	49.4	51.0	31.6	13.8	17.2	14.4	22.0	14.0	15.6	10.2	29.6	12.2	35.6	21.8
3	DHANDORE	73.2	24.4	6.6	6.0	21.2	41.2	39.4	89.9	76.8	17.0	16.8	9.6	4.4	20.0	1.8	7.2	26.8	89.2	43.4	37.6
4	NANIPALSAN	54.8	13.4	4.0	10.0	7.0	27.8	45.0	78.4	62.2	5.0	11.2	9.2	6.6	18.2	7.8	12.2	19.0	30.4	29.6	21.2
5	OZERKHEDA	25.6	22	9.2	2.2	4.6	9.8	27.4	137.6	78.8	10.2	10.6	16.2	4.6	9.6	9.2	10.8	48.8	23.2	34.2	38.2
6	MADHUBAN DAM	9.6	8.4	1.0	4.4	3.8	10.8	39.0	72.0	31.4	5.4	8.2	9.8	2.4	8.0	7.0	4.0	24.0	35.8	38.0	11.4
7	SILVASSA	5.4	30.8	1.2	3.2	4.6	19.4	19.0	59.0	48.6	3.4	10.4	4.4	6.6	6.0	2.6	3.8	12.4	26.2	38.2	8.4
8	VAPI	1.2	12.4	0.0	0.0	1.8	16.2	4.8	46.6	36.0	0.4	0.0	5.6	2.0	12.6	1.8	0.0	15.0	28.6	44.6	2.0
9	SOLACHAR	7.6	6.8	5.4	0.0	4.4	11.2	37.4	79.6	29.6	2.8	1.6	7.4	7.2	8.0	8.8	2.4	27.0	21.4	44.8	14.8
10	DAMAN	1	0.8	0.0	0.0	3.6	2.8	4.0	22.0	14.0	2.8	2.6	1.8	1.4	7.8	2.0	2.4	5.0	28.8	8.8	2.4

Statement No – 5 Continued

Sl No	Name of the Station	3rd SPELL									
		28/08	29/08	30/08	31/08	01/09	02/09	03/09	04/09	05/09	06/09
1	HARSUL	46.0	6.6	0.0	63.6	3.2	0.0	4.8	8.4	43.2	66.6
2	MOKHEDA	30.6	10.2	29.0	58.8	12.6	10.6	12.2	24.4	38.8	54.8
3	DHANDORE	96.4	14.8	0.2	54.6	39.8	0.0	1.0	7.6	15.4	40.8
4	NANIPALSAN	93.6	12.0	0.2	36.4	0.8	0.0	5.0	10.4	29.6	33.8
5	OZERKHEDA	75.8	13.2	0.0	16.2	3.2	0.0	12.6	15.0	42.4	53.0
6	MADHUBAN DAM	91.0	68.6	0.0	8.0	2.2	1.8	71.2	175.6	27.4	44.2
7	SILVASSA	66.0	12.6	5.0	7.4	1.2	3.4	82.6	248.0	27.0	35.8
8	VAPI	34.2	15.0	4.4	9.0	2.4	0.0	3.6	244.6	19.2	58.0
9	SOLACHAR	60.0	74.8	4.0	11.6	2.0	2.6	80.2	300.2	39.0	72.6
10	DAMAN	8.0	5.6	6.6	50.0	5.2	1.6	1.3	267.8	26.8	24.3

Statement no 6

Heavy rainfall warnings received from IMD during floods spell

Tapi Basin

Sl No	H.R.W. Received from	Date of receipt of Email	Text of Email
From 06-07-2012 to 10-07-2012			
1	Weather Ahmedabad	06-07-12	Heavy rain would occur at one or two places over M.P. and south Gujarat region during next 48 hrs.
2	Weather Ahmedabad	07-07-12	Heavy rain would occur at one or two places over M.P. and south Chhatisgadh during next 48 hrs.
3	Weather Ahmedabad	08-07-12	Heavy rain would occur at one or two places over M.P. and south Chhatisgadh during next 48 hrs.
4	Weather Ahmedabad	09-07-12	Heavy rain would occur at one or two places over M.P. and south Chhatisgadh during next 48 hrs.
5	Weather Ahmedabad	10-07-12	Heavy rain would occur at one or two places over M.P. and south Gujarat region during next 48 hrs.
From 22-07-2012 to 01-08-2012			
6	Weather Ahmedabad	22-07-12	Heavy rain would occur at isolated places over Chhatisgadh during next 24 hrs and east M.P,Maharashtra and south Gujarat region during next 48 hrs
7	Weather Ahmedabad	23-07-12	Heavy rain would occur at isolated places over east M.P and south Gujarat region during next 48 hrs.
8	Weather Ahmedabad	24-07-12	Nil
9	Weather Ahmedabad	25-07-12	Heavy to very heavy rain would occur over M.P. during next 48 hrs.
10	Weather Ahmedabad	26-07-12	Heavy rain would occur over M.P. during next 48 hrs.
11	Weather Ahmedabad	27-07-12	Heavy rain would occur over M.P. during next 48 hrs.
12	Weather Ahmedabad	28-07-12	Heavy rainfall would occur at one or two places over Vidarbha, east Rajasthan and Madhya Pradesh during next 48 hours.
13	Weather Ahmedabad	29-07-12	Heavy rainfall would occur at one or two places over, east Rajasthan and Madhya Pradesh during next 48 hours.
14	Weather Ahmedabad	30-07-12	Nil
15	Weather Mumbai	30-07-12	Heavy rainfall would occur at isolated places in the districts of South Madhya Maharashtra until the morning of 2ND August 2012.
16	Weather Ahmedabad	31-07-12	Heavy rainfall would occur at one or two places over Madhya Pradesh during next 48 hours

17	Weather Ahmedabad	01-08-12	NIL
From 10-08-2012 to 14-08-2012			
18	Weather Ahmedabad	10-08-12	Heavy rainfall would occur at one or two places over Madhya Pradesh during next 48 hours.
19	Weather Ahmedabad	11-08-12	Heavy rainfall would occur at one or two places over Chhatisgadh and Madhya Pradesh during next 48 hours.
20	Weather Ahmedabad	12-08-12	Heavy to very heavy rainfall would occur at one or two places over South Gujarat region and Madhya Pradesh during next 48 hours.
21	Weather Ahmedabad	13-08-12	Heavy to very heavy rainfall would occur at one or two places over South Gujarat region and Madhya Pradesh during next 48 hours.
22	Weather Ahmedabad	14-08-12	NIL
From 27-08-2012 to 12-09-2012			
23	Weather Ahmedabad	27-08-12	Heavy rainfall would also occur at one or two places over Chhattisgarh, Madhya Pradesh, Vidarbha during next 24 hours
24	Weather Ahmedabad	28-08-12	Heavy to very heavy rainfall would occur at isolated places over South Gujarat rigion & West M P during next 48 hours.
25	Weather Ahmedabad	29-08-12	Heavy to very heavy rainfall would occur at isolated places over South Gujarat rigion & West M P during next 24 hours.
26	Weather Ahmedabad	30-08-12	Nil
27	Weather Mumbai	30-08-12	Rainfall exceeding 7cm and reaching 12 cm accompanied by thundarsquall would occur at isolated places in all the districts of North Madhya Maharashtra during next 12 hrs.
28	Weather Ahmedabad	31-08-12	Nil
29	Weather Mumbai	31-08-12	Rainfall exceeding 7cm and reaching 12 cm would occur at isolated places would occur in the districts of Satara, Sangli, Solapur and Kolhapur during next 36 hrs.
30	Weather Ahmedabad	01-09-12	Nil
31	Weather Ahmedabad	02-09-12	Nil
32	Weather Ahmedabad	03-09-12	Heavy rainfall would occur at one or two places over South Gujarat Region & Daman during next 48 hours.
33	Weather Ahmedabad	04-09-12	Heavy rainfall would occur at one or two places over South Gujarat Region,Chhatishgarh,Vidarbha & Madhya Maharastra during next 48 hours.
34	Weather Ahmedabad	05-09-12	Heavy rainfall would occur at one or two places over Chhattisgarh, East Madhya Pradesh during next 24 hours and over west Madhya Pradesh, Vidarbha, during next 48 hours. Heavy to very heavy rainfall would occur at one or two places over South Gujarat, Madhya Maharashtra during next 48 hours.

35	Weather Ahmedabad	06-09-12	Heavy to very heavy rainfall would occur at one or two places over South Gujarat, Madhya Maharashtra, west Madhya Pradesh during next 48 hours.
36	Weather Mumbai	06-09-12	Rainfall exceeding 7cm and reaching 12 cm would occur at isolated places in the districts of North Madhya Maharashtra during next 24 hrs.
37	Weather Ahmedabad	07-09-12	Heavy to very heavy rainfall would occur at one or two places over South Gujarat during next 48 hours. Heavy rainfall would occur at one or two places over Madhya Maharashtra, west Madhya Pradesh during next 48 hours.
38	Weather Ahmedabad	08-09-12	Nil
39	Weather Ahmedabad	09-09-12	Nil
40	Weather Ahmedabad	10-09-12	Heavy rainfall would occur at one or two places over Chhattisgarh during next 24 hours and over west Madhya Pradesh, Marathwada and Madhya Maharashtra on 11th.
41	Weather Ahmedabad	11-09-12	Heavy rainfall would occur at one or two places over Vidarbh a,Chhattisgarh, East Madhya Pradesh during next 48 hours.
42	Weather Ahmedabad	12-09-12	Nil

Damanganga Basin

Sl No	H.R.W. Received from	Date of receipt of Email / Fax	Text of Email / Fax.
From 05-07-2012 to 19-07-2012			
1	Weather Ahmedabad	05-07-12	Heavy rain would occur at one or two places over east M.P. and south Gujarat region during next 48 hrs.
2	Weather Ahmedabad	06-07-12	Heavy rain would occur at one or two places over M.P. and south Gujarat region during next 48 hrs.
3	Weather Ahmedabad	07-07-12	Heavy rain would occur at one or two places over M.P. and south Chhatisgadh during next 48 hrs.
4	Weather Ahmedabad	08-07-12	Heavy rain would occur at one or two places over M.P. and south Chhatisgadh during next 48 hrs.
5	Weather Ahmedabad	09-07-12	Heavy rain would occur at one or two places over M.P. and south Chhatisgadh during next 48 hrs.
6	Weather Ahmedabad	10-07-12	Heavy rain would occur at one or two places over M.P. and south Gujarat region during next 48 hrs.
7	Weather Ahmedabad	11-07-12	Nil
8	Weather Ahmedabad	12-07-12	Nil
9	Weather Ahmedabad	13-07-12	Nil
10	Weather Ahmedabad	14-07-12	Nil
11	Weather Ahmedabad	15-07-12	Nil
12	Weather Ahmedabad	16-07-12	Nil
13	Weather Ahmedabad	17-07-12	Nil
14	Weather Ahmedabad	18-07-12	Nil
15	Weather Ahmedabad	19-07-12	Nil
16	Weather Ahmedabad	20-07-12	Nil
From 24-07-2012 to 12-08-2012			
17	Weather Ahmedabad	24-07-12	Nil

18	Weather Ahmedabad	25-07-12	Heavy to very heavy rain would occur over M.P. during next 48 hrs.
19	Weather Ahmedabad	26-07-12	Heavy rain would occur over M.P. during next 48 hrs.
20	Weather Ahmedabad	27-07-12	Heavy rain would occur over M.P. during next 48 hrs.
21	Weather Ahmedabad	28-07-12	Heavy rainfall would occur at one or two places over Vidarbha, east Rajasthan and Madhya Pradesh during next 48 hours.
22	Weather Ahmedabad	29-07-12	Heavy rainfall would occur at one or two places over , east Rajasthan and Madhya Pradesh during next 48 hours.
23	Weather Ahmedabad	30-07-12	Nil
24	Weather Mumbai	30-07-12	Heavy rainfall would occur at isolated places in the districts of South Madhya Maharashtra until the morning of 2ND August 2012.
25	Weather Ahmedabad	31-07-12	Heavy rainfall would occur at one or two places over Madhya Pradesh during next 48 hours
26	Weather Ahmedabad	01-08-12	NIL
27	Weather Ahmedabad	02-08-12	NIL
28	Weather Ahmedabad	03-08-12	NIL
29	Weather Ahmedabad	04-08-12	NIL
30	Weather Ahmedabad	05-08-12	NIL
31	Weather Ahmedabad	06-08-12	NIL
32	Weather Ahmedabad	07-08-12	Heavy to very heavy rainfall would occur at a few places over west Madhya Pradesh during next 24 hours.
33	Weather Ahmedabad	08-08-12	Heavy rainfall would occur at one or two places over west Madhya Pradesh during next 24 hours
34	Weather Ahmedabad	09-08-12	Heavy rainfall would occur at one or two places over Chhatisgadh and Madhya Pradesh during next 48 hours
35	Weather Ahmedabad	10-08-12	Heavy rainfall would occur at one or two places over Madhya Pradesh during next 48 hours.
36	Weather Ahmedabad	11-08-12	Heavy rainfall would occur at one or two places over Chhatisgadh and Madhya Pradesh during next 48 hours.

37	Weather Ahmedabad	12-08-12	Heavy to very heavy rainfall would occur at one or two places over South Gujarat region and Madhya Pradesh during next 48 hours.
From 28-08-2012 to 06-09-2012			
38	Weather Ahmedabad	28-08-12	Heavy to very heavy rainfall would occur at isolated places over South Gujarat rigion & West M P during next 48 hours.
39	Weather Ahmedabad	29-08-12	Heavy to very heavy rainfall would occur at isolated places over South Gujarat rigion & West M P during next 24 hours.
40	Weather Ahmedabad	30-08-12	Nil
41	Weather Mumbai	30-08-12	Rainfall exceeding 7cm and reaching 12 cm accompanied by thundarsquall would occur at isolated places in all the districts of North Madhya Maharashtra during next 12 hrs.
42	Weather Ahmedabad	31-08-12	Nil
43	Weather Mumbai	31-08-12	Rainfall exceeding 7cm and reaching 12 cm would occur at isolated places would occur in the districts of Satara, Sangli, Solapur and Kolhapur during next 36 hrs.
44	Weather Ahmedabad	01-09-12	Nil
45	Weather Ahmedabad	02-09-12	Nil
46	Weather Ahmedabad	03-09-12	Heavy rainfall would occur at one or two places over South Gujarat Region & Daman during next 48 hours.
47	Weather Ahmedabad	04-09-12	Heavy rainfall would occur at one or two places over South Gujarat Region, Chhatishgarh, Vidarbha & Madhya Maharastra during next 48 hours.
48	Weather Ahmedabad	05-09-12	Heavy rainfall would occur at one or two places over Chhattisgarh, East Madhya Pradesh during next 24 hours and over west Madhya Pradesh, Vidarbha, during next 48 hours. Heavy to very heavy rainfall would occur at one or two places over South Gujarat, Madhya Maharashtra during next 48 hours.
49	Weather Ahmedabad	06-09-12	Heavy to very heavy rainfall would occur at one or two places over South Gujarat, Madhya Maharashtra, west Madhya Pradesh during next 48 hours.
50	Weather Mumbai	06-09-12	Rainfall exceeding 7cm and reaching 12 cm would occur at isolated places in the districts of North Madhya Maharashtra during next 24 hrs.

Lower Narmada Basin

Sl No	H.R.W. Received from	Date of receipt of Email / Fax	Text of Email / Fax.
From 07-08-2012 to 14-08-2012			
1	Weather Ahmedabad	07-08-12	Heavy to very heavy rainfall would occur at a few places over west Madhya Pradesh during next 24 hours.
2	Weather Ahmedabad	08-08-12	Heavy rainfall would occur at one or two places over west Madhya Pradesh during next 24 hours
3	Weather Ahmedabad	09-08-12	Heavy rainfall would occur at one or two places over Chhatisgadh and Madhya Pradesh during next 48 hours
4	Weather Ahmedabad	10-08-12	Heavy rainfall would occur at one or two places over Madhya Pradesh during next 48 hours.
5	Weather Ahmedabad	11-08-12	Heavy rainfall would occur at one or two places over Chhatisgadh and Madhya Pradesh during next 48 hours.
6	Weather Ahmedabad	12-08-12	Heavy to very heavy rainfall would occur at one or two places over South Gujarat region and Madhya Pradesh during next 48 hours.
7	Weather Ahmedabad	13-08-12	Heavy to very heavy rainfall would occur at one or two places over South Gujarat region and Madhya Pradesh during next 48 hours.
8	Weather Ahmedabad	14-08-12	NIL
From 04-09-2012 to 12-09-2012			
9	Weather Ahmedabad	04-09-12	Heavy rainfall would occur at one or two places over South Gujarat Region,Chhatishgarh,Vidarbha & Madhya Maharastra during next 48 hours.
10	Weather Ahmedabad	05-09-12	Heavy rainfall would occur at one or two places over Chhattisgarh, East Madhya Pradesh during next 24 hours and over west Madhya Pradesh, Vidarbha, during next 48 hours. Heavy to very heavy rainfall would occur at one or two places over South Gujarat, Madhya Maharashtra during next 48 hours.
11	Weather Ahmedabad	06-09-12	Heavy to very heavy rainfall would occur at one or two places over South Gujarat, Madhya Maharashtra, west Madhya Pradesh during next 48 hours.

12	Weather Mumbai	06-09-12	Rainfall exceeding 7cm and reaching 12 cm would occur at isolated places in the districts of North Madhya Maharashtra during next 24 hrs.
13	Weather Ahmedabad	07-09-12	Heavy to very heavy rainfall would occur at one or two places over South Gujarat during next 48 hours. Heavy rainfall would occur at one or two places over Madhya Maharashtra, west Madhya Pradesh during next 48 hours.
14	Weather Ahmedabad	08-09-12	Nil
15	Weather Ahmedabad	09-09-12	Nil
16	Weather Ahmedabad	10-09-12	Heavy rainfall would occur at one or two places over Chhattisgarh during next 24 hours and over west Madhya Pradesh, Marathwada and Madhya Maharashtra on 11th.
17	Weather Ahmedabad	11-09-12	Heavy rainfall would occur at one or two places over Vidarbha,Chhattisgarh, East Madhya Pradesh during next 48 hours.
18	Weather Ahmedabad	12-09-12	Nil

Statement no 7

SYNOPTIC SITUATION

Received from IMD Ahmadabad during monsoon 2011

Tapi Basin

[From 06-07-2012To 09-07-2012]	
06-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists. The upper air cyclonic circulation over northeast Arabian sea off Maharashtra and Gujarat coasts persists between 1.5 to 3.1 Km above mean sea level. The upper air cyclonic circulation over east Madhya Pradesh and adjoining areas persists and extends upto 4.5 km above mean sea level
07-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
08-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
09-07-12	The cyclonic circulation over east Madhya Pradesh and adjoining areas persists and extends upto mid tropospheric levels. The upper air cyclonic circulation over northwest Bay of Bengal and adjoining north coastal Orissa and Gangetic West Bengal between 3.1 to 5.8 Km above mean sea level persists. The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
10-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists. The trough at mean sea level from northwest Rajasthan to eastcentral Bay of Bengal across north Madhya Pradesh, Chhattisgarh and Orissa persists.The low pressure area over northwest Madhya Pradesh and adjoining Uttar Pradesh persists and associated cyclonic circulation extends upto midtropospheric level.
[From 22-07-2012 to 01-08-2012	
22-07-12	The off shore trough at mean sea level from Konkan coast to Karnataka coast persists. The low pressure area over north Chhattisgarh and neighbourhood persists. The associated cyclonic circulation extends upto midtropospheric levels, tilting southwestwards with height.
23-07-12	The off shore trough at mean sea level from Konkan coast Kerala coast persists. The low pressure area now lies over northeast Madhya Pradesh and neighbourhood. Associated cycloniccirculation extends upto mid tropospheriClevels, tilting southwestwards with height.
24-07-12	The off shore trough at mean sea level from South Gujarat coast to Kerala coast persists.
25-07-12	The off shore trough at mean sea level from South Gujarat coast to Kerala coast persists.
26-07-12	The off shore trough at mean sea level from South Gujarat coast to Kerala coast persists.

27-07-12	The off shore trough at mean sea level from South Gujarat coast to Kerala coast persists. The upper air cyclonic circulation over northwest Bay of Bengal and adjoining coastal areas of Orissa & West Bengal persists and extends upto mid tropospheric levels, tilting southwards with height.
28-07-12	The feeble off-shore trough at mean sea level off Goa–Karnataka coasts persists. ·The cyclonic circulation extending upto mid tropospheric levels over Jharkhand and adjoining areas of Gangetic West Bengal and north Orissa persists, tilting southwestwards with height. ·The cyclonic circulation over northwest Madhya Pradesh and adjoining south Uttar Pradesh now lies over northeast Rajasthan and neighbourhood and extends upto 2.1 kms a.s.l.
29-07-12	The feeble off shore trough at mean sea level from Konkan coast to south Karnataka coast persists. The upper air cyclonic circulation over Jharkhand and adjoining Gangetic West Bengal & north Orissa persists and extends upto mid tropospheric levels, tilting southwestwards with height.
30-07-12	The feeble off shore trough at mean sea level from Konkan coast to south Karnataka coast persists. The upper air cyclonic circulation over Jharkhand and adjoining Gangetic West Bengal & north Orissa persists and extends upto mid tropospheric levels, tilting southwestwards with height.
31-07-12	The feeble off shore trough at mean sea level from Konkan coast to south Karnataka coast persists. The upper air cyclonic circulation over Jharkhand and adjoining Gangetic West Bengal & north Orissa persists and extends upto mid tropospheric levels, tilting southwestwards with height.
01-08-12	The off shore trough at mean sea level from Gujarat coast to Karala coast persists. The upper air cyclonic circulation over Jharkhand and adjoining Gangetic West Bengal & north Orissa persists and extends upto mid tropospheric levels, tilting southwestwards with height.
[From 10-08-2012 to 14-08-2012]	
10-08-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.The low pressure area over northwest Madhya Pradesh and neighbourhood persists. The associated upper air cyclonic circulation extends upto 3.1 km above mean level
11-08-12	The off-shore trough at mean sea level from south Maharashtra coast to Kerala coast persists. ·The cyclonic circulation over northwest Bay of Bengal and adjoining coastal areas of north Orissa and Gangetic West Bengal now lies over north Chattisgarh and neighbourhood and extends upto 7.6 kms a.s.l.
12-08-12	The upper air cyclonic circulation over northwest Madhya Pradesh and neighbourhood persists and extends upto 1.5 km above mean level..The off shore trough at mean sea level from south Maharashtra coast to Kerala coast persists.
13-08-12	The low pressure area over northwest Madhya Pradesh and neighbourhood now lies over northwest Madhya Pradesh and adjoining east Rajasthan.Associated cyclonic circulation extends upto mid tropospheric levels. The off shore trough at mean sea level from south Maharashtra coast to Kerala coast persists.

14-08-12	The low pressure area over northwest Madhya Pradesh and neighbourhood now lies over northwest Madhya Pradesh and adjoining east Rajasthan.Associated cyclonic circulation extends upto mid tropospheric levels. The off shore trough at mean sea level from south Maharashtra coast to Kerala coast persists.
[From 27-08-2012 to 12-09-2012]	
27-08-12	The low pressure area over north Chhattisgarh and adjoining Jharkhand and Odisha persists. The associated upper air cyclonic circulation extends upto midtropospheric levels, tilting southwestwards with height. The feeble off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
28-08-12	The low pressure area over north Chhattisgarh and adjoining Jharkhand & Odisha persists and associated upper air cyclonic circulation extends upto midtropospheric levels, tilting outh west wards with height. The feeble off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
29-08-12	The upper air cyclonic circulation over northeast Madhya Pradesh and neighbourhood now lies over northwest Madhya Pradesh and adjoining east Rajasthan and extends upto midtropospheric levels tilting southwestwards with height. The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
30-08-12	The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
31-08-12	The low pressure area over west central and adjoining northwest Bay of Bengal off south Odisha and north Andhra Pradesh coasts persists. The Associated upper air cyclonic circulation apparently extends upto midtropospheric levels tilting southwestwards with height. The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
01-09-12	The low pressure area over over west Madhya Pradesh and neighbour hood, now lie overwest Madhya Pradesh and adjoining east Rajasthan and south Uttar Pradesh. The associated upper air cyclonic circulation extends upto mid- tropospheric levels, tilting south westwards with height. The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
02-09-12	The upper air cyclonic circulation over Gujarat and neighbourhood persist s and extends upto 2.1 km above mean sea level.The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
03-09-12	The upper air cyclonic circulation over Gujarat and neighbourhood persis ts and extends upto 2.1 km above mean sea level.The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
04-09-12	The upper air cyclonic circulation over Gujarat and neighbourhood persist s and extends upto 2.1 km above mean sea level.The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
05-09-12	The well marked low pressure area over over central parts of Chhattisgar h and adjoining Odisha now lies over east Madhya Pradesh and neighbour hood The associated upper air cyclonic circulation extends uptomid tropospheric levels, tilting southwest wards with height.The off shore trough at mean sea level runs from Gujarat coast to Kerala coast. The upper air cyclonic circulation over Gujarat region & neighbourhood persists and extends upto mid- tropospheric levels

06-09-12	The well marked low pressure area over east Madhya Pradesh and adjoin ing Vidarbha now lies over west Madhya Pradesh and neighbourhood. The associated upper air cyclonic circulation extends upto mid-tropospheric levels, tilting southwestwards with height. The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.
07-09-12	The low pressure area over west Madhya Pradesh and east Rajasthan per sists. The associated upper air cyclonic circulation extends upto mid-tropospheric levels, tilting southwestwards with height The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.
08-09-12	The low pressure area over southwest Rajasthan and neighbourhood persists.The associated upper air cyclonic circulation extends upto mid-tropospheric levels, tilting southwestwards with height. The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.
09-09-12	The low pressure area over north Saurashtra & Kutch and neighbourhood . persists. The associated upperair cyclonic circulation extends upto mid-t ropospheric levels, tilting southwestwards with height..The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.
10-09-12	The upper air cyclonic circulation over northwest Bay of Bengal & adjoining coastal areas of Odisha andWest Bengal now lies over Odisha and neighbourhood and extends upto 5.8 km above mean sea level, tilting southwestwards with height. The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.
11-09-12	The low pressure area over central parts of Chhattisgarh and neighbourh ood now lies over East Madhya Pradesh and adjoining Chhattisgarh. The associated upper air cyclonic circulation extends upto mid-tropospheric levels, tilting southwestwards with height. The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.
12-09-12	The low pressure area over central parts of north Madhya Pradesh and n eighbourhood has become lessmarked. However, the upper air cyclonic ci rculation lies over west Madhya Pradesh and neighbourhood in lower levels. The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.

Damanganga Basin

[From 05-07-2012 To 19-07-2012]	
05-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists. The upper air cyclonic circulation over northeast Arabian sea off Maharashtra and Gujarat coasts persists between 1.5 to 3.1 Km above mean sea level. The trough at mean sea level from northwest Rajasthan to northeast Bay of Bengal across Madhya Pradesh and Orissa persists.
06-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists. The upper air cyclonic circulation over northeast Arabian sea off Maharashtra and Gujarat coasts persists between 1.5 to 3.1 Km above mean sea level. The upper air cyclonic circulation over east Madhya Pradesh and adjoining areas persists and extends upto 4.5 km above mean sea level
07-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
08-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
09-07-12	The cyclonic circulation over east Madhya Pradesh and adjoining areas persists and extends upto mid tropospheric levels. The upper air cyclonic circulation over northwest Bay of Bengal and adjoining north coastal Orissa and Gangetic West Bengal between 3.1 to 5.8 Km above mean sea level persists. The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
10-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists. The trough at mean sea level from northwest Rajasthan to eastcentral Bay of Bengal across north Madhya Pradesh, Chhattisgarh and Orissa persists. The low pressure area over northwest Madhya Pradesh and adjoining Uttar Pradesh persists and associated cyclonic circulation extends upto midtropospheric level.
11-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists. The low pressure area over southwest Rajasthan and adjoining north Gujarat region is less marked and associated cyclonic circulation extends upto 4.5 Kms. above mean sea level.
12-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
13-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
14-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
15-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
16-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.

17-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
18-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
19-07-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.
[From 24-07-2012to 12-08-2012]	
24-07-12	The off shore trough at mean sea level from South Gujarat coast to Kerala coast persists.
25-07-12	The off shore trough at mean sea level from South Gujarat coast to Kerala coast persists.
26-07-12	The off shore trough at mean sea level from South Gujarat coast to Kerala coast persists.
27-07-12	The off shore trough at mean sea level from South Gujarat coast to Kerala coast persists. The upper air cyclonic circulation over northwest Bay of Bengal and adjoining coastal areas of Orissa & West Bengal persists and extends upto mid tropospheric levels, tilting southwards with height.
28-07-12	The feeble off-shore trough at mean sea level off Goa–Karnataka coasts persists. ▪The cyclonic circulation extending upto mid tropospheric levels over Jharkhand and adjoining areas of Gangetic West Bengal and north Orissa persists, tilting southwestwards with height. ▪The cyclonic circulation over northwest Madhya Pradesh and adjoining south Uttar Pradesh now lies over northeast Rajasthan and neighbourhood and extends upto 2.1 kms a.s.l.
29-07-12	The feeble off shore trough at mean sea level from Konkan coast to south Karnataka coast persists. The upper air cyclonic circulation over Jharkhand and adjoining Gangetic West Bengal & north Orissa persists and extends upto mid tropospheric levels, tilting southwestwards with height.
30-07-12	The feeble off shore trough at mean sea level from Konkan coast to south Karnataka coast persists. The upper air cyclonic circulation over Jharkhand and adjoining Gangetic West Bengal & north Orissa persists and extends upto mid tropospheric levels, tilting southwestwards with height.
31-07-12	The feeble off shore trough at mean sea level from Konkan coast to south Karnataka coast persists. The upper air cyclonic circulation over Jharkhand and adjoining Gangetic West Bengal & north Orissa persists and extends upto mid tropospheric levels, tilting southwestwards with height.
01-08-12	The off shore trough at mean sea level from Gujarat coast to Karala coast persists. The upper air cyclonic circulation over Jharkhand and adjoining Gangetic West Bengal & north Orissa persists and extends upto mid tropospheric levels, tilting southwestwards with height.
02-08-12	The off shore trough at mean sea level from Gujarat coast to Karala coast persists. The upper air cyclonic circulation over Jharkhand and adjoining Gangetic West Bengal & north Orissa persists and extends upto mid tropospheric levels, tilting southwestwards with height.

03-08-12	The off shore trough at mean sea level from Gujarat coast to Karala coast persists. The upper air cyclonic circulation over Jharkhand and adjoining Gangetic West Bengal & north Orissa persists and extends upto mid tropospheric levels, tilting southwestwards with height.
04-08-12	The off shore trough at mean sea level from Gujarat coast to Karala coast persists. The low pressure area over northwest Bay of Bengal and adjoining coastal areas of north Orissa and Gangetic West Bengal persists. Associated upper air cyclonic circulation extends upto mid tropospheric levels, tilting southwestwards with height.
05-08-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists. The low pressure area over northwest Bay of Bengal and adjoining coastal areas of north Orissa and West Bengal persists. The associated cyclonic circulation extends upto midtropospheric levels, tilting southwestwards with height.
06-08-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists. The low pressure area over northwest Bay of Bengal and adjoining coastal areas of north Orissa and Gangetic West Bengal moved inland yesterday evening, the 5th August 2012 and now lies over north Chattisgarh and neighbourhood. Associated upper air cyclonic circulation extends upto mid tropospheric levels, tilting southwestwards with height.
07-08-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists. The low pressure area over north Chattisgarh and neighbourhood now lies over north Madhya Pradesh and neighbourhood. Associated upper air cyclonic circulation extends upto 3.1 Kms a.s.l.
08-08-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.The low pressure area over north Madhya Pradesh and adjoining Uttar Pradesh persists.The associated upper air cyclonic circulation extends upto 3.1 km above mean level.
09-08-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.The low pressure area over north Madhya Pradesh and adjoining Uttar Pradesh persists.The associated upper air cyclonic circulation extends upto 3.1 km above mean level.
10-08-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.The low pressure area over northwest Madhya Pradesh and neighbourhood persists. The associated upper air cyclonic circulation extends upto 3.1 km above mean level
11-08-12	The off-shore trough at mean sea level from south Maharashtra coast to Kerala coast persists. ·The cyclonic circulation over northwest Bay of Bengal and adjoining coastal areas of north Orissa and Gangetic West Bengal now lies over north Chattisgarh and neighbourhood and extends upto 7.6 kms a.s.l.
12-08-12	The upper air cyclonic circulation over northwest Madhya Pradesh and neighbourhood persists and extends upto 1.5 km above mean level..The off shore trough at mean sea level from south Maharashtra coast to Kerala coast persists.
[From 28-08-2012to 06-09-2012]	

28-08-12	The low pressure area over north Chhattisgarh and adjoining Jharkhand & Odisha persists and associated upper air cyclonic circulation extends upto midtropospheric levels, tilting southwestwards with height. The feeble off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
29-08-12	The upper air cyclonic circulation over northeast Madhya Pradesh and neighbourhood now lies over northwest Madhya Pradesh and adjoining east Rajasthan and extends upto midtropospheric levels tilting southwestwards with height. The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
30-08-12	The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
31-08-12	The low pressure area over west central and adjoining northwest Bay of Bengal off south Odisha and north Andhra Pradesh coasts persists. The Associated upper air cyclonic circulation apparently extends upto midtropospheric levels tilting southwestwards with height. The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
01-09-12	The low pressure area over over west Madhya Pradesh and neighbourh ood. now lies over west Madhya Pradesh and adjoining east Rajasthan and south Uttar Pradesh. The associated upper air cyclonic circulation extends upto mid - tropospheric levels tilting southwestwards with height. The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
02-09-12	The upper air cyclonic circulation over Gujarat and neighbourhood persi sts and extends upto 2.1 km above mean sea level.The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
03-09-12	The upper air cyclonic circulation over Gujarat and neighbourhood pers ists and extends upto 2.1 km above mean sea level.The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
04-09-12	The upper air cyclonic circulation over Gujarat and neighbourhood persi sts and extends upto 2.1 km above mean sea level.The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
05-09-12	The well marked low pressure area over over central parts of Chhattisg arh and adjoining Odisha now liesover east Madhya Pradesh and neigh bourhood The associated upper air cyclonic circulation extends uptomid tropospheric levels, tilting southwest wards with height.The off shore trough at mean sea level runs from Gujarat coast to Kerala coast. The upper air cyclonic circulation over Gujarat region & neighbourhood persists and extends upto mid-tropospheric levels
06-09-12	The well marked low pressure area over east Madhya Pradesh and adjo ining Vidarbha now lies over west Madhya Pradesh and neighbourhood. The associated upper air cyclonic circulation extends upto mid-tropospheric levels, tilting southwestwards with height. The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.

Lower Narmada Basin

[From 07-08-2012To 14-08-2012]	
07-08-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists. The low pressure area over north Chattisgarh and neighbourhood now lies over north Madhya Pradesh and neighbourhood. Associated upper air cyclonic circulation extends upto 3.1 Kms a.s.l.
08-08-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.The low pressure area over north Madhya Pradesh and adjoining Uttar Pradesh persists.The associated upper air cyclonic circulation extends upto 3.1 km above mean level.
09-08-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.The low pressure area over north Madhya Pradesh and adjoining Uttar Pradesh persists.The associated upper air cyclonic circulation extends upto 3.1 km above mean level.
10-08-12	The off shore trough at mean sea level from Gujarat coast to Kerala coast persists.The low pressure area over northwest Madhya Pradesh and neighbourhood persists. The associated upper air cyclonic circulation extends upto 3.1 km above mean level
11-08-12	The off-shore trough at mean sea level from south Maharashtra coast to Kerala coast persists. ·The cyclonic circulation over northwest Bay of Bengal and adjoining coastal areas of north Orissa and Gangetic West Bengal now lies over north Chattisgarh and neighbourhood and extends upto 7.6 kms a.s.l.
12-08-12	The upper air cyclonic circulation over northwest Madhya Pradesh and neighbourhood persists and extends upto 1.5 km above mean level..The off shore trough at mean sea level from south Maharashtra coast to Kerala coast persists.
13-08-12	The low pressure area over northwest Madhya Pradesh and neighbourhood now lies over northwest Madhya Pradesh and adjoining east Rajasthan.Associated cyclonic circulation extends upto mid tropospheric levels. The off shore trough at mean sea level from south Maharashtra coast to Kerala coast persists.
14-08-12	The low pressure area over northwest Madhya Pradesh and neighbourhood now lies over northwest Madhya Pradesh and adjoining east Rajasthan.Associated cyclonic circulation extends upto mid tropospheric levels. The off shore trough at mean sea level from south Maharashtra coast to Kerala coast persists.
[From 04-09-2012To 12-09-2012]	
04-09-12	The upper air cyclonic circulation over Gujarat and neighbourhood persists and extends up to 2.1 km above mean sea level.The off shore trough at mean sea level runs from Maharashtra coast to Kerala coast.
05-09-12	The well marked low pressure area over over central parts of Chhattisgarh and adjoining O disha now lies over east Madhya Pradesh and neighbourhood The associated upper air cyclonic circulation extends uptomid tropospheric levels, tilting southwest wards with height.The off shore trough at mean sea level runs from Gujarat coast to Kerala coast. The upper air cyclonic circulation over Gujarat region & neighbourhood persists and extends upto mid- tropospheric levels

06-09-13	The well marked low pressure area over east Madhya Pradesh and adjoining Vidarbha now lies over west Madhya Pradesh and neighbourhood. The associated upper air cyclonic circulation extends upto mid-tropospheric levels, tilting southwestwards with height. The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.
07-09-13	The low pressure area over west Madhya Pradesh and east Rajasthan persis ts. The associated upper air cyclonic circulation extends upto mid-tropospheric levels, tilting southwestwards with height The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.
08-09-13	The low pressure area over southwest Rajasthan and neighbourhood persists.The associated upper air cyclonic circulation extends upto mid-tropospheric levels, tilting southwestwards with height. The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.
09-09-12	The low pressure area over north Saurashtra & Kutch and neighbourhood. p ersists.The associated upperair cyclonic circulation extends upto mid-tropospheric levels, tilting southwestwards with height The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.
10-09-12	The upper air cyclonic circulation over northwest Bay of Bengal & adjoining coastal areas of Odisha and West Bengal now lies over Odisha and neighbour hood and extends upto 5.8 km above mean sea level, tilting southwestwards with height. The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.
11-09-12	The low pressure area over central parts of Chhattisgarh and neighbourhoo d now lies over East Madhya Pradesh and adjoining Chhattisgarh. The associated upper air cyclonic circulation extends upto mid - tropospheric levels, tilting southwestwards with height. The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.
12-09-12	The low pressure area over central parts of north Madhya Pradesh and neig hbourhood has become less marked. However, the upper air cyclonic circulation lies over west Madhya Pradesh and neighbourhood in lower levels. The off shore trough at mean sea level runs from Gujarat coast to Kerala coast.

Site wise 10 years monsoon average rainfall (2002-2011) and rainfall received during monsoon 2012.

LOWER NARMADA BASIN FROM HOSHANBAD TO BHARUCH				TAPI BASIN				DAMANGANGA BASIN.			
SL. NO.	*STATION*	*Average R.F. 2002-2011*	*Rainfall recorded in 2012*	SL. NO.	*STATION*	*Average R.F. 2002-2011*	*Rainfall recorded in 2012*	SL. NO	*STATION*	*Average R.F. 2002-2011*	*Rainfall recorded in 2012*
1	GARUDESHWAR	1004.3	728.0	1	TESKA	961.3	1631.5	1	HARSUL	2010.1	1624.8
2	RAJPIPLA	1034.6	710.2	2	CHIKALDARA	1343.4	1955.0	2	MOKHEDA	2580.3	1954.6
3	BODELI	1150.9	926.0	3	GOPALKHEDA	656.6	736.0	3	DHANDORE	2517.1	1766.3
4	BHARUCH	1146.7	654.2	4	LAKHPURI	699.4	714.8	4	NANIPALSAN	2516.2	1680.8
				5	YERLI	656.6	591.3	5	OZERKHEDA	2434.0	1818.2
				6	DEDTALAI	813.6	1083.6	6	MADHUBAN	2613.6	1693.2
				7	BURHANPUR	864.1	920.4	7	SOLACHAR	2515.3	1778.1
				8	HATHNUR	677.1	493.0	8	SILVASSA	2483.3	1615.7
				9	BHUSAWAL	722.4	456.8	9	VAPI	2266.9	1156.5
				10	GIRNA DAM	580.3	463.6	10	DAMAN	2168.1	1371.9
				11	DAHIGAON	695.5	437.2				
				12	SAVKHEDA	707.9	472.4				
				13	MORANE(DHULE)	584.8	429.6				
				14	GIDHADE	600.8	423.3				
				15	SARANGKHEDA	577.8	616.2				
				16	UKAI DAM	1535.3	935.1				
				17	GHALA	1398.9	720.2				
				18	SURAT	1417.0	762.7				
		1084.1	754.6			860.7	769.1			2410.5	1646.0

Statement no 9

Maximum water level and maximum Rainfall in a day 2012

(all sites in Tapi , Lower Narmada and Damanganga river Basin)

Sl. No	Name of Station	Maximum Water Level (m) With Date & Time			Maximum Rain fall (mm) in a day with date	
		Water Level	Time	Date	Rain fall	Date
(A)	**Tapi basin**					
1	Teska	471.000	1100	05-09-12	228.4	07-08-12
2	Chikaldara	---	--	--	128.8	27-08-12
3	Dedtalai	288.300	1600	05-09-12	133.0	06-09-12
4	Burhanpur	238.000	2300	05-09-12	97.0	12-08-12
5	Lakhpuri	269.900	0800	06-09-12	76.0	28-07-12
6	Gopalkheda	250.160	0500	07-09-12	79.8	18-06-12
7	Yerli	224.070	2200	07-09-12	81.8	04-09-12
8	Hathnur Dam	214.000	0700	05-10-12	45.6	22-09-12
9	Bhusawal	181.800	1000	06-09-12	45.8	24-07-12
10	Girna Dam	386.097	0600	30-09-12	63.6	04-09-12
11	Dahigaon	219.550	1800	14-07-12	57.2	31-08-12
12	Savkheda	156.700	1800	06-09-12	46.6	04-07-12
13	Morane (Dhule)	264.500	0600	30-06-12	44.2	04-07-12
14	Gidhade	135.600	2200	06-09-12	77.2	04-07-12
15	Sarangkheda	121.600	0600	07-09-12	131.0	01-09-12
16	Ukai Dam	104.305	1200	25-09-12	90.2	11-08-12
17	Ghala	12.820	2300	07-09-12	121.6	04-09-12
18	Surat	8.650	0200	08-09-12	137.5	04-09-12
19	Ucchal	Rainfall data collected from state government authority			75.0	11-08-12
20	Nizar				65.0	31-08-12
21	Chopdavav				65.0	07-09-12
22	Khetia	6 new rain gauge stations are working under telemetry system And the data received between the monsoon period in trial basis.			40.2	31-08-12
23	Dusane				32.2	01-07-12
24	Nandurbar				69.4	31-08-12
25	Nizampur					
26	Sagbara					
27	Shelgaon					
(B)	**Lower Narmada basin**					
1	Garudeshwar	29.790	0600	09-08-12	80.0	12-08-12
2	Bodeli	74.200	1100	12-09-12	127.0	13-08-12
3	Rajpipala	23.200	0600	07-09-12	127.8	04-09-12
4	Bharuch	9.200	1100	07-09-12	68.0	10-09-12
(C)	**Damanganga basin**					
1	Harsul	--	--	--	136.2	01-08-12
2	Mokheda	--	--	--	117.6	19-07-12
3	Dhandore	--	--	--	96.4	28-08-12
4	Nanipalsan	101.650	1300	31-07-12	154.2	11-09-12
5	Ozerkheda	86.700	1200	11-09-12	137.6	31-07-12
6	Madhuban Dam	80.050	1600	11-10-12	176.0	04-09-12
7	Solachar	31.550	1400	11-09-12	300.2	04-09-12
8	Silvasa	28.100	1300	11-09-12	248.0	04-09-12
9	Vapi	16.450	1500	11-09-12	244.6	04-09-12
10	Daman	2.000	1500	05-07-12	267.8	04-09-12
11	Varrai	25.000	1600	31-07-12	----	----

Statement No. 10

Maximum Observed Discharge during 2012 and Ever Recorded discharge of base stations.

Sl. No	Name of site	MAXIMUM					
		Maximum Observed Discharge with time and date of the year 2012			Ever Recorded Discharge with time and date		
		Disch.	Time	Date	Disch.	Time	Date
1	Burhanpur	8680.0	0800 to 1000	06-09-2012	25261.00	0800 to 1000	15-09-98
2	Gopalkheda	3246.4	0800 to 0900	07-09-2012	31850.0	1700 to 2000	08-07-10
3	Yerli	2021.0	0800 to 1000	08-09-2012	10600.00	0800	07-08-06
4	Gidhade	8124.72	0800 to 1000	07-09-2012	26665.60	1300	30-08-78
5	Sarangkheda	10478.94	0800 to 1000	07-09-2012	17828.00	0800 to 1000	08-08-06
6	Ozerkheda	1380.00	0800 to 1000	11-09-2012	3750.00	0800 to 0900	04-08-04
7	Nanipalsan	352.80	0800 to 0900	11-09-2012	3173.00	0800 to 0900	03-08-04

Statement No. 11

Maximum Reservoir Level (m), Out flow (cumec) / Discharge (cumec) and Inflow (cumec) of the Dam during 2012

Sl No	Name of Station	MAXIMUM								
		Reservoir Level (m) with Date & Time			Out flow (cumec) with date & time			In flow (cumec) with date & time		
		R.L.	Time	Date	Out flow	Time	Date	Inflow	Time	Date
1	Hathnur Dam	214.000	0700	05-10-12	13552.41	0500	06-09-12	16763.4	0200	06-09-12
2	Ukai Dam	104.305	0900	26-09-12	9507.84	2200	07-09-12	18227.3	0300	07-09-12
3	Madhuban Dam	80.050	1600	11-10-12	2992.10	1500	11-09-12	2755.50	1000	11-09-12

Period above warning level/Danger level/HFL during the year 2012

Sl. No.	Name of Forecasting Station	Warning level(m)	Danger level (m)	HFL with Year (m)		Warning level		Danger level		Highest Flood level	
				HFL	Year	From	To	From	To	From	To
1	Garudeshwar	30.480	31.090	41.650	1970	---	---	---	---	---	---
2	Bharuch	6.705	7.315	12.650	1970	0200 hrs of 09-08-12 1300 hrs of 14-08-12 1000 hrs of 24-08-12 2000 hrs of 06-09-12	1700 hrs of 10-08-12 0100 hrs of 15-08-12 1200 hrs of 24-08-12 0500 hrs of 09-09-12	0600 hrs of 09-08-12 ----- ----- 2200 hrs of 06-09-12	0700 hrs of 10-08-12 ----- ----- 1800 hrs of 08-09-12	---	---
3	Surat	8.500	9.500	12.50	2006	0100 hrs of 08-09-12	0200 hrs of 08-09-12	---	---	---	---
4	Vapi	18.200	19.200	23.760	2004	---	---	---	---	---	---
5	Daman	2.600	3.400	4.000	2004	-----	-----	-----	-----	-----	-----

Inflow forecast performance (forecast with actual) during monsoon 2012

Name of Inflow Forecast Station : Ukai Dam River : Tapi

Forecast No	Date	Time of Issue	Forcasted Value	Actual in MCM	Diff in MCM	Variation % of Accuaracy within ± 20 %	Accuracy above or below	Remarks
TU-1	24-07-2012	0830	225	REVISED				
TU-1 R	24-07-2012	1520	225	231.34	6.34	2.74	97.26	
TU-2	25-07-2012	1030	135	142.84	7.84	5.49	94.51	
TU-3	25-07-2012	2220	125	150.49	25.49	16.94	83.06	
TU-4	26-07-2012	1020	75	83.58	8.58	10.27	89.73	
TU-5	26-07-2012	2230	45	67.04	22.04	32.88	67.12	OUT
TU-6	27-07-2012	1040	55	REVISED				
TU-6 R	27-07-2012	1735	40	45.21	5.21	11.52	88.48	
TU-7	29-07-2012	1620	195	230.19	35.19	15.29	84.71	
TU-8	30-07-2012	0620	160	REVISED				
TU-8 R	30-07-2012	1430	205	199.07	-5.93	2.98	97.02	
TU-9	30-07-2012	1830	110	113	3.00	2.65	97.35	
TU-10	31-07-2012	0620	105	94.37	-10.63	11.26	88.74	
TU-11	31-07-2012	1830	70	86.58	16.58	19.15	80.85	
TU-12	01-08-2012	0620	65	56.46	-8.54	15.13	84.87	
TU-13	01-08-2012	1820	54	65.2	11.20	17.18	82.82	
TU-14	02-08-2012	0630	55	55.74	0.74	1.33	98.67	
TU-15	02-08-2012	1830	70	79.9	9.90	12.39	87.61	
TU-16	03-08-2012	0630	95	83.64	-11.36	13.58	86.42	
TU-17	03-08-2012	1820	55	67.76	12.76	18.83	81.17	
TU-18	04-08-2012	0640	45	REVISED				
TU-18 R	04-08-2012	1310	30	36.89	6.89	18.68	81.32	
TU-19	04-08-2012	2140	42	36.66	-5.34	14.57	85.43	
TU-20	08-08-2012	0920	200	245.69	45.69	18.60	81.40	
TU-21	08-08-2012	2130	275	253.04	-21.96	8.68	91.32	
TU-22	09-08-2012	0920	145	137.87	-7.13	5.17	94.83	
TU-23	09-08-2012	2130	100	REVISED				
TU-23 R	10-08-2012	0510	80	89.91	9.91	11.02	88.98	
TU-24	10-08-2012	0920	70	75.12	5.12	6.82	93.18	
TU-25	10-08-2012	2140	60	REVISED				
TU-25 R	11-08-2012	0420	110	121.1	11.10	9.17	90.83	
TU-26	11-08-2012	0930	90	REVISED				
TU-26 R	11-08-2012	1630	60	58.23	-1.77	3.04	96.96	
TU-27	11-08-2012	2120	70	65.69	-4.31	6.56	93.44	
TU-28	12-08-2012	0920	65	65.27	0.27	0.41	99.59	
TU-29	12-08-2012	2130	145	176.96	31.96	18.06	81.94	
TU-30	13-08-2012	0920	185	160.45	-24.55	15.30	84.70	
TU-31	13-08-2012	2130	95	97.2	2.20	2.26	97.74	

TU-32	14-08-2012	0920	65	69.19	4.19	6.06	93.94	
TU-33	14-08-2012	2130	65	63.49	-1.51	2.38	97.62	
TU-34	15-08-2012	0920	60	61.47	1.47	2.39	97.61	
TU-35	15-08-2012	2110	44	42.08	-1.92	4.56	95.44	
TU-36	21-08-2012	1245	110	104.87	-5.13	4.89	95.11	
TU-37	22-08-2012	1120	85	72.18	-12.82	17.76	82.24	
TU-38	22-08-2012	2340	42	REVISED				
TU-38 R	23-08-2012	0540	55	47.5	-7.50	15.79	84.21	
TU-39	28-08-2012	1430	200	168.54	-31.46	18.67	81.33	
TU-40	29-08-2012	0230	145	140.32	-4.68	3.34	96.66	
TU-41	29-08-2012	1420	70	REVISED				
TU-41 R	29-08-2012	2140	45	43.13	-1.87	4.34	95.66	
TU-42	31-08-2012	0845	50	REVISED				
TU-42 R	31-08-2012	1545	85	72.43	-12.57	17.35	82.65	
TU-43	31-08-2012	2020	60	63.71	3.71	5.82	94.18	
TU-44	01-09-2012	0820	95	101.5	6.50	6.40	93.60	
TU-45	01-09-2012	2020	75	75.16	0.16	0.21	99.79	
TU-46	02-09-2012	0820	65	64.67	-0.33	0.51	99.49	
TU-47	02-09-2012	2020	60	65.64	5.64	8.59	91.41	
TU-48	03-09-2012	0820	60	REVISED				
TU-48 R	03-09-2012	1530	45	43.08	-1.92	4.46	95.54	
TU-49	04-09-2012	1340	55	54.12	-0.88	1.63	98.37	
TU-50	05-09-2012	0030	70	79.06	9.06	11.46	88.54	
TU-51	05-09-2012	1230	85	REVISED				
TU-51 R	05-09-2012	1820	130	123.51	-6.49	5.25	94.75	
TU-52	06-09-2012	0030	125	REVISED				
TU-52 R	06-09-2012	0710	160	175.89	15.89	9.03	90.97	
TU-53	06-09-2012	1230	400	REVISED				
TU-53 R	06-09-2012	1840	570	571.3	1.30	0.23	99.77	
TU-54	07-09-2012	0020	500	REVISED				
TU-54 R	07-09-2012	0640	715	685.44	-29.56	4.31	95.69	
TU-55	07-09-2012	1230	450	462.24	12.24	2.65	97.35	
TU-56	08-09-2012	0030	280	255.3	-24.70	9.67	90.33	
TU-57	08-09-2012	1220	200	231.47	31.47	13.60	86.40	
TU-58	09-09-2012	0020	185	212.85	27.85	13.08	86.92	
TU-59	09-09-2012	1210	180	176.21	-3.79	2.15	97.85	
TU-60	10-09-2012	0020	120	128.77	8.77	6.81	93.19	
TU-61	10-09-2012	1220	90	85.28	-4.72	5.53	94.47	
TU-62	11-09-2012	0020	65	REVISED				
TU-62 R	11-09-2012	0640	85	102.88	17.88	17.38	82.62	
TU-63	11-09-2012	1220	80	REVISED				
TU-63 R	11-09-2012	1840	105	106.12	1.12	1.06	98.94	
TU-64	12-09-2012	0020	125	122.01	-2.99	2.45	97.55	
TU-65	12-09-2012	1230	190	164.83	-25.17	15.27	84.73	
TU-66	13-09-2012	0020	110	128.58	18.58	14.45	85.55	

TU-67	13-09-2012	1230	95	REVISED				
TU-67 R	13-09-2012	1830	70	78.37	8.37	10.68	89.32	
TU-68	14-09-2012	0020	75	86.41	11.41	13.20	86.80	
TU-69	14-09-2012	1220	75	REVISED				
TU-69 R	14-09-2012	1940	55	55.59	0.59	1.06	98.94	
TU-70	18-09-2012	1540	55	57.00	2.00	3.51	96.49	
TU-71	19-09-2012	0630	45	38.27	-6.73	17.59	82.41	
TU-72	24-09-2012	0830	43	52.94	9.94	18.78	81.22	
TU-73	24-09-2012	2040	55	66.81	11.81	17.68	82.32	

Inflow forecast performance (forecast with actual) during monsoon 2012

Name of Inflow Forecast Station : Hathnur Dam River : Tapi

Forecast No	Date	Time of Issue	Forcasted Value	Actual in MCM	Diff in MCM	Variation % of Accuaracy within ± 20 %	Accuracy above or below	Remarks
TH-1	23-07-2012	0030	100	99.36	-0.64	0.64	99.36	
TH-2	23-07-2012	1120	95	92.00	-3.00	3.26	96.74	
TH-3	23-07-2012	1730	60	52.80	-7.20	13.64	86.36	
TH-4	23-07-2012	2330	30	REVISED				
TH-4 R	24-07-2012	0330	80	91.53	11.53	12.60	87.40	
TH-5	24-07-2012	0530	100	98.61	-1.39	1.41	98.59	
TH-6	24-07-2012	1135	145	123.93	-21.07	17.00	83.00	
TH-7	24-07-2012	1730	85	89.40	4.40	4.92	95.08	
TH-8	24-07-2012	2330	60	58.42	-1.58	2.70	97.30	
TH-9	25-07-2012	0540	35	33.46	-1.54	4.60	95.40	
TH-10	25-07-2012	1120	24	29.37	5.37	18.28	81.72	
TH-11	25-07-2012	1730	23	26.04	3.04	11.67	88.33	
TH-12	28-07-2012	0440	50	45.72	-4.28	9.36	90.64	
TH-13	28-07-2012	1020	50	REVISED				
TH-13 R	28-07-2012	1330	75	88.30	13.30	15.06	84.94	
TH-14	28-07-2012	1610	110	REVISED				
TH-14 R	28-07-2012	1940	140	133.22	-6.78	5.09	94.91	
TH-15	28-07-2012	2220	90	79.54	-10.46	13.15	86.85	
TH-16	29-07-2012	0430	60	70.76	10.76	15.21	84.79	
TH-17	29-07-2012	1015	75	64.31	-10.69	16.62	83.38	
TH-18	29-07-2012	1620	40	40.80	0.80	1.96	98.04	
TH-19	29-07-2012	2220	40	41.19	1.19	2.89	97.11	
TH-20	30-07-2012	0430	60	67.87	7.87	11.60	88.40	
TH-21	30-07-2012	1010	50	46.10	-3.90	8.46	91.54	
TH-22	30-07-2012	1610	32	34.86	2.86	8.20	91.80	
TH-23	30-07-2012	2205	30	32.52	2.52	7.75	92.25	
TH-24	31-07-2012	0410	28	34.02	6.02	17.70	82.30	
TH-25	31-07-2012	1020	30	32.82	2.82	8.59	91.41	
TH-26	31-07-2012	1610	32	32.27	0.27	0.84	99.16	
TH-27	31-07-2012	2220	30	31.74	1.74	5.48	94.52	
TH-28	01-08-2012	0430	30	33.69	3.69	10.95	89.05	
TH-29	01-08-2012	1020	35	38.27	3.27	8.54	91.46	
TH-30	01-08-2012	1610	45	51.34	6.34	12.35	87.65	
TH-31	01-08-2012	2220	52	47.62	-4.38	9.20	90.80	
TH-32	02-08-2012	0430	40	39.97	-0.03	0.08	99.92	
TH-33	02-08-2012	1030	32	32.58	0.58	1.78	98.22	
TH-34	02-08-2012	1610	28	31.90	3.90	12.23	87.77	

TH-35	02-08-2012	2220	30	27.41	-2.59	9.45	90.55	
TH-36	03-08-2012	0430	26	28.17	2.17	7.70	92.30	
TH-37	03-08-2012	1015	25	28.78	3.78	13.13	86.87	
TH-38	03-08-2012	1610	30	30.28	0.28	0.92	99.08	
TH-39	03-08-2012	2210	25	27.58	2.58	9.35	90.65	
TH-40	06-08-2012	2310	40	35.65	-4.35	12.20	87.80	
TH-41	07-08-2012	0530	60	65.06	5.06	7.78	92.22	
TH-42	07-08-2012	1130	130	131.41	1.41	1.07	98.93	
TH-43	07-08-2012	1710	140	125.97	-14.03	11.14	88.86	
TH-44	07-08-2012	2310	110	117.16	7.16	6.11	93.89	
TH-45	08-08-2012	0530	100	REVISED				
TH-45R	08-08-2012	0845	70	73.58	3.58	4.87	95.13	
TH-46	08-08-2012	1120	60	61.68	1.68	2.72	97.28	
TH-47	08-08-2012	1730	40	48.45	8.45	17.44	82.56	
TH-48	08-08-2012	2320	40	37.79	-2.21	5.85	94.15	
TH-49	09-08-2012	0530	30	32.07	2.07	6.45	93.55	
TH-50	09-08-2012	1110	30	34.99	4.99	14.26	85.74	
TH-51	09-08-2012	1720	32	33.22	1.22	3.67	96.33	
TH-52	09-08-2012	2330	27	31.34	4.34	13.85	86.15	
TH-53	10-08-2012	0530	30	34.00	4.00	11.76	88.24	
TH-54	10-08-2012	1120	35	34.81	-0.19	0.55	99.45	
TH-55	10-08-2012	1710	35	36.53	1.53	4.19	95.81	
TH-56	10-08-2012	2320	35	33.61	-1.39	4.14	95.86	
TH-57	11-08-2012	0510	27	29.04	2.04	7.02	92.98	
TH-58	11-08-2012	1120	35	36.76	1.76	4.79	95.21	
TH-59	11-08-2012	1720	30	REVISED				
TH-59 R	11-08-2012	2030	55	54.49	-0.51	0.94	99.06	
TH-60	11-08-2012	2330	90	84.65	-5.35	6.32	93.68	
TH-61	12-08-2012	0530	100	85.99	-14.01	16.29	83.71	
TH-62	12-08-2012	1130	70	61.29	-8.71	14.21	85.79	
TH-63	12-08-2012	1710	50	45.84	-4.16	9.08	90.92	
TH-64	12-08-2012	2320	35	42.04	7.04	16.75	83.25	
TH-65	13-08-2012	0530	40	38.15	-1.85	4.85	95.15	
TH-66	13-08-2012	1110	35	39.42	4.42	11.21	88.79	
TH-67	13-08-2012	1720	38	37.86	-0.14	0.37	99.63	
TH-68	13-08-2012	2320	35	36.78	1.78	4.84	95.16	
TH-69	14-08-2012	0530	35	33.05	-1.95	5.90	94.10	
TH-70	14-08-2012	1130	25	22.24	-2.76	12.41	87.59	
TH-71	14-08-2012	1710	22	20.62	-1.38	6.69	93.31	
TH-72	14-08-2012	2320	20	21.24	1.24	5.84	94.16	
TH-73	15-08-2012	0920	20	21.85	1.85	8.47	91.53	
TH-74	20-08-2012	1840	45	REVISED				
TH-74 R	20-08-2012	2120	60	56.19	-3.81	6.78	93.22	
TH-75	21-08-2012	0030	50	50.23	0.23	0.46	99.54	
TH-76	21-08-2012	0630	28	24.89	-3.11	12.49	87.51	

TH-77	22-08-2012	1820	30	REVISED				
TH-77 R	22-08-2012	2120	40	38.52	-1.48	3.84	96.16	
TH-78	23-08-2012	0020	32	28.93	-3.07	10.61	89.39	
TH-79	23-08-2012	0630	24	21.04	-2.96	14.07	85.93	
TH-80	25-08-2012	1240	10	9.38	-0.62	6.61	93.39	
TH-81	25-08-2012	1810	25	22.20	-2.80	12.61	87.39	
TH-82	26-08-2012	0630	11	11.00	0.00	0.00	100.00	
TH-83	26-08-2012	1210	11	10.86	-0.14	1.29	98.71	
TH-84	26-08-2012	1815	21	21.81	0.81	3.71	96.29	
TH-85	27-08-2012	0620	11	REVISED				
TH-85 R	27-08-2012	0940	25	21.17	-3.83	18.09	81.91	
TH-86	27-08-2012	1420	60	62.20	2.20	3.54	96.46	
TH-87	27-08-2012	2020	95	REVISED				
TH-87 R	27-08-2012	2320	60	57.41	-2.59	4.51	95.49	
TH-88	28-08-2012	0230	55	61.33	6.33	10.32	89.68	
TH-89	28-08-2012	0840	45	41.37	-3.63	8.77	91.23	
TH-90	28-08-2012	1420	30	26.66	-3.34	12.53	87.47	
TH-91	28-08-2012	2030	24	24.59	0.59	2.40	97.60	
TH-92	29-08-2012	0230	24	21.83	-2.17	9.94	90.06	
TH-93	29-08-2012	0835	22	22.11	0.11	0.50	99.50	
TH-94	29-08-2012	1420	21	17.60	-3.40	19.32	80.68	
TH-95	30-08-2012	1240	25	25.18	0.18	0.71	99.29	
TH-96	31-08-2012	0630	35	29.47	-5.53	18.76	81.24	
TH-97	01-09-2012	0820	30	34.53	4.53	13.12	86.88	
TH-98	01-09-2012	1420	30	30.72	0.72	2.34	97.66	
TH-99	01-09-2012	2020	28	27.20	-0.80	2.94	97.06	
TH-100	02-09-2012	0230	24	23.71	-0.29	1.22	98.78	
TH-101	02-09-2012	0810	20	23.54	3.54	15.04	84.96	
TH-102	02-09-2012	1435	21	23.82	2.82	11.84	88.16	
TH-103	02-09-2012	2020	20	18.68	-1.32	7.07	92.93	
TH-104	03-09-2012	0820	30	REVISED				
TH-104 R	03-09-2012	1145	45	45.00	0.00	0.00	100.00	
TH-105	03-09-2012	1430	38	32.08	-5.92	18.45	81.55	
TH-106	03-09-2012	2020	25	22.22	-2.78	12.51	87.49	
TH-107	04-09-2012	1120	45	50.35	5.35	10.63	89.37	
TH-108	04-09-2012	1820	52	51.00	-1.00	1.96	98.04	
TH-109	05-09-2012	0020	50	44.04	-5.96	13.53	86.47	
TH-110	05-09-2012	0630	40	REVISED				
TH-110 R	05-09-2012	0910	60	62.19	2.19	3.52	96.48	
TH-111	05-09-2012	1220	120	REVISED				
TH-111 R	05-09-2012	1510	165	176.55	11.55	6.54	93.46	
TH-112	05-09-2012	1835	240	257.24	17.24	6.70	93.30	
TH-113	06-09-2012	0020	300	304.27	4.27	1.40	98.60	
TH-114	06-09-2012	0630	235	257.38	22.38	8.70	91.30	
TH-115	06-09-2012	1240	180	176.38	-3.62	2.05	97.95	

TH-116	06-09-2012	1830	115	135.10	20.10	14.88	85.12	
TH-117	07-09-2012	0030	115	125.01	10.01	8.01	91.99	
TH-118	07-09-2012	0630	110	103.84	-6.16	5.93	94.07	
TH-119	07-09-2012	1220	90	102.76	12.76	12.42	87.58	
TH-120	07-09-2012	1820	95	89.97	-5.03	5.59	94.41	
TH-121	08-09-2012	0040	80	88.63	8.63	9.74	90.26	
TH-122	08-09-2012	0630	84	86.58	2.58	2.98	97.02	
TH-123	08-09-2012	1210	80	81.21	1.21	1.49	98.51	
TH-124	08-09-2012	1840	75	78.46	3.46	4.41	95.59	
TH-125	09-09-2012	0030	60	56.44	-3.56	6.31	93.69	
TH-126	09-09-2012	0630	42	46.12	4.12	8.93	91.07	
TH-127	09-09-2012	1220	45	42.63	-2.37	5.56	94.44	
TH-128	09-09-2012	1830	27	32.43	5.43	16.74	83.26	
TH-129	10-09-2012	0030	28	29.02	1.02	3.51	96.49	
TH-130	10-09-2012	0630	26	32.40	6.40	19.75	80.25	
TH-131	10-09-2012	1210	30	29.07	-0.93	3.20	96.80	
TH-132	10-09-2012	1810	32	28.57	-3.43	12.01	87.99	
TH-133	11-09-2012	0030	25	31.16	6.16	19.77	80.23	
TH-134	11-09-2012	0630	55	59.13	4.13	6.98	93.02	
TH-135	11-09-2012	1235	80	72.71	-7.29	10.03	89.97	
TH-136	11-09-2012	1820	55	51.04	-3.96	7.76	92.24	
TH-137	12-09-2012	0030	45	REVISED				
TH-137 R	12-09-2012	0330	68	77.05	9.05	11.75	88.25	
TH-138	12-09-2012	0630	65	61.75	-3.25	5.26	94.74	
TH-139	12-09-2012	1220	48	47.73	-0.27	0.57	99.43	
TH-140	12-09-2012	1830	44	41.75	-2.25	5.39	94.61	
TH-141	13-09-2012	0030	35	31.44	-3.56	11.32	88.68	
TH-142	13-09-2012	0630	30	31.67	1.67	5.27	94.73	
TH-143	13-09-2012	1210	27	28.48	1.48	5.20	94.80	
TH-144	13-09-2012	1820	27	27.56	0.56	2.03	97.97	
TH-145	14-09-2012	0030	21	20.97	-0.03	0.14	99.86	
TH-146	15-09-2012	2120	35	38.10	3.10	8.14	91.86	
TH-147	16-09-2012	0920	38	33.73	-4.27	12.66	87.34	
TH-148	16-09-2012	2130	30	27.87	-2.13	7.64	92.36	
TH-149	17-09-2012	0910	25	REVISED				
TH-149 R	17-09-2012	1440	19	23.22	4.22	18.17	81.83	
TH-150	17-09-2012	2130	20	22.34	2.34	10.47	89.53	
TH-151	18-09-2012	0920	20	20.30	0.30	1.48	98.52	
TH-152	18-09-2012	2140	20	20.40	0.40	1.96	98.04	
TH-153	19-09-2012	0915	20	20.40	0.40	1.96	98.04	
TH-154	19-09-2012	2130	19	20.40	1.40	6.86	93.14	
TH-155	20-09-2012	0920	20	19.93	-0.07	0.35	99.65	
TH-156	20-09-2012	2130	13	14.60	1.60	10.96	89.04	
TH-157	21-09-2012	0925	14	13.60	-0.40	2.94	97.06	
TH-158	21-09-2012	2140	13	14.43	1.43	9.91	90.09	

TH-158 R	22-09-2012	0920	15	REVISED				
TH-159	22-09-2012	1610	20	24.69	4.69	19.00	81.00	
TH-159 R	22-09-2012	2130	40	REVISED				
TH-160	23-09-2012	0530	26	25.69	-0.31	1.21	98.79	
TH-161	23-09-2012	0920	20	18.03	-1.97	10.93	89.07	
TH-162	25-09-2012	0330	16	15.15	-0.85	5.61	94.39	
TH-163	25-09-2012	0915	25	22.47	-2.53	11.26	88.74	
TH-164	25-09-2012	2130	20	REVISED				
TH-164 R	26-09-2012	0530	15	14.41	-0.59	4.09	95.91	
TH-165	26-09-2012	0920	12	REVISED				
TH-165 R	26-09-2012	1610	16	15.12	-0.88	5.82	94.18	
TH-166	26-09-2012	2130	15	13.32	-1.68	12.61	87.39	
TH-167	27-09-2012	0920	12	REVISED				
TH-167 R	27-09-2012	1615	9	10.23	1.23	12.02	87.98	
TH-168	28-09-2012	0630	16	14.65	-1.35	9.22	90.78	
TH-169	28-09-2012	1815	13	13.44	0.44	3.27	96.73	
TH-170	29-09-2012	0630	12	11.82	-0.18	1.52	98.48	

Statement No.13 continued

Inflow forecast performance (forecast with actual) during monsoon 2012

Name of Inflow Forecast Station : Madhuban Dam River : Damanganga

Forecast No	Date	Time of Issue	Forecasted Value	Actual in MCM	Diff in MCM	Variation % of Accuracy within ± 20 %	Accuracy above or below	Remarks
DM-1	31-07-2012	1015	70	REVISED				
DM-1 R	31-07-2012	1340	50	44.15	-5.85	13.25	86.75	
DM-2	27/08/2012	1510	40	REVISED				
DM-2R	27/08/2012	1830	20	18.41	-1.59	8.64	91.36	
DM - 3	11-09-2012	0720	38	46.5	8.50	18.28	81.72	

Level forecast performance (forecast with actual) during monsoon 2012

TAPI BASIN

Name of level Flood Forecast Station : Surat Warning Level: 8.500 m

River : Tapi Danger Level: 9.500 m

Forecast Sl. No.	Date	Time of Issue	Water level Nth hrs.	Valid for		Forecast Level (m)	Actual Level (m)
				Duration hrs.	Date		
TS – 1	07-09-2012	1630	8.200	0300	08-09-12	8.80	8.65

NARMADA BASIN

Name of Level Flood Forecast Station : Garudeshwar Warning Level: 30.380 m

River : Narmada Danger Level: 31.090 m

Forecast Sl. No.	Date	Time of Issue	Water level Nth hrs.	Valid for		Forecast Level (m)	Actual Level (m)
				Duration hrs.	Date		
Not Issued							

Name of Flood Forecast Station : Bharuch Warning Level: 6.705 m

River : Narmada Danger Level: 7.315 m

Forecast Sl. No.	Date	Time of Issue	Water level Nth hrs.	Valid for		Forecast Level (m)	Actual Level (m)
				Duration hrs.	Date		
NB-1	08-08-2012	1230	3.80	2200	08-08-2012	7.00	Revised
NB-1 R	08-08-2012	2020	4.10	0200	09-08-2012	7.00	6.90
NB-2	09-08-2012	0030	6.10	0900	09-08-2012	8.20	8.20
NB-3	09-08-2012	0700	7.60	1800	09-08-2012	8.90	Revised
NB-3 R	09-08-2012	1330	8.30	1800	09-08-2012	8.50	8.40
NB-4	09-08-2012	2040	8.30	0900	10-08-2012	7.35	7.30
NB-5	10-08-2012	0830	7.30	1800	10-08-2012	6.25	Revised
NB-5 R	10-08-2012	1530	6.80	1800	10-08-2012	6.65	6.70
NB-6	14-08-2012	0900	6.60	1600	14-08-2012	6.85	6.90
NB-7	23-08-2012	1520	5.90	2200	23-08-2012	6.70	Revised
NB-7 R	23-08-2012	1940	6.20	1000	24-08-2012	6.70	6.80
NB-8	06-09-2012	0930	4.40	2200	06-09-2012	6.80	6.90
NB-9	06-09-2012	1900	6.40	0900	07-09-2012	8.75	8.80
NB-10	07-09-2012	0500	8.60	1300	07-09-2012	9.15	9.20
NB-11	07-09-2012	2140	9.10	1200	08-09-2012	7.90	7.90
NB-12	08-09-2012	1130	8.00	2300	08-09-2012	6.90	7.00
NB-13	08-09-2012	2400	7.10	1500	09-09-2012	6.60	6.20

DAMANGANGA BASIN

Name of Level Flood Forecast Station : Vapi Warning Level: 18.20 m

River : Damanganga Danger Level: 19.20 m

Forecast Sl. No.	Date	Time of Issue	Water level Nth hrs.	Valid for		Forecast Level (m)	Actual Level (m)
				Duration hrs.	Date		
Not Issued							

Name of Level Flood Forecast Station : Daman Warning Level: 2.60 m

River : Damanganga Danger Level: 3.40 m

Forecast Sl. No.	Date	Time of Issue	Water level Nth hrs.	Valid for		Forecast Level (m)	Actual Level (m)
				Duration hrs.	Date		
Not Issued							

Statement No. 15

Percentage of forecast accuracy (Inflow /Level Forecast) during monsoon 2012

INFLOW FORECAST PERFORMANCE DURING - 2012.

Sl. No	River	Forecasting Station	Total no. forecast issued	Percentage of Accuracy			
				Within +/- 20%		Beyond Limit +/-20 %	
				NOs.	%	Nos	%
1	2	3	4	5	6	7	8
1	Tapi	a) Hathnur Dam	170	170	100	NIL	---
2	Tapi	b)Ukai Dam	73	72	98.6	1	1.4
3	Damanganga	c)Madhuban Dam	3	3	100	NIL	---
		Total:-	246	245	99.6	1	0.4

LEVEL FORECAST PERFORMANCE DURING - 2012.

Sl. No	River	Forecasting Station	Total no. forecast issued	Percentage of Accuracy			
				Within +/- 15cm		Beyond +/-15cm	
				NOs.	%	Nos	%
1	2	3	4	5	6	7	8
1	Narmada	Garudeshwar	Nil	--	--	--	--
2	Narmada	Bharuch	13	12	92.3	1	7.7
3	Tapi	Surat	1	1	100	---	--
4	Damanganga	Vapi	Nil	---	---	---	--
5	Damanganga	Daman	Nil	---	---	---	--
		Total:-	14	13	92.9	1	7.1

Overall performance :

Total No. of Forecast issued (Inflow + Level) : 260

Total No. of Forecast within permissible limit (Inflow + Level) : 258

Overall performance : 99.23%

Flood Forecast performance for last 10 years

{TAPI BASIN}

Tapi at Hathnur (Inflow) Commencement year – 1986			
Year	Total Forecast issued	Variation	
		Within +/- 20%	%
2003	47	47	100
2004	16	16	100
2005	47	47	100
2006	45	41	91.1
2007	101	95	94.06
2008	23	22	95.7
2009	31	29	93.55
2010	111	110	99.5
2011	82	82	100
2012	170	170	100

Tapi at Ukai (Inflow) Commencement year – 1973			
Year	Total Forecast issued	Variation	
		Within +/-20 %	%
2003	29	29	100
2004	09	09	100
2005	28	28	100
2006	72	72	100
2007	48	46	95.8
2008	17	16	94.1
2009	5	5	100
2010	79	79	100
2011	44	44	100
2012	73	72	98.6

Tapi at Surat (Flood Level) Commencement year – 1969			
Year	Total Forecast issued	Within +/- 15 cm	%
2003	0	0	----
2004	0	0	----
2005	0	0	----
2006	27	26	96.3
2007	0	0	----
2008	0	0	----
2009	0	0	----
2010	0	0	----
2011	0	0	----
2012	1	1	100

{LOWER NARMADA BASIN}

Narmada at Garudeshwar (Flood Level) Commencement year-1985			
Year	Total Forecast issued	Within +/- 15 cm	%
2003	0	0	0
2004	0	0	0
2005	0	0	0
2006	1	1	100
2007	0	0	0
2008	0	0	0
2009	0	0	0
2010	0	0	0
2011	0	0	0
2012	0	0	0

Narmada at Bharuch (Flood Level) Commencement year-1969			
Year	Total Forecast issued	Within +/- 15cm	%
2003	0	0	0
2004	7	7	100
2005	0	0	0
2006	26	24	92.3
2007	0	0	0
2008	0	0	0
2009	0	0	0
2010	0	0	0
2011	4	4	100
2012	13	12	92.3

Flood Forecast performance for last 10 years

{ DAMANGANGA BASIN }

Madhuban at Damanganga (Inflow) Commencement year – 1986			
Year	Total Forecast issued	Variation	
		Within +/- 20%	%
2003	7	7	100
2004	19	18	94.7
2005	39	39	100
2006	22	21	95.5
2007	19	19	100
2008	17	17	100
2009	8	8	100
2010	1	1	100
2011	12	12	100
2012	3	3	100

Vapi at Damanganga (Flood Level) Commencement year - 1991			
Year	Total Forecast issued	Within +/- 15 cm	%
2003	0	0	----
2004	0	0	----
2005	0	0	----
2006	0	0	----
2007	0	0	----
2008	0	0	----
2009	0	0	----
2010	0	0	----
2011	1	1	100
2012	0	0	----

Daman at Damanganga (Flood Level) Commencement year - 1986			
Year	Total Forecast issued	Within +/-15 cm	%
2003	0	0	----
2004	0	0	----
2005	0	0	----
2006	0	0	----
2007	0	0	----
2008	0	0	----
2009	0	0	----
2010	0	0	----
2011	0	0	----
2012	0	0	----

Comparision of flood forecast performance of Forecasting sites for last 10 years 2002– 2011 , with 2003 – 2012 and 2012

A] INFLOW FORECAST

River	Station	Percentage from 2002 to 2011	Percentage 2012 only	Percentage from 2003 to 2012
Tapi	Hathnur	97.1	100	97.9
Tapi	Ukai	98.9	98.6	99.0
Damanganga	Madhuban	98.7	100	98.6

B] LEVEL FORECAST.

River	Station	Percentage from 2002 to 2011	Percentage 2012 only	Percentage from 2003 to 2012
Narmada	Garudeshwar	100	No forecast issued	100
Narmada	Bharuch	95.5	92.3	94.0
Tapi	Surat	96.3	100	96.4
Damanganga	Vapi	100	No forecast issued	100
Damanganga	Daman	No forecast Issued	No forecast issued	No Forecast Issued.

NOTE:
Permissible limit for:
A] Inflow Forecast +,- 20 %
B] Level Forecast +,- 0.15cm.

Overall forecast performance of forecasting stations

(Inflow and Level forecast) for last 10 year

TAPI DIVISION OF LAST TEN YEARS.

Year	Total Nos. of Forecast Issued	Nos. of Forecast within permissible limit	% of Accuracy
2003	83	83	100
2004	51	50	98.04
2005	114	114	100
2006	193	185	95.9
2007	168	160	95.24
2008	57	55	96.5
2009	44	42	95.45
2010	191	190	99.5
2011	143	143	100
2012	260	258	99.23

Statement No 19

FLOOD / HEAVY RAINFALL / CYCLONE DAMAGE - 2012

Sl .No	Name of State	Area affected	Population affected	Damages to crops		Damage to Houses / Huts		Cattle lost		Human lives lost	Damage to public utilities in Rs. Lakh	Total damage to crops, House & public utilities etc. in Rs. Lakh (Col.5(b)+6(b) +7(b)+9)	Remarks
				Area Ha	Value in Rs. Lakh	Nos.	Value in Rs. Lakh	Nos.	Value in Rs. Lakh				
1	2	3	4	5[a]	5[b]	6[a]	6[b]	7[a]	7[b]	8	9	10	11
1	**Jalgaon [M.S.]**	-------	523 families	-------	-------	1) Totally collaps—98 2)Partly --470	------- -------	48	-------	8	-------	1848220	As per report received from the Collector Jalgaon (M.S.)
2	**Akola (M.S)**	202 villages	432 families	24905.4	-------	1) Totally collaps—33 2)Partly --185	NA	20	-------	4	NA	4273.80	As per report received from the Collector Akola (M.S.)
3	**Dhule (M.S.)**	21 villages	287 families	-------	-------	1) Totally collaps—8 2)Partly --278	6.17 147.6	39		5		170.69	As per report received from the Collector Dhule (M.S.)

Contd..

Statement No 19 Contd.

Sl .No	Name of State	Area affected	Population affected	Damages to crops		Damage to Houses / Huts		Cattle lost		Human lives lost	Damage to public utilities Rs. Lakh	Total damage to crops, House & public utilities etc. Rs Lakh (Col.5(b)+6(b) +7(b)+9)	Remarks
				Area Ha	Value in Rs. Lakh	Nos.	Value in Rs. Lakh	Nos.	Value in Rs. Lakh				
1	2	3	4	5[a]	5[b]	6[a]	6[b]	7[a]	7[b]	8	9	10	11
4	**Buldhana (M.S.)**	22 Vilages	326families	1433.96	------	1)Completely damaged houses : 5 2)Partially damaged houses 72		20		9	-----	-------	As per report received from the Collector Buldhana (M.S.)
5	**Nandurbar**	9 villages	10	------	------	1) Totally collaps—10 2)Partly --98	------	31	------	6	-----	-------	As per report received from the collector Nandurbar
6	**Bharuch [Gujarat]**	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	2	NIL	NIL	As per report received from Collector Bharuch
7	**Burhanpur [M.P.]**	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	As per report received from the Water Resources Division

Sl .No	Name of State	Area affected	Population affected	Damages to crops		Damage to Houses / Huts		Cattle lost		Human lives lost	Damage to public utilities Rs. Lakh	Total damage to crops,House & public utilities etc. Rs Lakh (Col.5(b)+6(b)	Remarks
				Area Ha	Value in Rs. Lakh	Nos.	Value in Rs. Lakh	Nos.	Value in Rs. Lakh				
1	2	3	4	5[a]	5[b]	6[a]	6[b]	7[a]	7[b]	8	9	10	11
8	**Surat [Gujarat]**	0.0	140	NIL	NIL	NIL	NIL	16	0.30	1	NIL	2.38	As per report received from the Collector, Surat
9	**Daman Dadara Nagar**	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	As per report received from the Mamlatdar, Dadara Nagar & Haveli
10	**Valsad & Navasari (Gujarat)**	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	As per the report received from the SE Damanganga Project Circle, Valsad.

Statement No. 20

Contact no. of User agencies

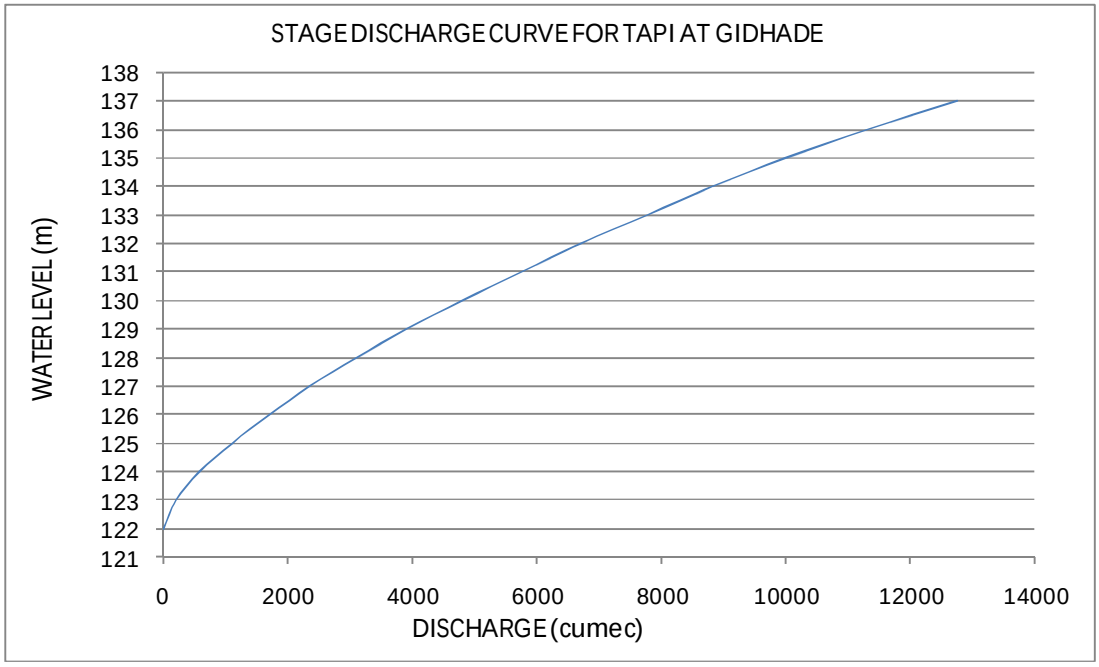
Contact no. of User agencies for Ukai Dam / Surat		
	Phone No	
	Office	Residence
FLOOD CONTROLL CELL, WALMI CAMPUS, GANDHINAGAR	23248735, 23248736 Fax 23240553 & HOTLINE	
S E SIC SURAT FOCAL OFFICER TAPI	2667950 FAX,2669701 2669131 FLOOD CELL	
COLLECTOR SURAT	2471121, 2472419 FAX	2669080
MUNICIPAL COMMISSIONAR SURAT	2422291, FAX,2451935 FAX	
Sh.V.D.Patel Addl.City Engineer (Nodel Officer)	**2434339,2212399 CR**	**9724345007**
Sh. C.Y.Bhatta	**2435958,2254605**	**9724345008**
CAUSE WAY TAPI	**2761365**	
S E UKAI CIRCLE	02624 233239 ,02624 233361Fax	
UKAI FLOOD CELL,EE, UKAI	02624 233361	
PRAKASHA TAHSILDAR SHAHADA	**02565 224500 09890909300**	
AHWA CONTROL ROOM	**0260 2993732 ---------**	**02631 220347**

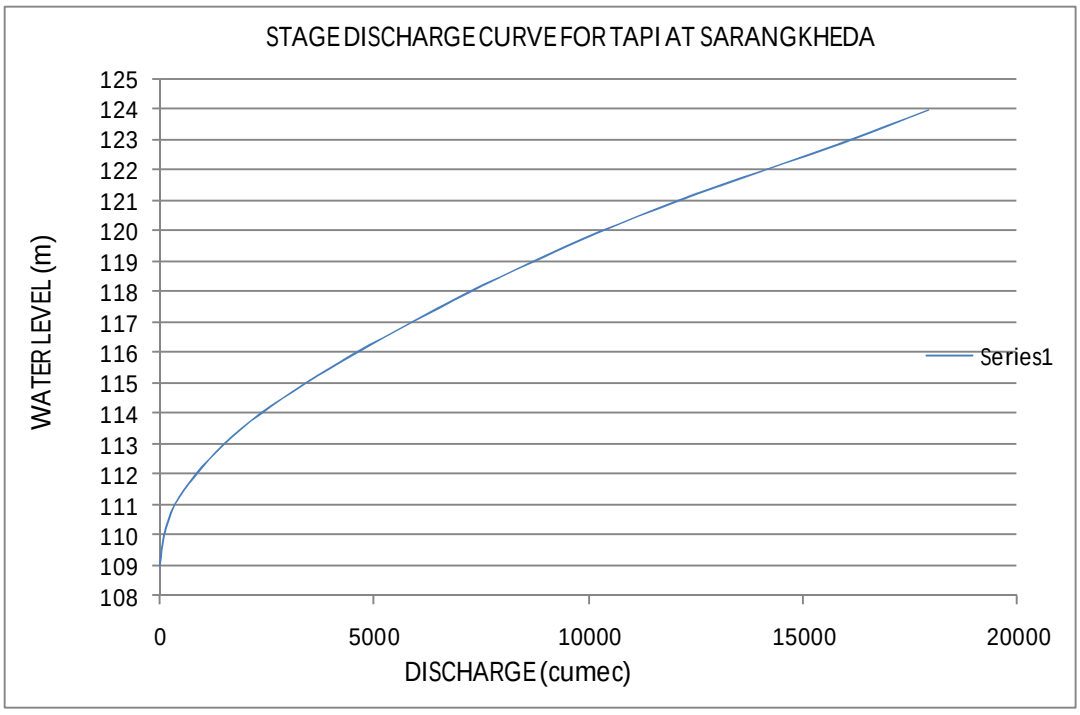
Contact no. of User agencies for Hatnur Dam		
	Phone No	
	Office	Residence
COLLECTOR JALGAON	0257 2220800, 0257 2217193	
EE IRRIGATION DIV. JALGAON	0257 223886, 0257 2239869	
HATHNUR DAM(MH)	02582277044	
TASILDAR BHUSAWAL	02582 222592	
POLICE STATION BHUSAWAL	02582 222200	

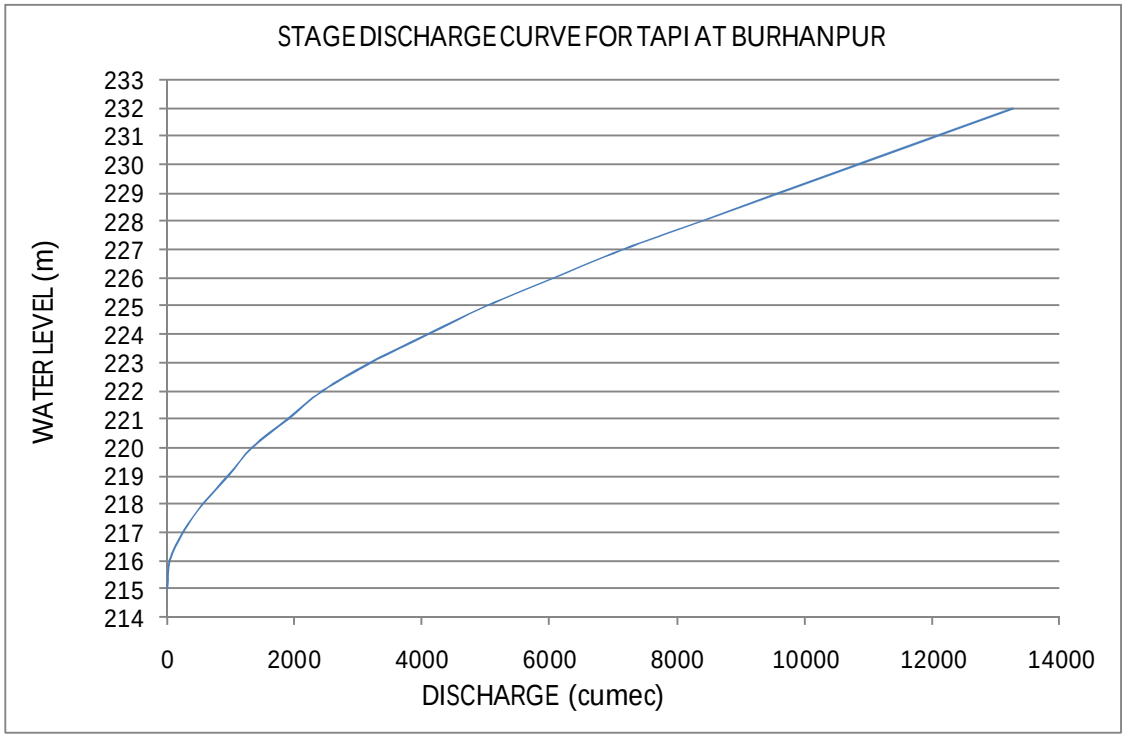
Contact no. of User agencies for MADHUBAN Dam / Vapi /Daman		
EE VALSAD (Control Room)	02632 254501,02632 254502, 02602640213 Flood Cell 02632 254502 FAX 02632 254503, 02632 254504	
CONTROL ROOM VALSAD	02632-254502	
E. E. Madhuban DAM & SUB FOCAL OFFICER	0260 2640213 FAX 0260 2640232	0260 2640233
DAM SITE	02632 2640213	
FLOOD CELL VALSAD	**0 2632 254501 to 4**	
FLOOD CELL MADHUBAN COLONY DEE	02632 2640232	0260 2640233
S E DAMANGANGA PROJECT CIRCLE VALSAD [FOCAL OFFICER]	02632 253307 (D), 02632 253308 Fax	02632 242903
COLLECTOR VALSAD	02632 253613, 02632 249335 Fax	02632 253060
COLLECTOR DAMAN	**0260 2230689, 0260 2330698**	
COLLECTOR DNH SILVASA (ONLY FOR DAMAN)	**0260 2642721, 0260 2642106**	

Contact no. of User agencies for Bharuch/Garudeshwar		
	Phone No	
	Office	**Residence**
COLLECTOR BHARUCH	**02642 240602 Fax,02642 240600**	02642223701
COLLECTOR NARMADA	**02640 222161 CR, 02640 220171 Fax**	02640222162
FLOOD CELL VADODARA	0265 2429343, 02652429343	
COLLECTOR VADODARA	**0265 2431093 FAX,0265 2433000**	02652313131

Correlation Curves






STAGE DISCHARGE CURVE FOR TAPI AT BURHANPUR
WATER LEVEL (m)
233
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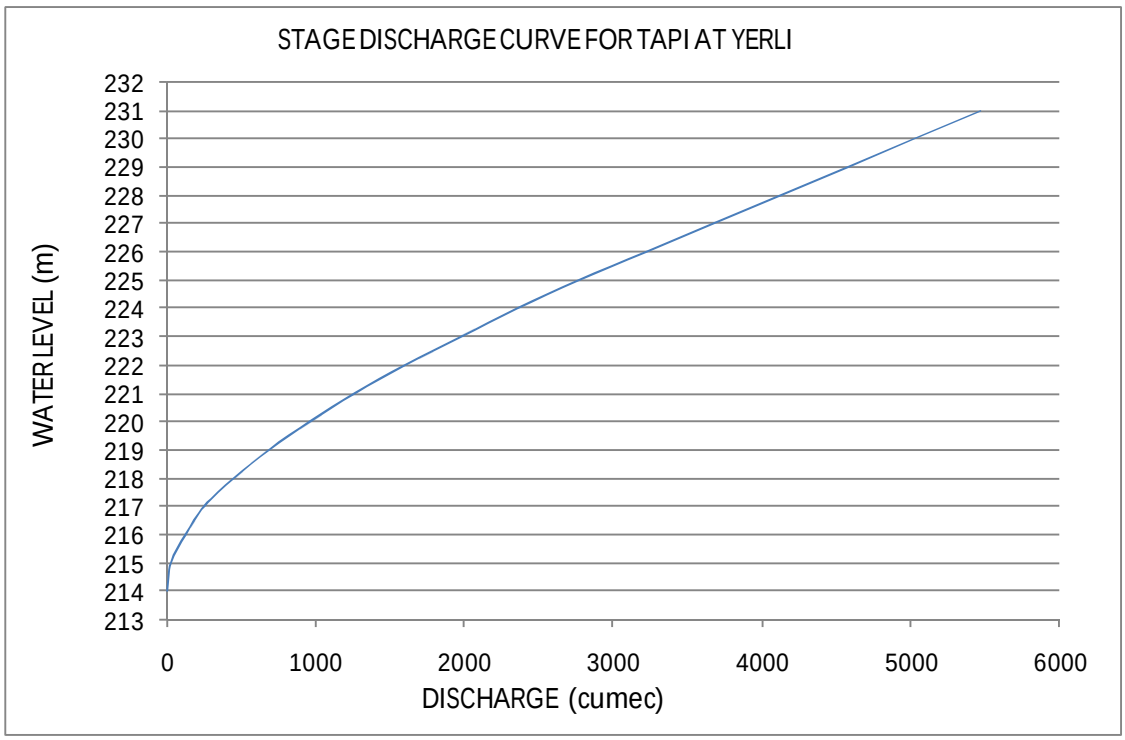
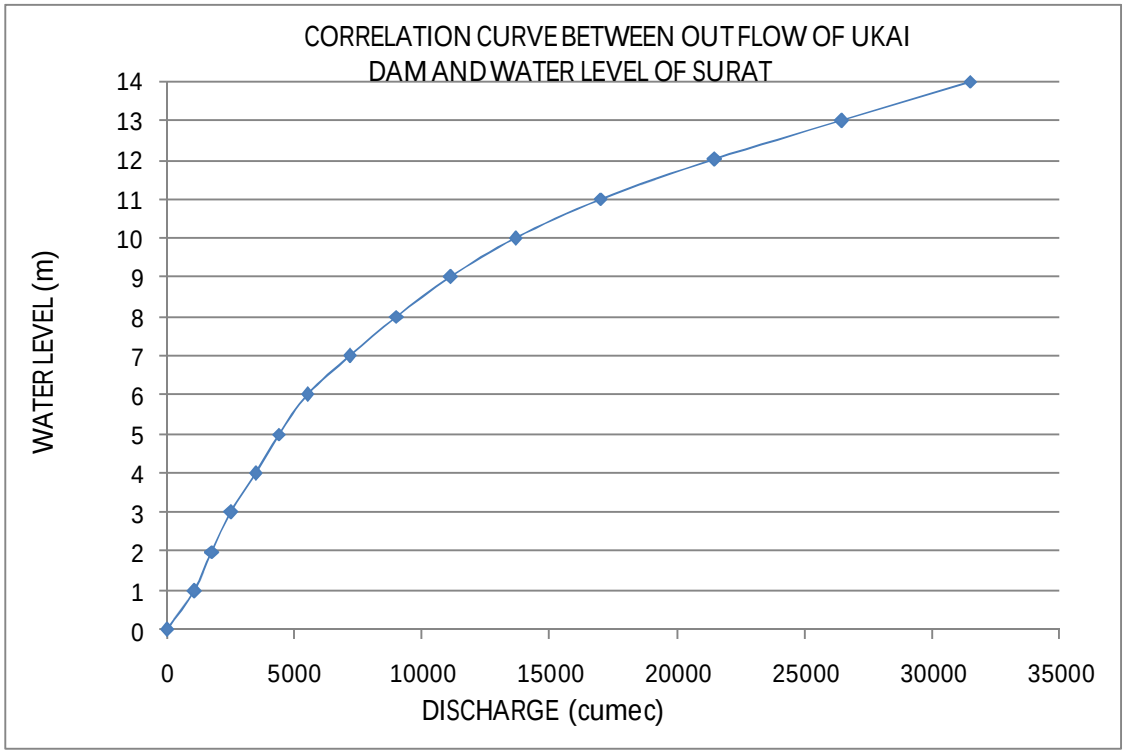
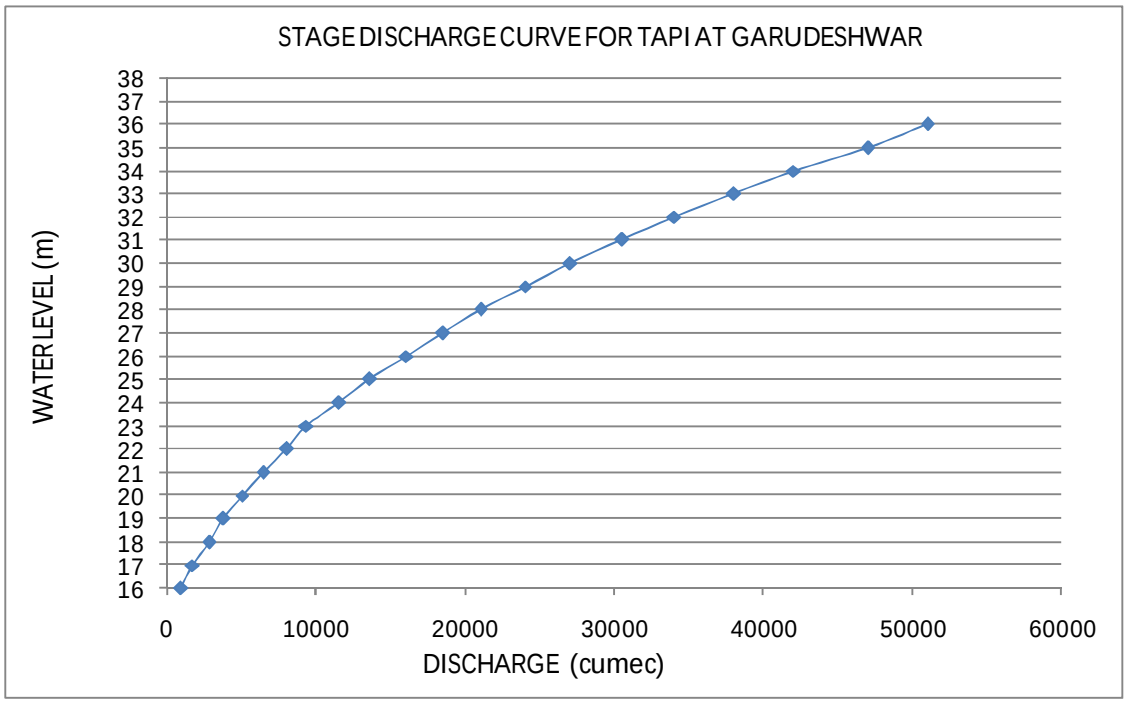
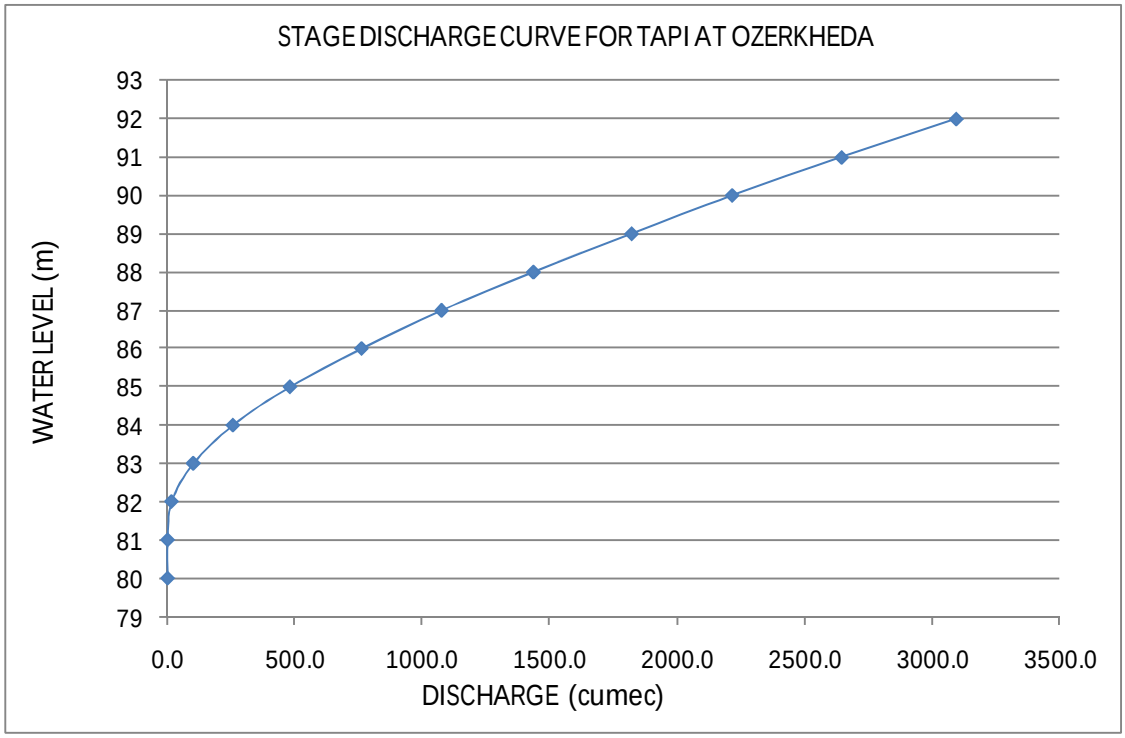
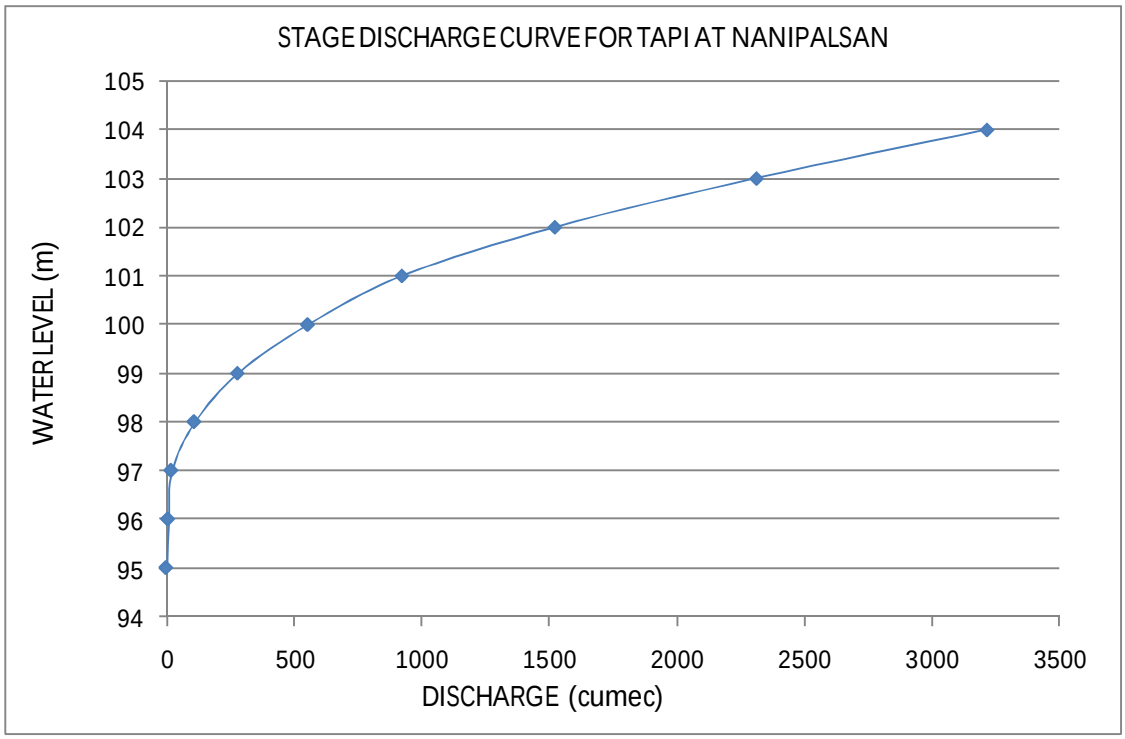
215
214
0
2000
4000
6000
8000
10000
12000
14000
DISCHARGE (cumec)


STAGE DISCHARGE CURVE FOR TAPI AT YERLI
WATER LEVEL (m)
232
231
230
229
228
227
226
225
224
223
222
221
220
219
218
217
216
215
214
213
0
1000
2000
3000
4000
5000
6000
DISCHARGE (cumec)


CORRELATION CURVE BETWEEN OUT FLOW OF UKAI DAM AND WATER LEVEL OF SURAT
WATER LEVEL (m)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
0
5000
10000
15000
20000
25000
30000
35000
DISCHARGE (cumec)


STAGE DISCHARGE CURVE FOR TAPI AT GARUDESHWAR
WATER LEVEL (m)
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
0
10000
20000
30000
40000
50000
60000
DISCHARGE (cumec)


STAGE DISCHARGE CURVE FOR TAPI AT OZERKHEDA
WATER LEVEL (m)
93
92
91
90
89
88
87
86
85
84
83
82
81
80
79
0.0
500.0
1000.0
1500.0
2000.0
2500.0
3000.0
3500.0
DISCHARGE (cumec)

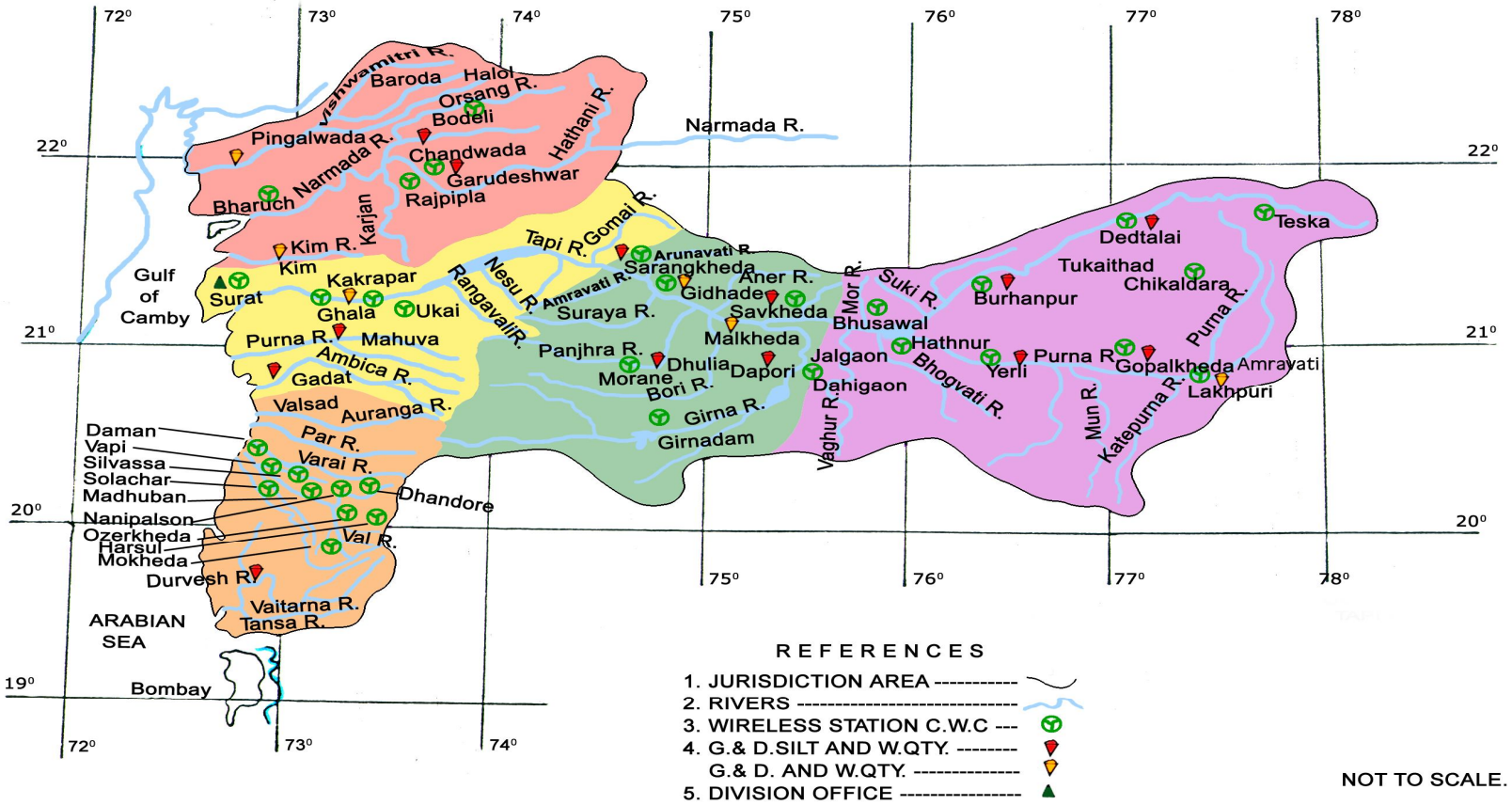

STAGE DISCHARGE CURVE FOR TAPI AT NANIPALSAN
WATER LEVEL (m)
105
104
103
102
101
100
99
98
97
96
95
94
0
500
1000
1500
2000
2500
3000
3500
DISCHARGE (cumec)

STATEMENT- NO 22

Approximate travel time from base station to Forecasting stations.

BASE STATION	FORECASTING STATION	TYPE OF FORECAST	APPROXIMATE TIME IN HOURS
TAPI BASIN			
YERLI	HATHNUR DAM	INFLOW	5 TO 6
BURHANPUR	--DO--	INFLOW	5 TO 6
GIDHADE	UKAI DAM	INFLOW	10 TO 12
SARANGKHEDA	--DO--	INFLOW	6 TO 7
UKAI DAM	SURAT	LEVEL	6 TO 8
DAMANGANGA BASIN			
OZERKHEDA	MADHUBAN DAM	INFLOW	2 TO 3
NANIPALSAN	MADHUBAN DAM	INFLOW	2 TO 3
MADHUBAN DAM	VAPI	LEVEL	2 TO 3
MADHUBAN DAM	DAMAN	LEVEL	3
NARMADA BASIN			
OUT FLOW OF SARDAR SAROVAR DAM	GARUDESHWAR	LEVEL	2
OUT FLOW OF SARDAR SAROVAR DAM	BHARUCH	LEVEL	8 TO 10

JURISDICTION MAP OF TAPI DIVISION SURAT




TAPI BASIN
ARABIAN SEA
SURAT
GHALA
Tapi River
UKAI DAM
SAGBARA
Gomai River
SARANGKHEDA
Buray River
GIDHADE
ANER
SAVKHEDA
DHULE
MORANE
Bori River
Girna River
Punad Proj.
MALEGAON
GIRNADAM
DAHIGAON
JALGAON
BHUSAWAL
HATHNUR
BURHANPUR
Tapi River
DEDTALAI
CHIKALDARA
TESKA
Van R.
Van Proj.
Purna R.
YERLI
GOPALKHEDA
DARYAPUR
AMRAVATI
LAKHPURI
AKOLA
Mun R.
Murna R.
Katapurna R.
BULDANA
N
LEGEND
GAUGE
GAUGE DISCHARGE
GAUGE DISCHARGE SILT
GAUGE DISCHARGE SILT & W. QTY.
GAUGE DISCHARGE & W. QTY.
WIRELESS STATIONS
RAIN GAUGE STATIONS
FORECASTING STATIONS
COMPLETED PROJECTS
ON GOING PROJECTS
SUB DIVISION
DIVISION
NOT TO SCALE
73°
74°
75°
76°
77°
78°
22°
21°
20°

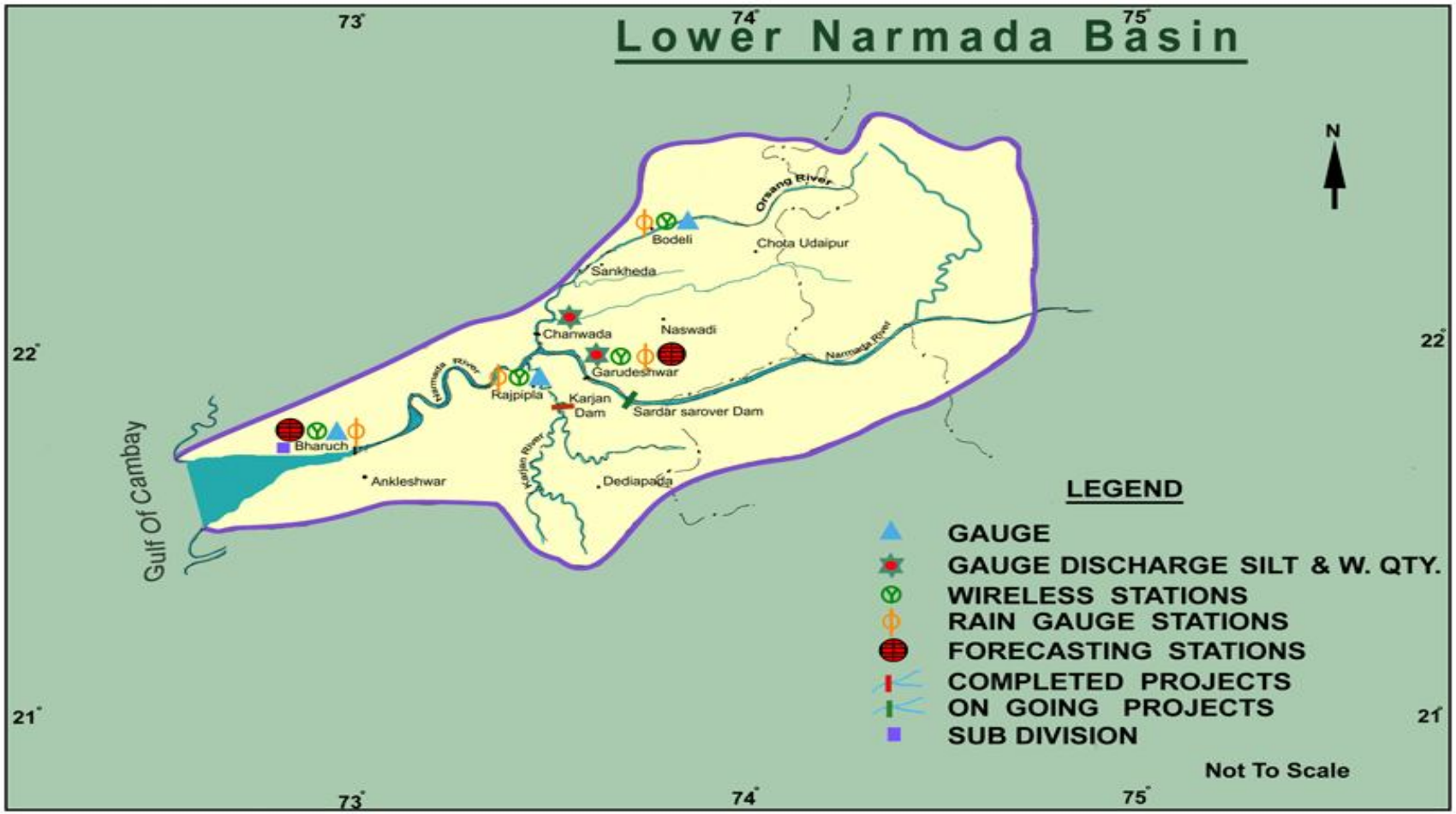
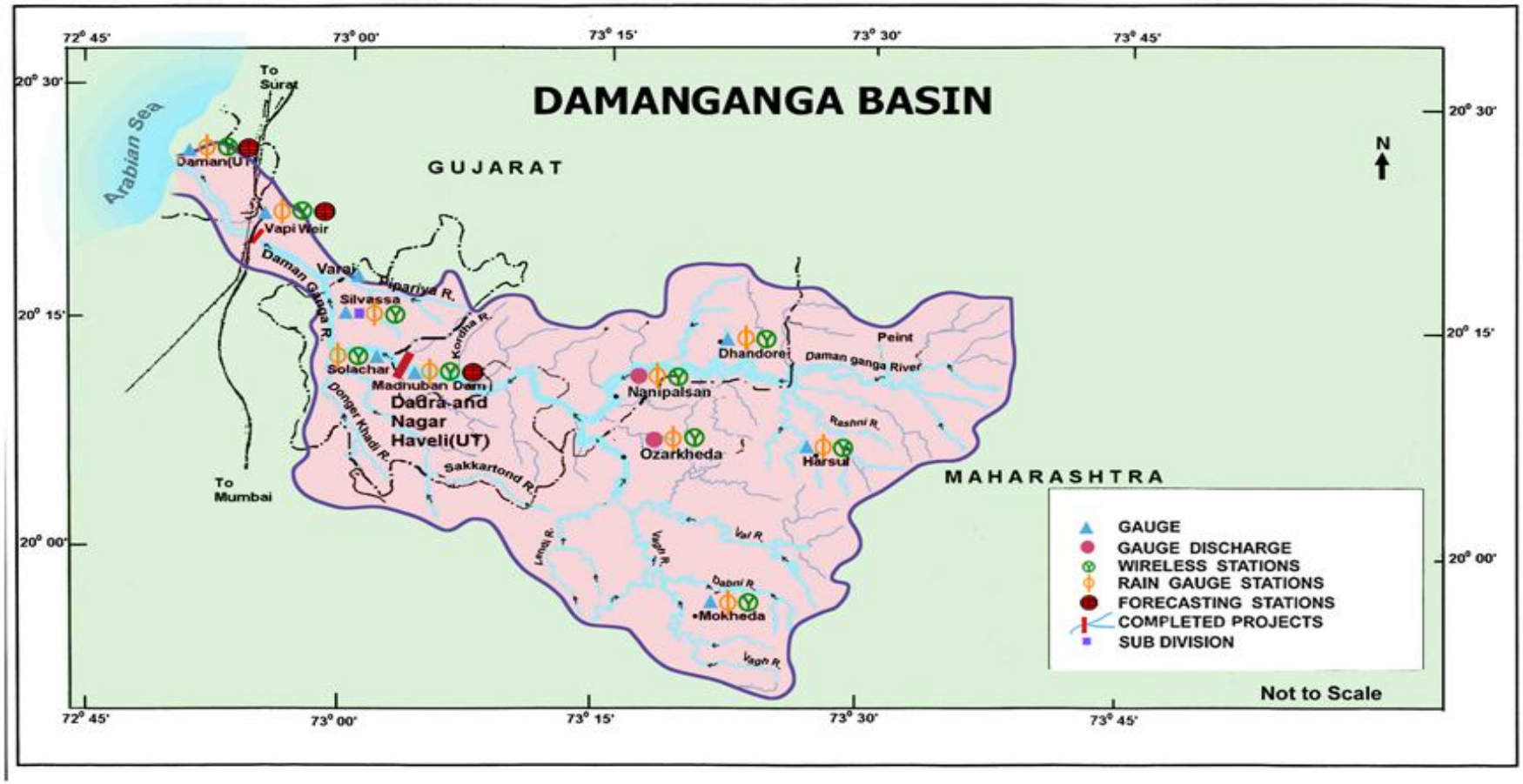
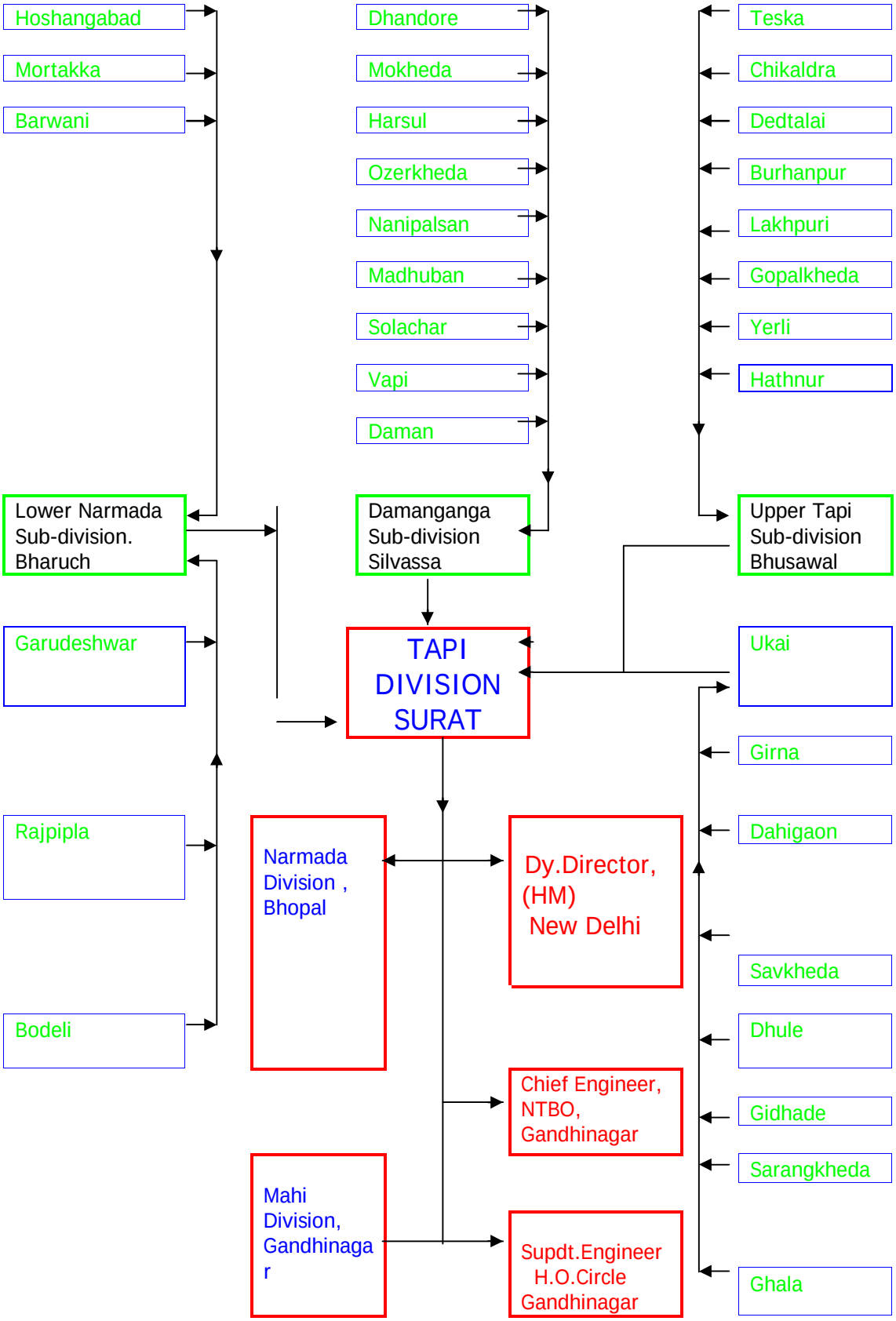
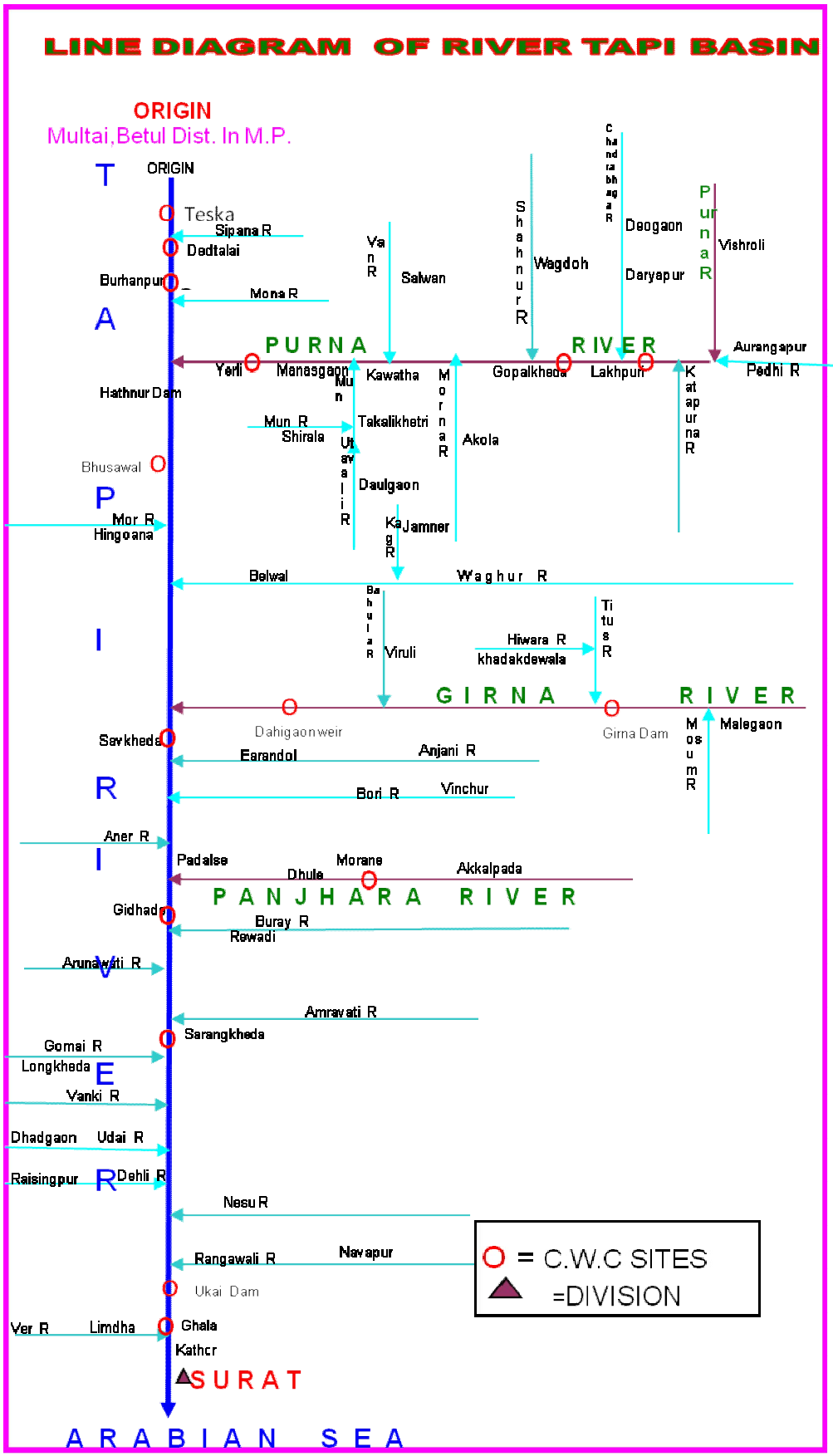

Lower Narmada Basin
73°
74°
75°
22°
21°
N
Orsang River
Bodeli
Chota Udaipur
Sankheda
Chanwada
Naswadi
Garudeshwar
Narmada River
Rajpipla
Karjan Dam
Sardar sarover Dam
Bharuch
Ankleshwar
Karjan River
Dediapada
Gulf Of Cambay
LEGEND
GAUGE
GAUGE DISCHARGE SILT & W. QTY.
WIRELESS STATIONS
RAIN GAUGE STATIONS
FORECASTING STATIONS
COMPLETED PROJECTS
ON GOING PROJECTS
SUB DIVISION
Not To Scale

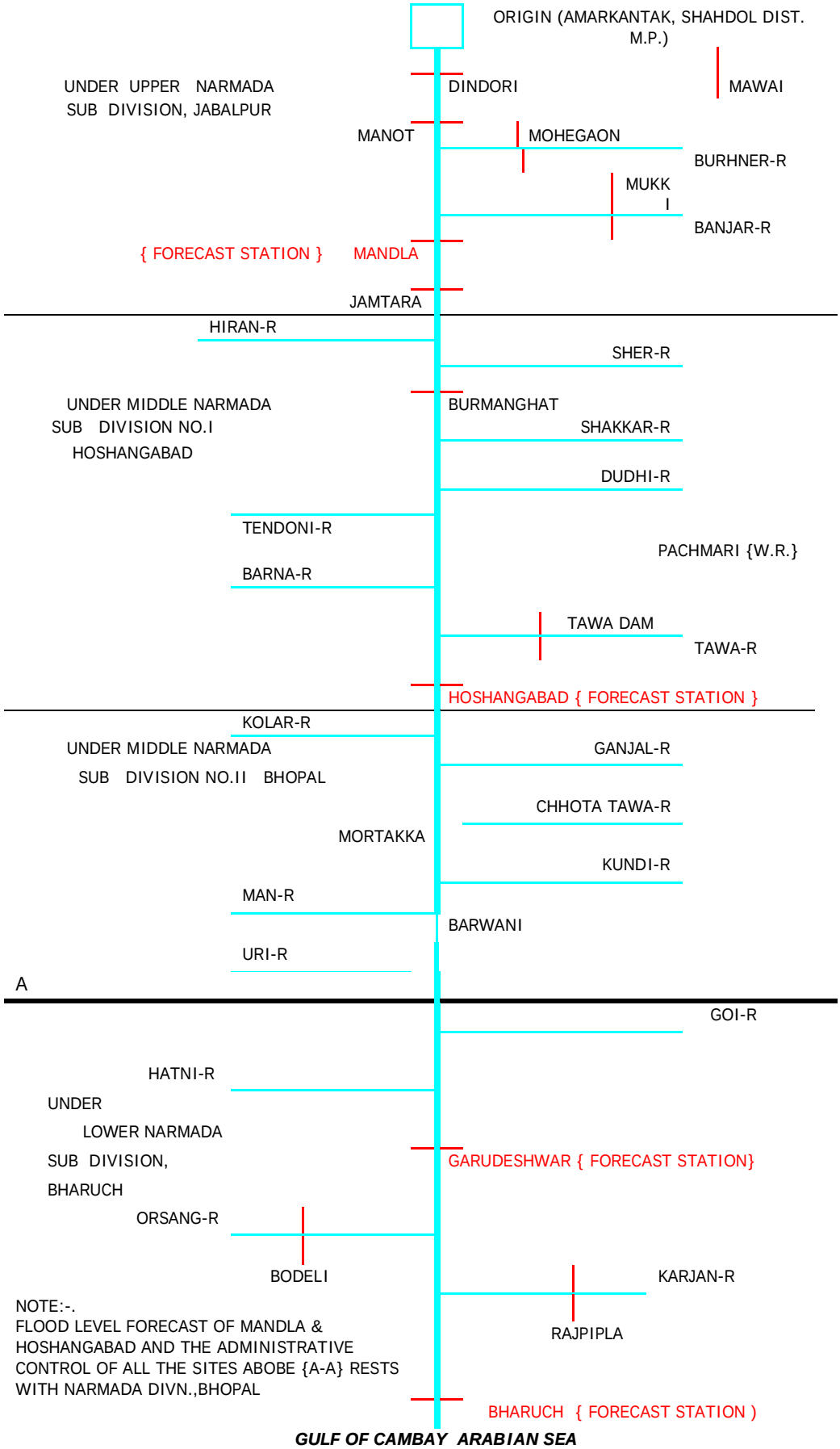
Plate - 4


DAMANGANGA BASIN
GUJARAT
MAHARASHTRA
Arabian Sea
To Surat
To Mumbai
Daman(UT)
Vapi Weir
Daman Ganga R.
Varai
Dipariya R.
Silvassa
Kordha R.
Solachar
Madhuban Dam
Dadra and Nagar Haveli(UT)
Donger Khadi R.
Sakkartond R.
Nanipalsan
Dhandorei
Peint
Daman ganga River
Ozarkheda
Harsul
Reshni R.
Lendi R.
Vagh R.
Vaal R.
Dabni R.
Mokheda
N
GAUGE
GAUGE DISCHARGE
WIRELESS STATIONS
RAIN GAUGE STATIONS
FORECASTING STATIONS
COMPLETED PROJECTS
SUB DIVISION
Not to Scale
72° 45'
73° 00'
73° 15'
73° 30'
73° 45'
20° 30'
20° 15'
20° 00'

COMMUNICATION NET WORK




LINE DIAGRAM OF RIVER TAPI BASIN
ORIGIN
Multai,Betul Dist. In M.P.
T
A
P
I
R
I
V
E
R
ORIGIN
Teska
Sipana R
Dedtalai
Burhanpur
Mona R
Hathnur Dam
Bhusawal
Mor R
Hingoana
Yerli
Manasgaon
Mun
Mun R
Shirala
Kawatha
Takalikhetri
Utavali R
Daulgaon
Kag R
Jamner
Van R
Salwan
Morna R
Akola
Shahnur R
Wagdoh
Gopalkheda
Chandrabhaga R
Deogaon
Daryapur
Lakhpuri
Purna R
Vishroli
Katapurna R
Aurangapur
Pedhi R
PURNA RIVER
Belwal
Waghur R
Bahula R
Viruli
Hiwara R
khadakdewala
Titus R
GIRNA RIVER
Dahigaonweir
Girna Dam
Mosum R
Malegaon
Savkheda
Earandol
Anjani R
Bori R
Vinchur
Aner R
Padalse
Dhule
Morane
Akkalpada
PANJHARA RIVER
Gidhade
Buray R
Rewadi
Arunawati R
Amravati R
Sarangkheda
Gomai R
Longkheda
Vanki R
Dhadgaon
Udai R
Raisingpur
Dehli R
Nesu R
Rangawali R
Navapur
Ukai Dam
Ver R
Limdha
Ghala
Kathor
SURAT
ARABIAN SEA
= C.W.C SITES
=DIVISION


ORIGIN (AMARKANTAK, SHAHDOL DIST. M.P.)
UNDER UPPER NARMADA SUB DIVISION, JABALPUR
DINDORI
MAWAI
MANOT
MOHEGAON
BURHNER-R
MUKK I
BANJAR-R
{ FORECAST STATION }
MANDLA
JAMTARA
HIRAN-R
SHER-R
UNDER MIDDLE NARMADA SUB DIVISION NO.I HOSHANGABAD
BURMANGHAT
SHAKKAR-R
DUDHI-R
TENDONI-R
PACHMARI {W.R.}
BARNA-R
TAWA DAM
TAWA-R
HOSHANGABAD { FORECAST STATION }
KOLAR-R
UNDER MIDDLE NARMADA SUB DIVISION NO.II BHOPAL
GANJAL-R
CHHOTA TAWA-R
MORTAKKA
KUNDI-R
MAN-R
BARWANI
URI-R
A
GOI-R
HATNI-R
UNDER LOWER NARMADA SUB DIVISION, BHARUCH
GARUDESHWAR { FORECAST STATION}
ORSANG-R
BODELI
KARJAN-R
RAJPIPLA
NOTE:-.
FLOOD LEVEL FORECAST OF MANDLA & HOSHANGABAD AND THE ADMINISTRATIVE CONTROL OF ALL THE SITES ABOBE {A-A} RESTS WITH NARMADA DIVN.,BHOPAL
BHARUCH { FORECAST STATION)
GULF OF CAMBAY ARABIAN SEA

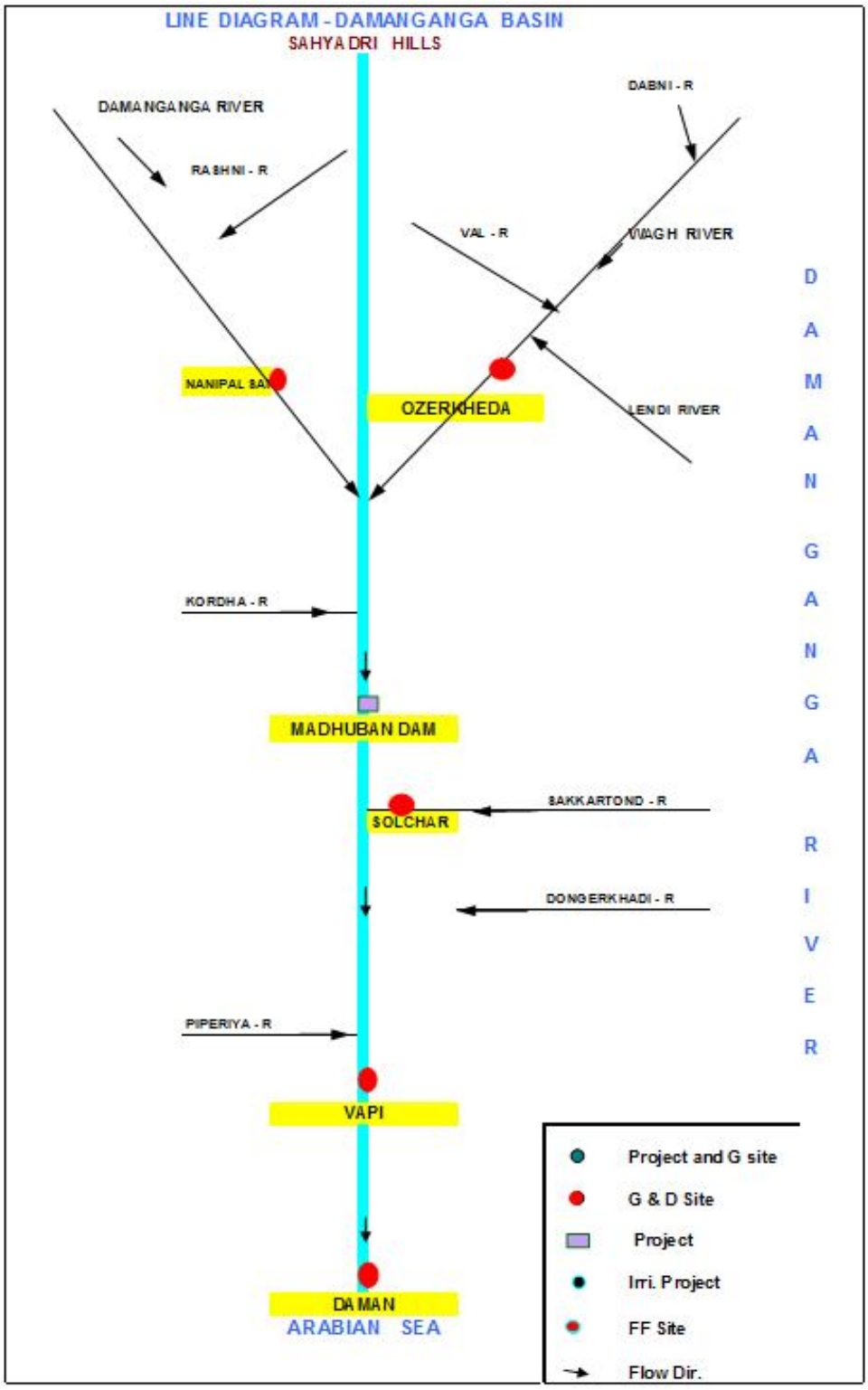
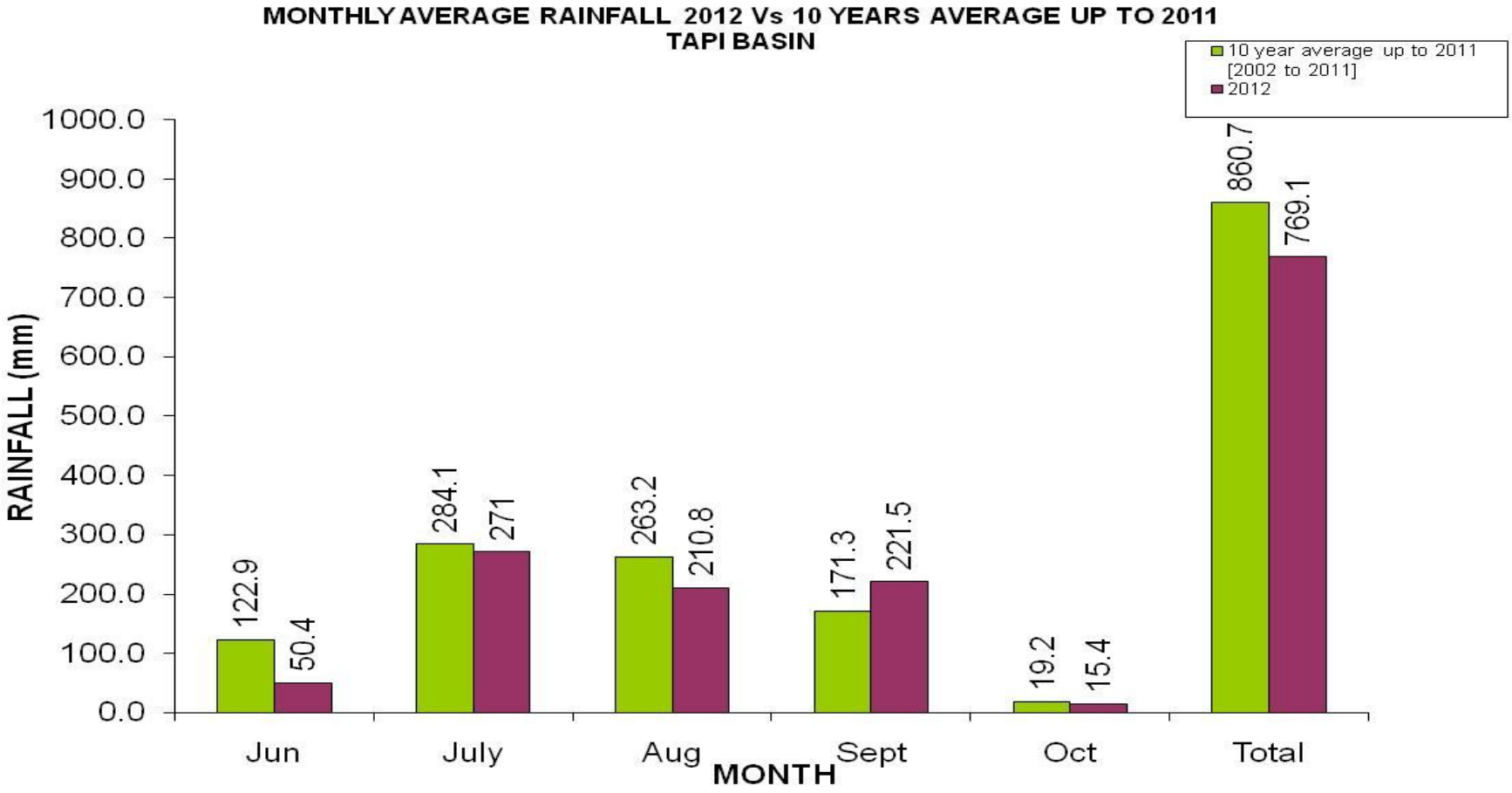

LINE DIAGRAM - DAMANGANGA BASIN
SAHYADRI HILLS
DAMANGANGA RIVER
RASHNI - R
DABNI - R
VAL - R
WAGH RIVER
NANIPAL SAT
OZERKHEDA
LENDI RIVER
KORDHA - R
MADHUBAN DAM
SAKKARTOND - R
SOLCHAR
DONGERKHADI - R
PIPERIYA - R
VAPI
DAMAN
ARABIAN SEA
DAMANGANGA RIVER
Project and G site
G & D Site
Project
Irri. Project
FF Site
Flow Dir.

Plate – 9


MONTHLY AVERAGE RAINFALL 2012 Vs 10 YEARS AVERAGE UP TO 2011
TAPI BASIN
10 year average up to 2011 [2002 to 2011]
2012
RAINFALL (mm)
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
122.9
50.4
284.1
271
263.2
210.8
171.3
221.5
19.2
15.4
860.7
769.1
Jun
July
Aug
Sept
Oct
Total
MONTH

MONTHLY AVERAGE RAINFALL 2012 Vs 10 YEARS AVERAGE UPTO 2011
LOWER NARMADA BASIN

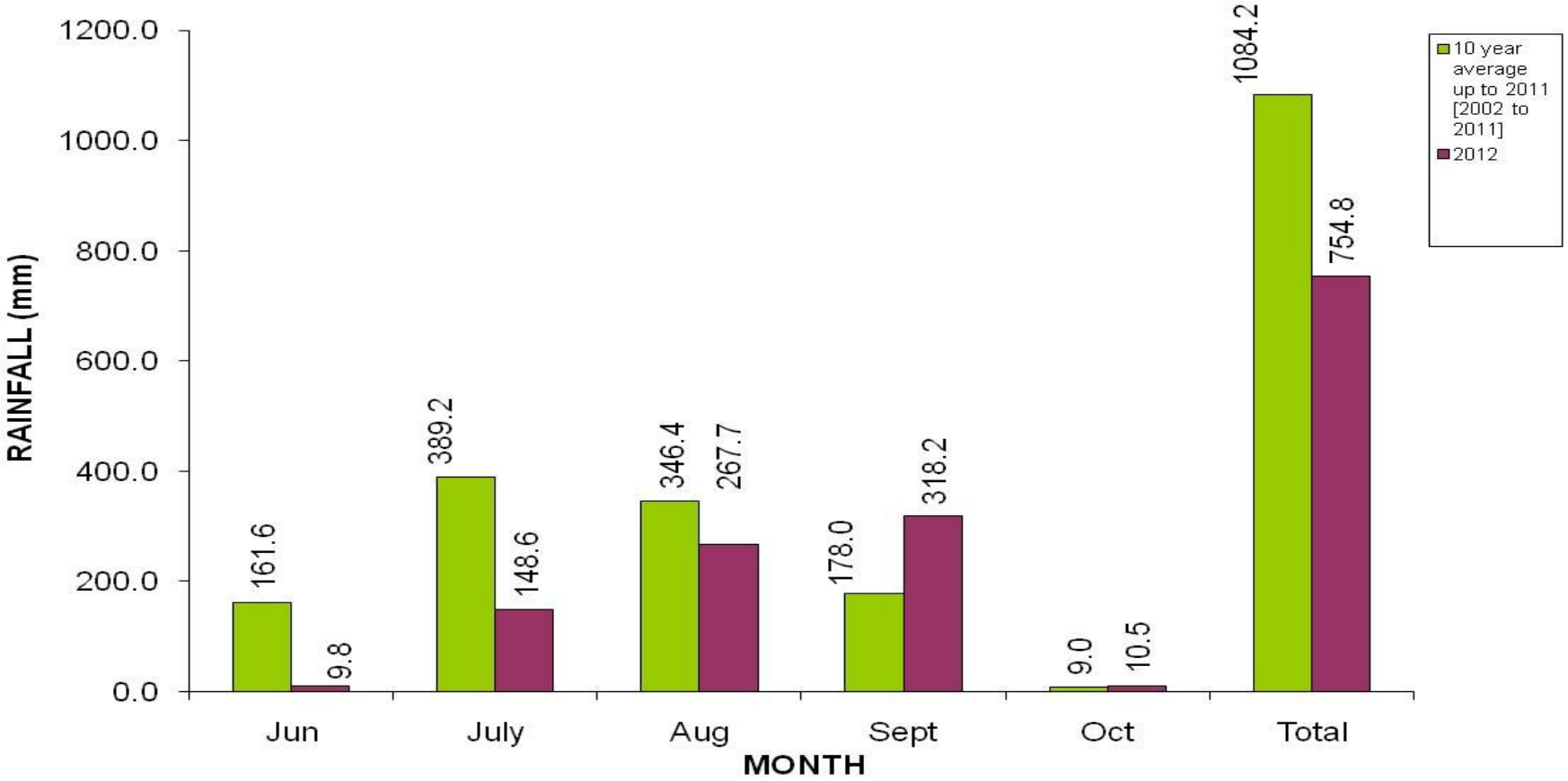
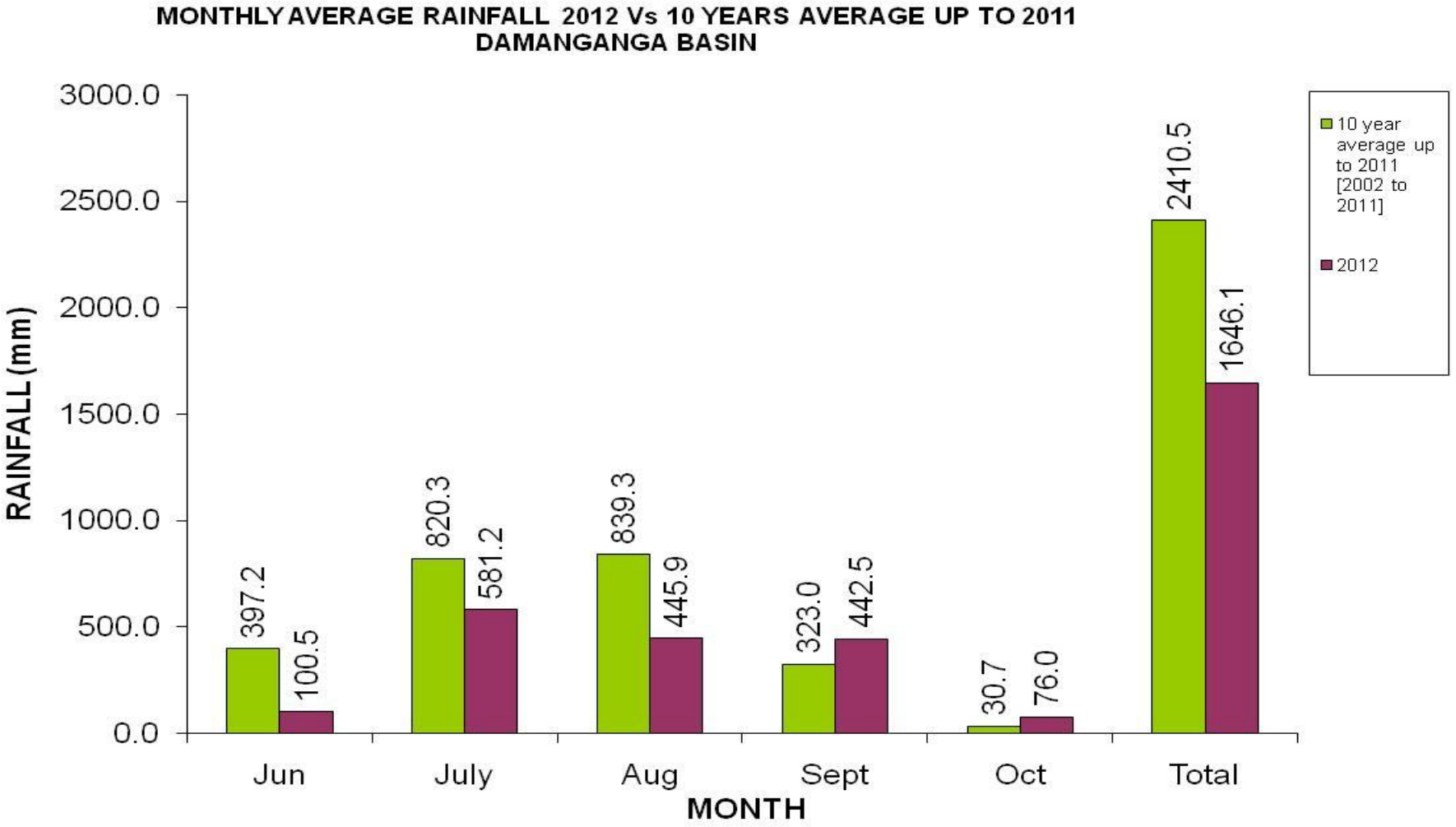
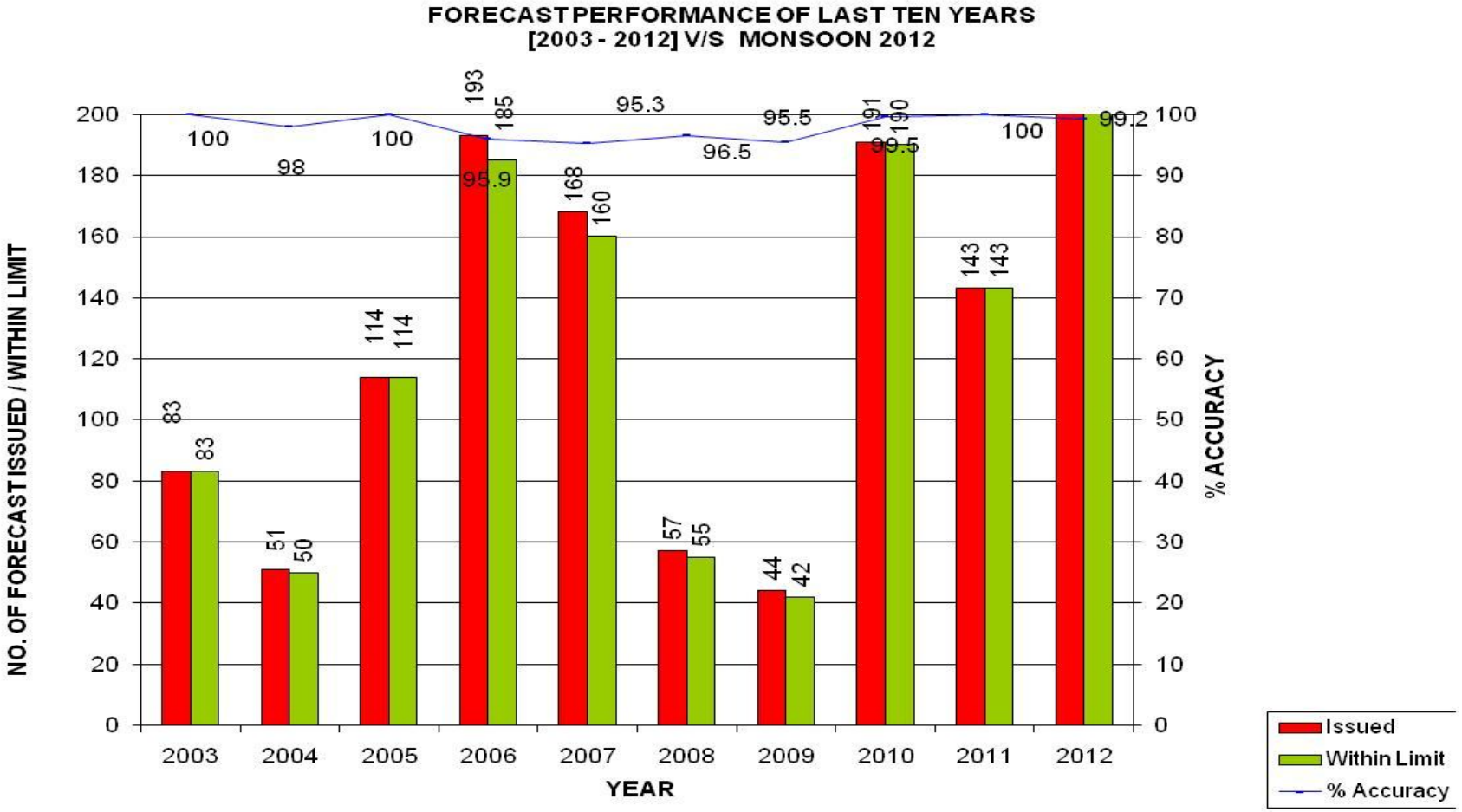
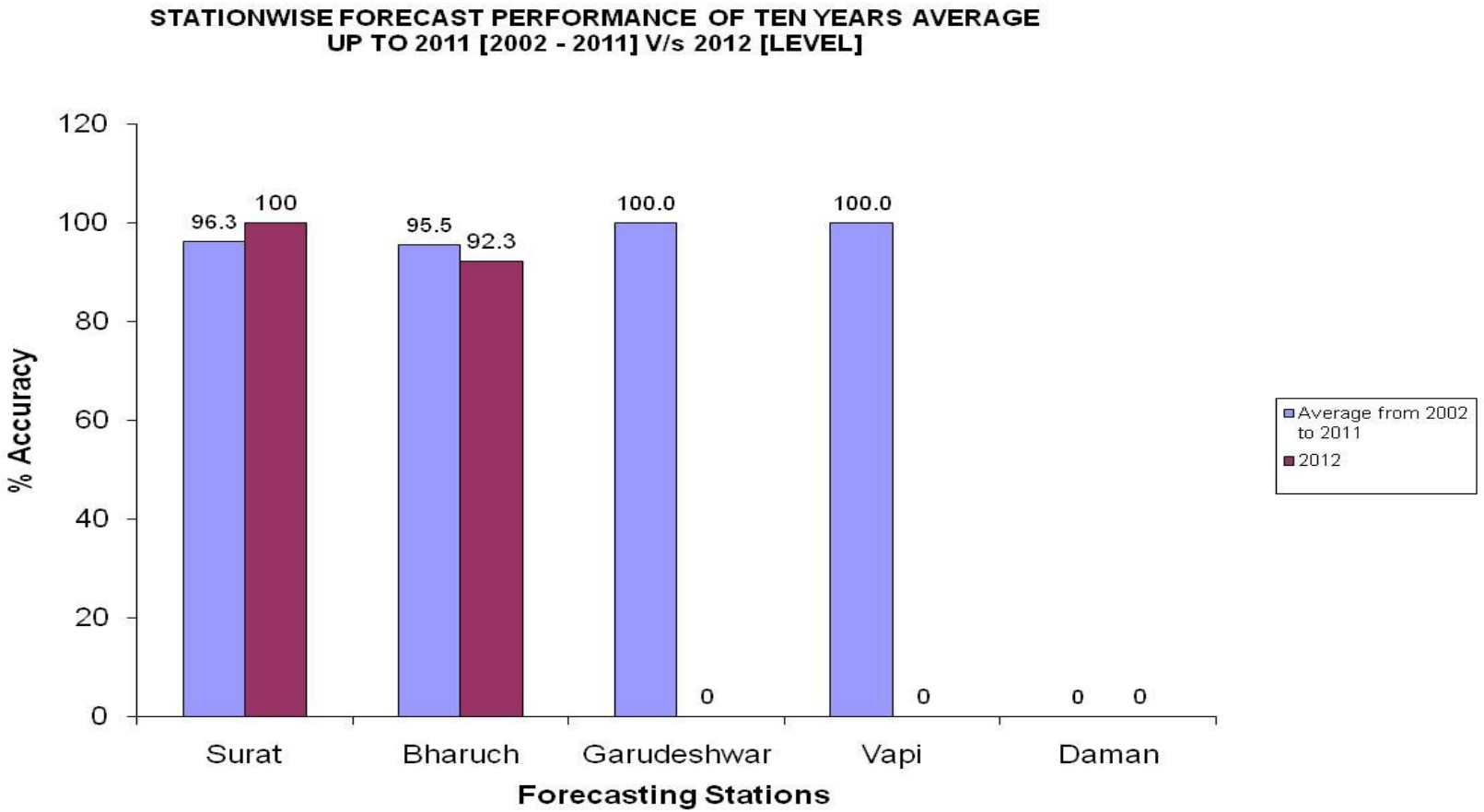


Plate - 11


MONTHLY AVERAGE RAINFALL 2012 Vs 10 YEARS AVERAGE UP TO 2011
DAMANGANGA BASIN
RAINFALL (mm)
3000.0
2500.0
2000.0
1500.0
1000.0
500.0
0.0
397.2
100.5
820.3
581.2
839.3
445.9
323.0
442.5
30.7
76.0
2410.5
1646.1
Jun
July
Aug
Sept
Oct
Total
MONTH
10 year average up to 2011 [2002 to 2011]
2012


FORECAST PERFORMANCE OF LAST TEN YEARS
[2003 - 2012] V/S MONSOON 2012
NO. OF FORECAST ISSUED / WITHIN LIMIT
% ACCURACY
YEAR
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
83
83
51
50
114
114
193
185
168
160
57
55
44
42
191
190
143
143
100
98
100
95.9
95.3
96.5
95.5
99.5
100
99.2
Issued
Within Limit
% Accuracy


STATIONWISE FORECAST PERFORMANCE OF TEN YEARS AVERAGE
UP TO 2011 [2002 - 2011] V/s 2012 [LEVEL]
% Accuracy
120
100
80
60
40
20
0
96.3
100
95.5
92.3
100.0
0
100.0
0
0
0
Surat
Bharuch
Garudeshwar
Vapi
Daman
Forecasting Stations
Average from 2002 to 2011
2012

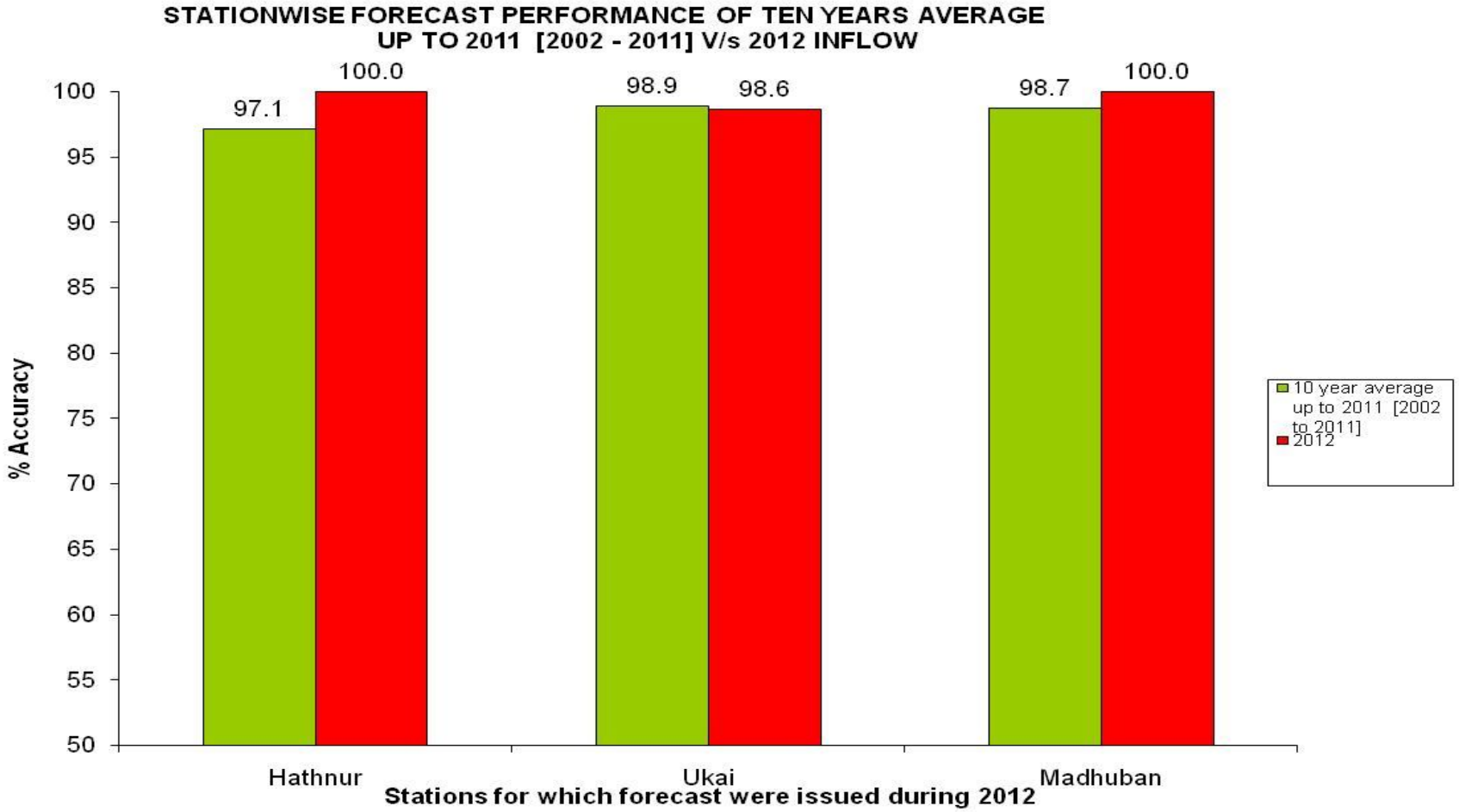

STATIONWISE FORECAST PERFORMANCE OF TEN YEARS AVERAGE
UP TO 2011 [2002 - 2011] V/s 2012 INFLOW
% Accuracy
100
95
90
85
80
75
70
65
60
55
50
97.1
100.0
98.9
98.6
98.7
100.0
Hathnur
Ukai
Madhuban
Stations for which forecast were issued during 2012
10 year average up to 2011 [2002 to 2011]
2012

Plate – 15

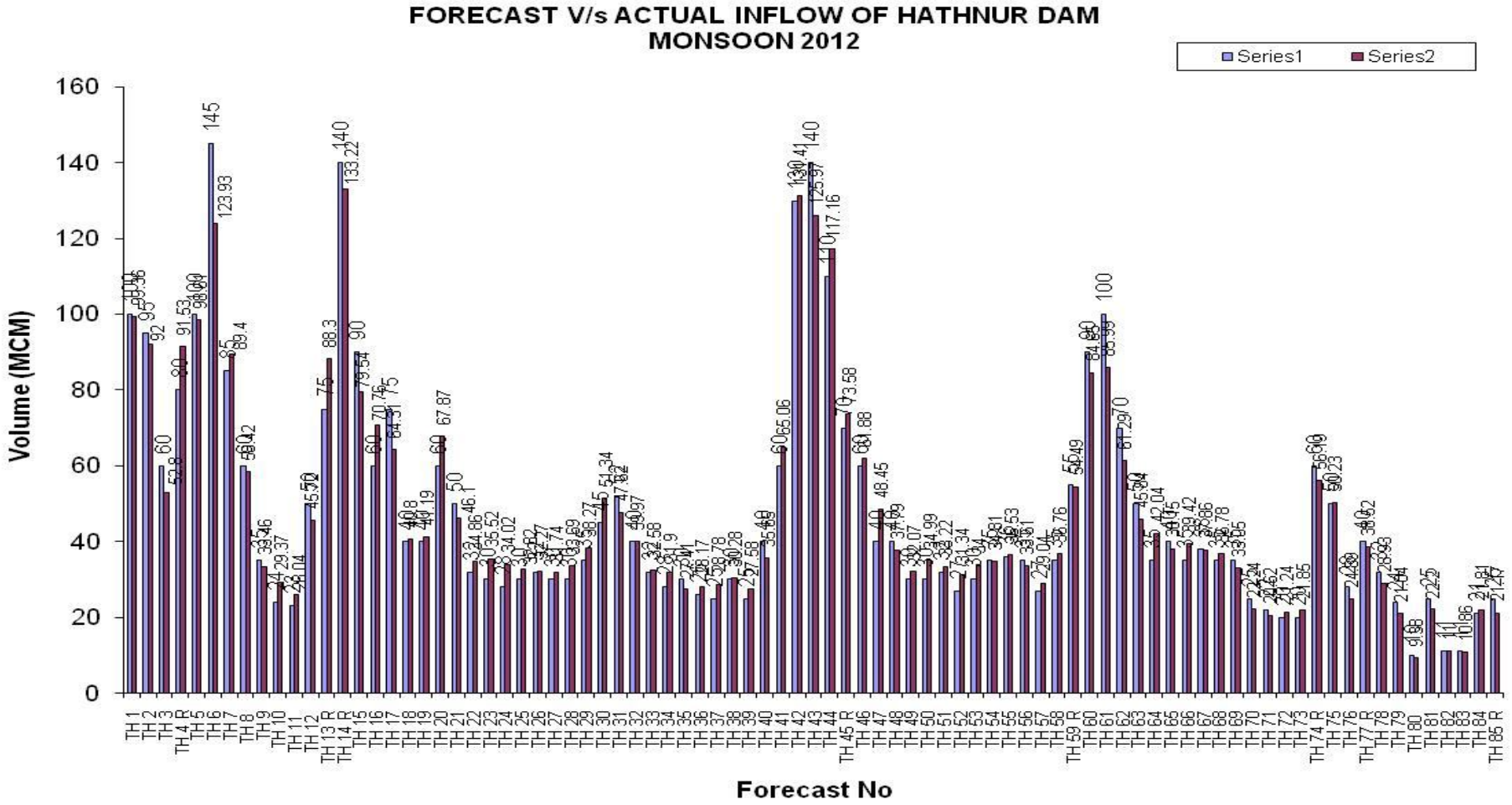
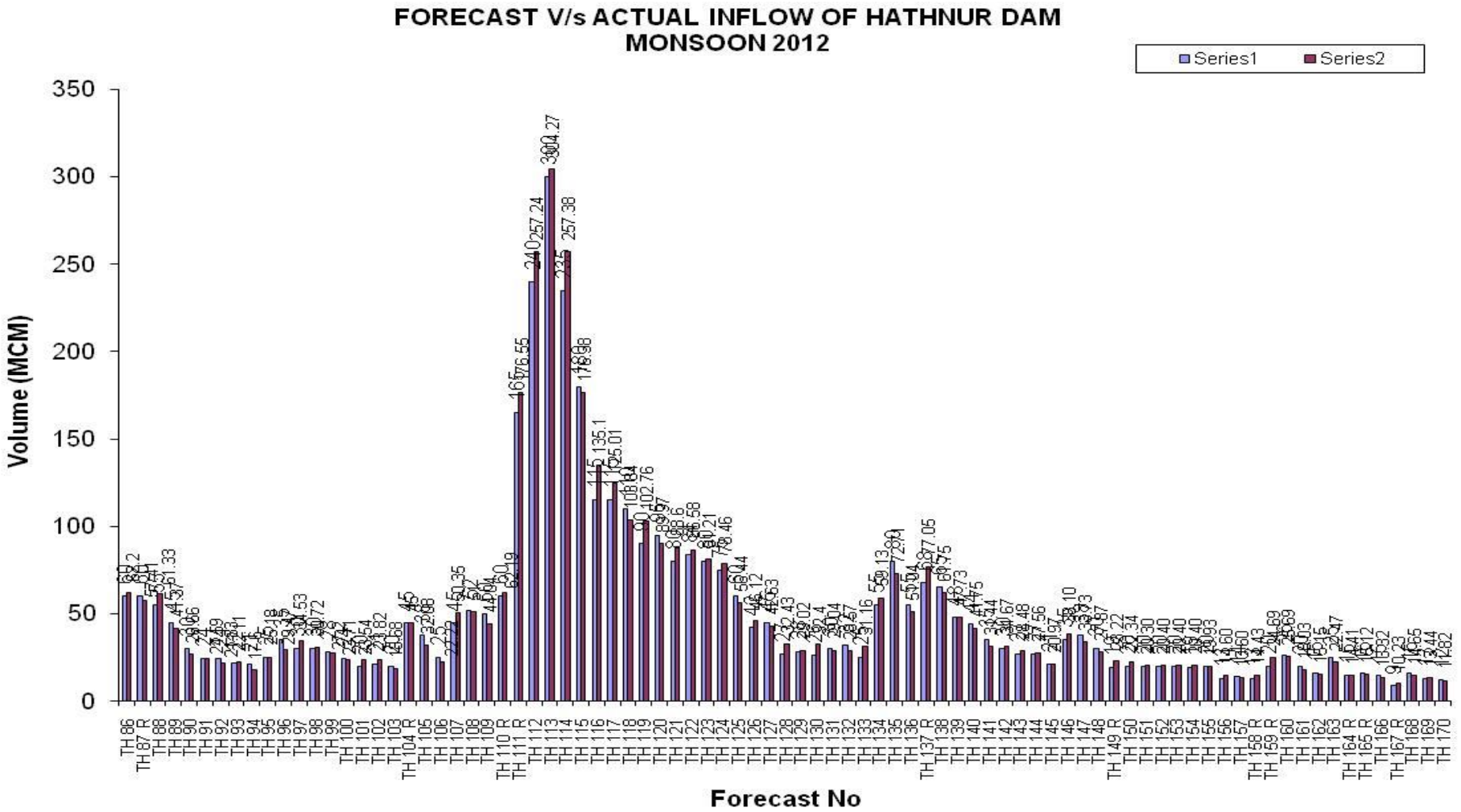
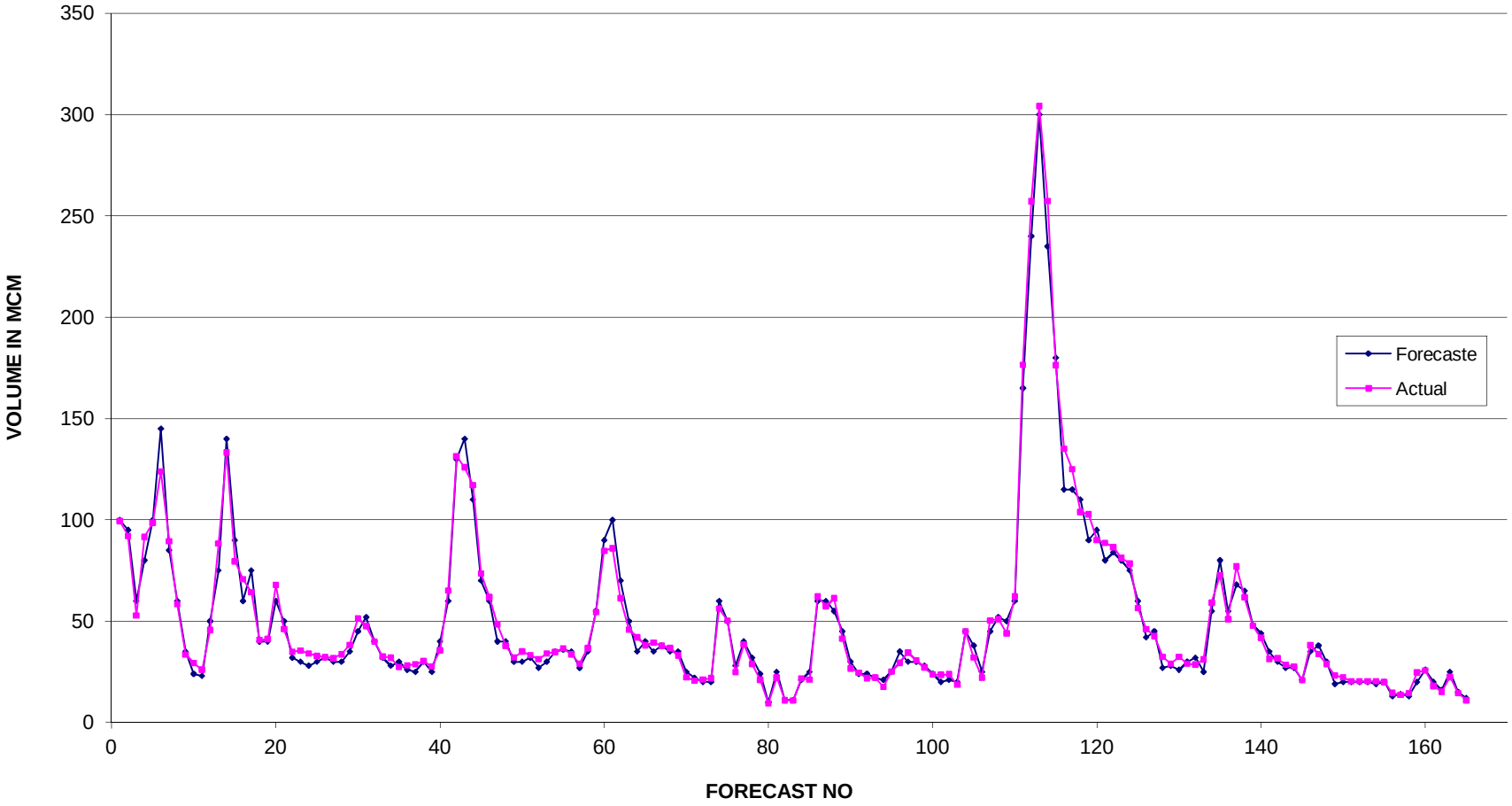

FORECAST V/s ACTUAL INFLOW OF HATHNUR DAM
MONSOON 2012
Series1
Series2
Volume (MCM)
Forecast No

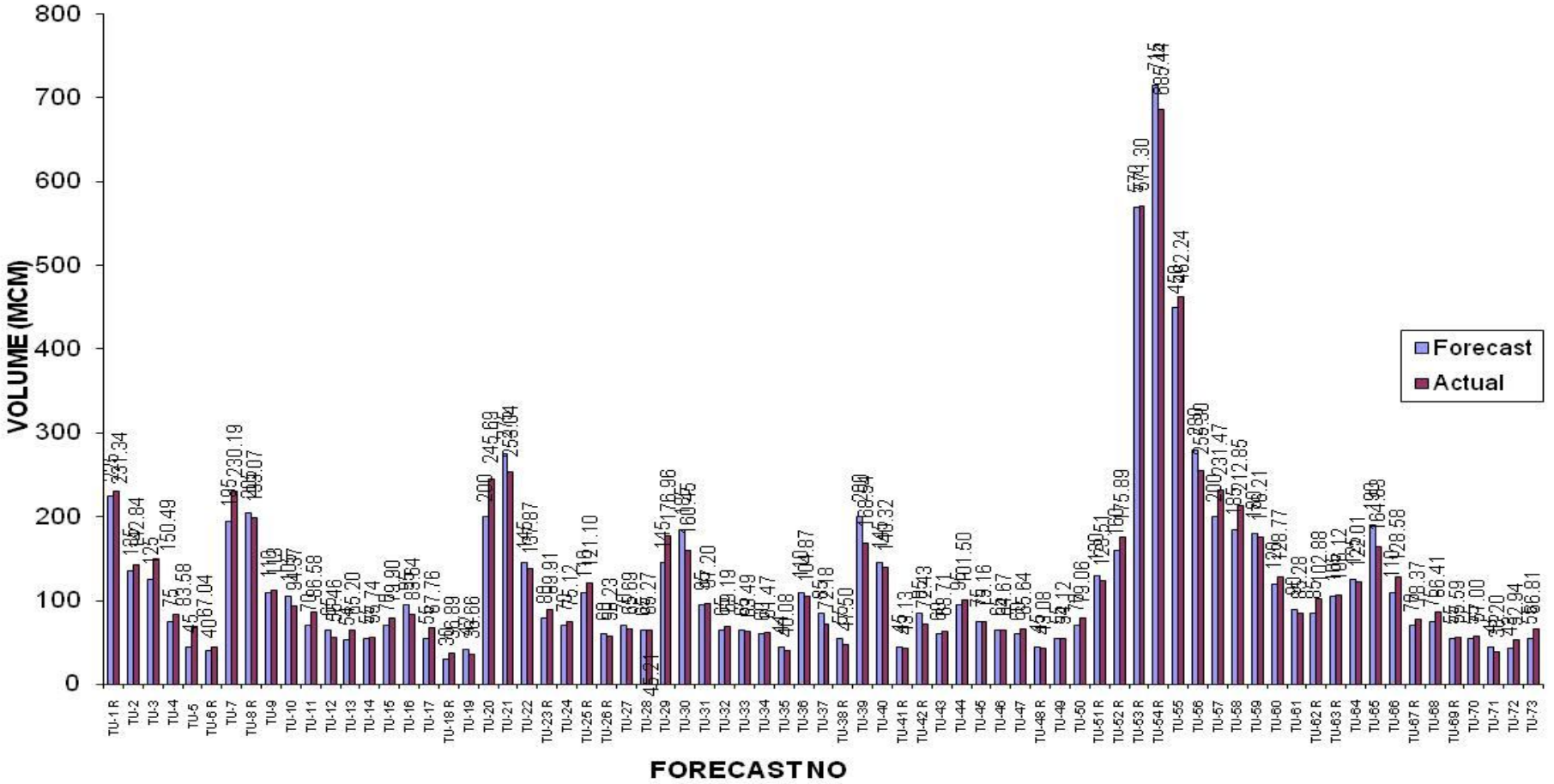
Plate – 15 CONTINUED



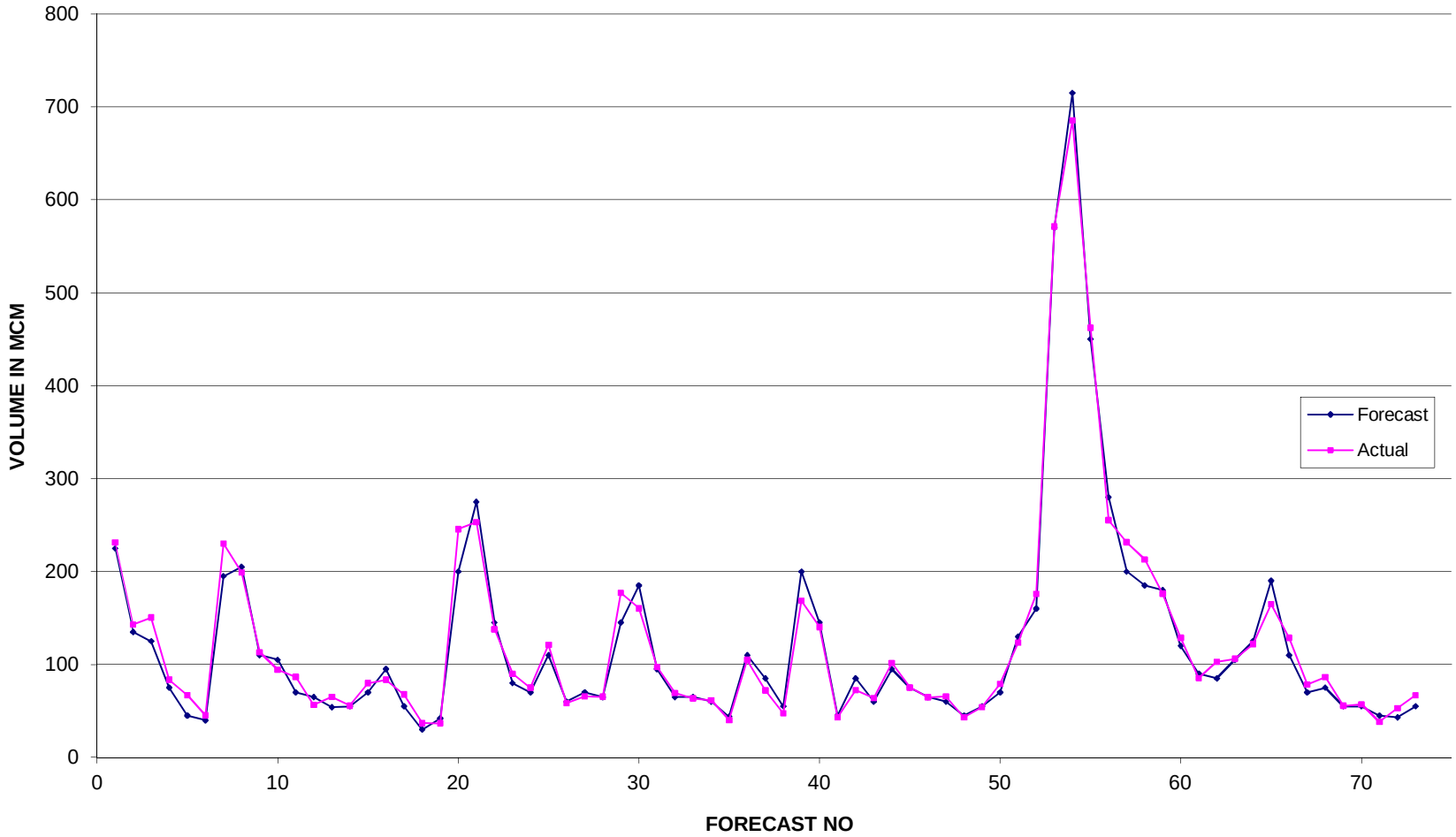
FORECASTED VALUE V/S ACTUAL VALUE FOR HATHNUR DAM



FORECAST V/s ACTUAL INFLOW OF UKAI DAM
MONSOON - 2012



FORECASTED VALUE V/S ACTUAL VALUE FOR UKAI DAM



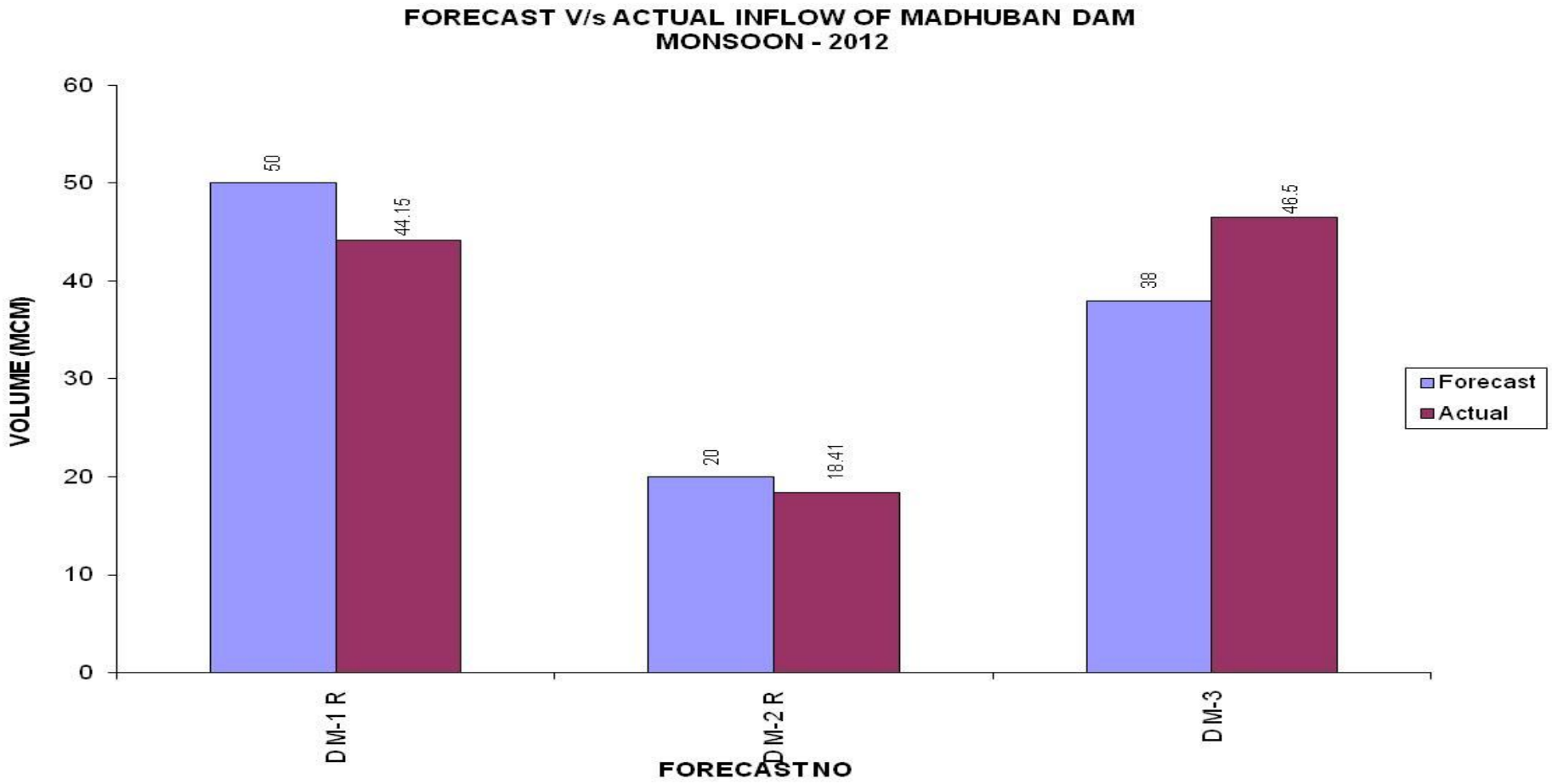

FORECAST V/s ACTUAL INFLOW OF MADHUBAN DAM
MONSOON - 2012
VOLUME (MCM)
60
50
40
30
20
10
0
50
44.15
20
18.41
38
46.5
Forecast
Actual
DM-1 R
DM-2 R
DM-3
FORECASTNO

Plate - 20

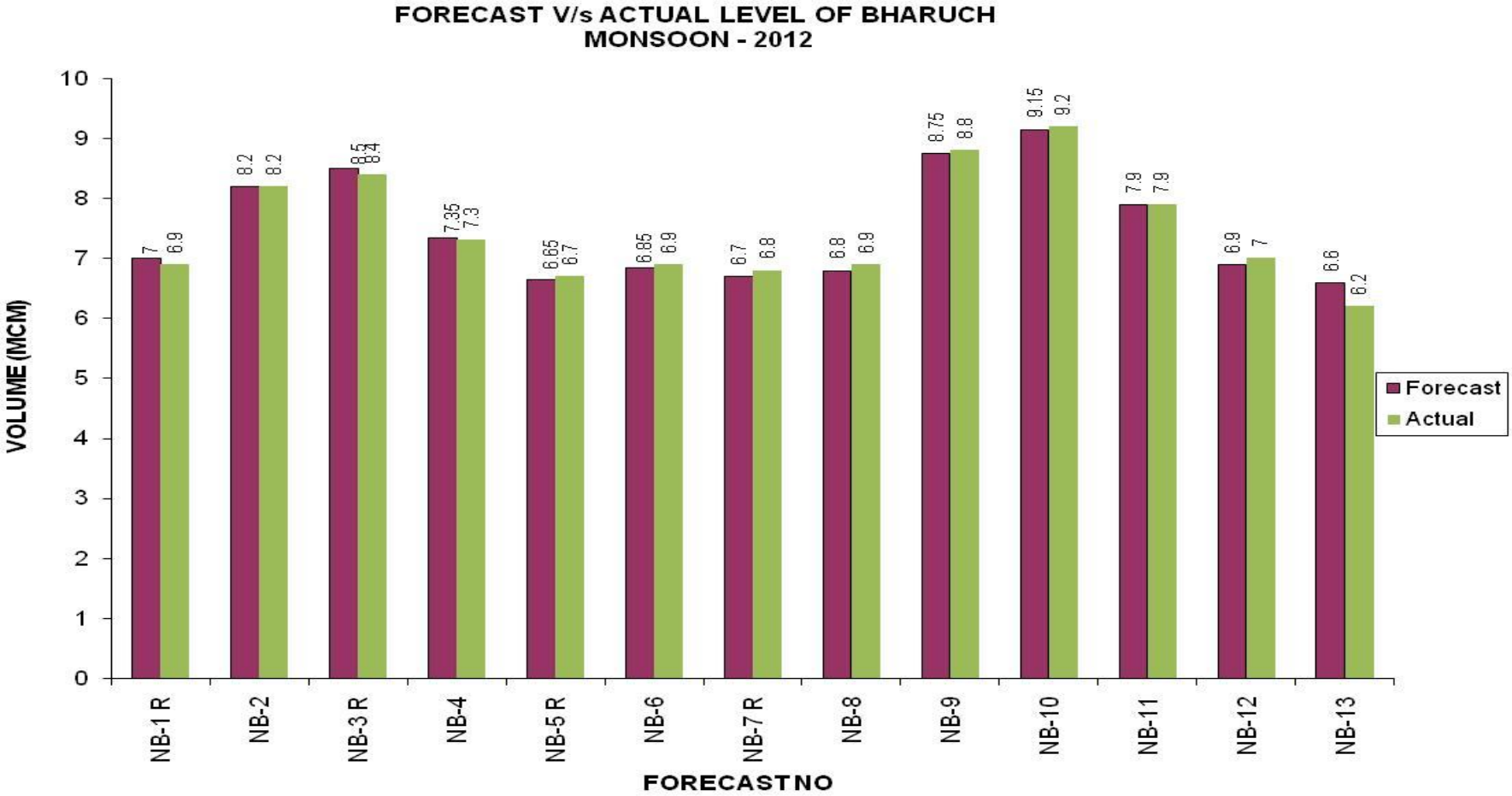
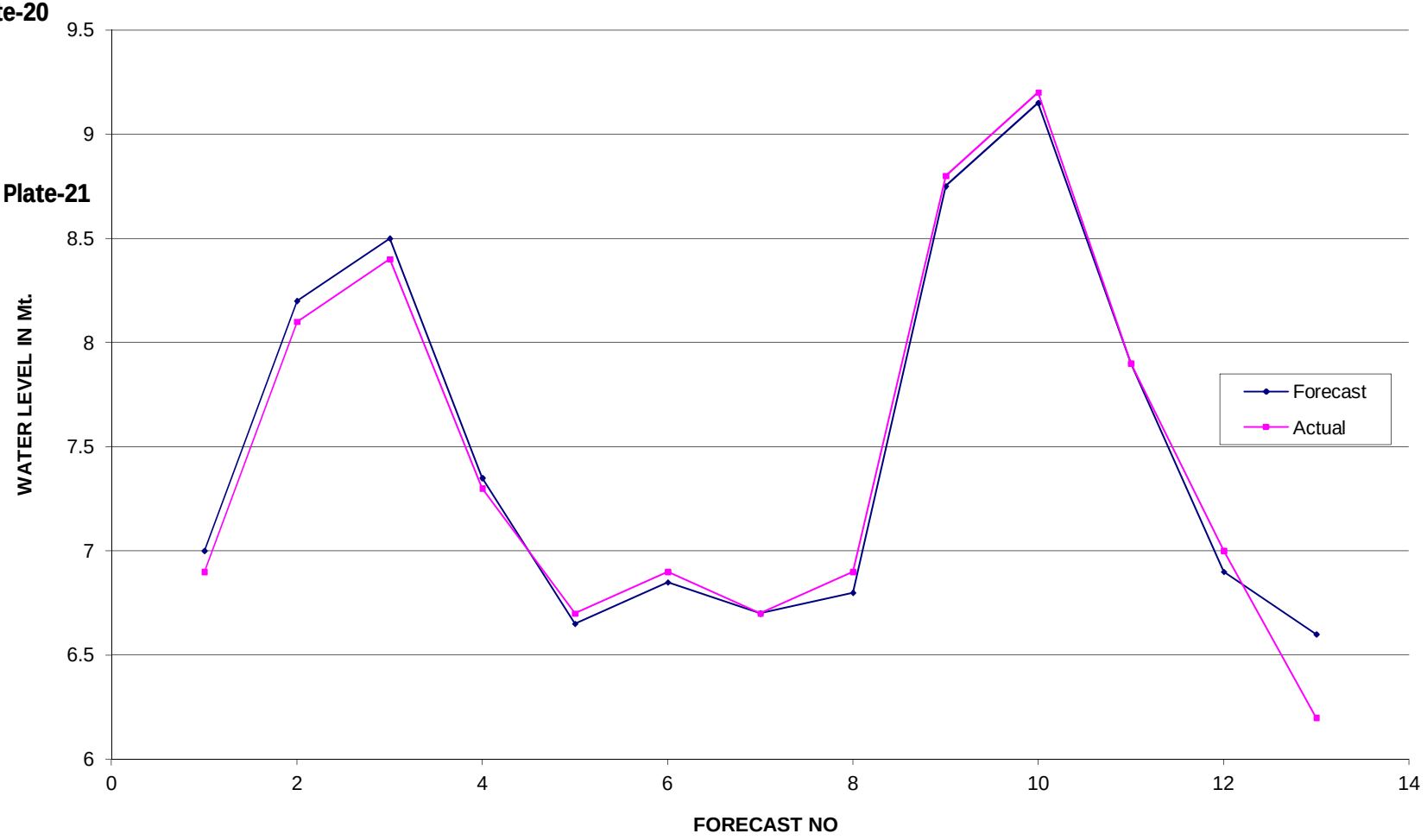

FORECAST V/s ACTUAL LEVEL OF BHARUCH
MONSOON - 2012
VOLUME (MCM)
10
9
8
7
6
5
4
3
2
1
0
7
6.9
8.2
8.2
8.5
8.4
7.35
7.3
6.65
6.7
6.85
6.9
6.7
6.8
6.8
6.9
8.75
8.8
9.15
9.2
7.9
7.9
6.9
7
6.6
6.2
NB-1 R
NB-2
NB-3 R
NB-4
NB-5 R
NB-6
NB-7 R
NB-8
NB-9
NB-10
NB-11
NB-12
NB-13
FORECASTNO
Forecast
Actual

Plate – 21

FORECASTED VALUE V/S ACTUAL VALUE FOR BHARUCH

Plate-20

Plate-21



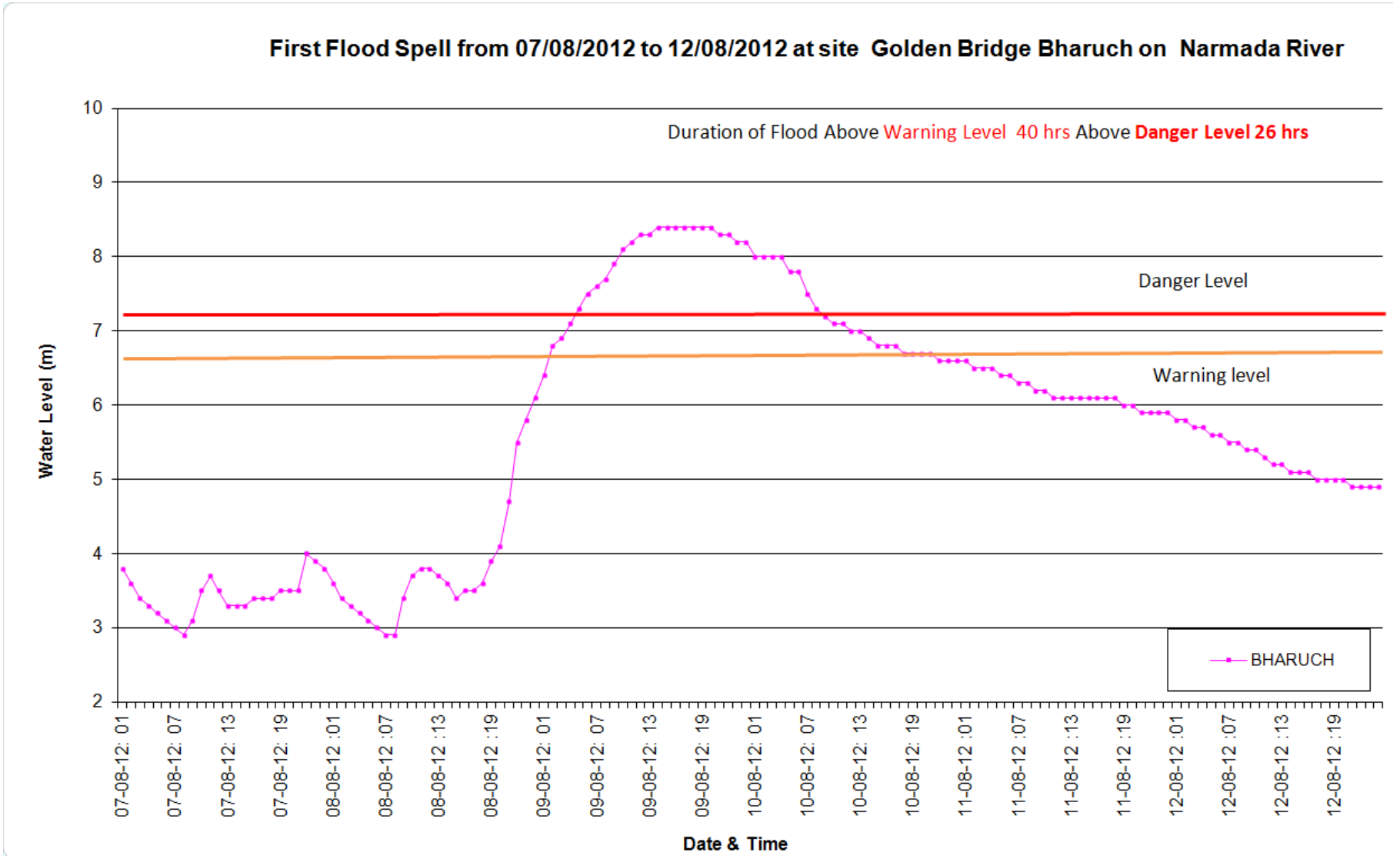
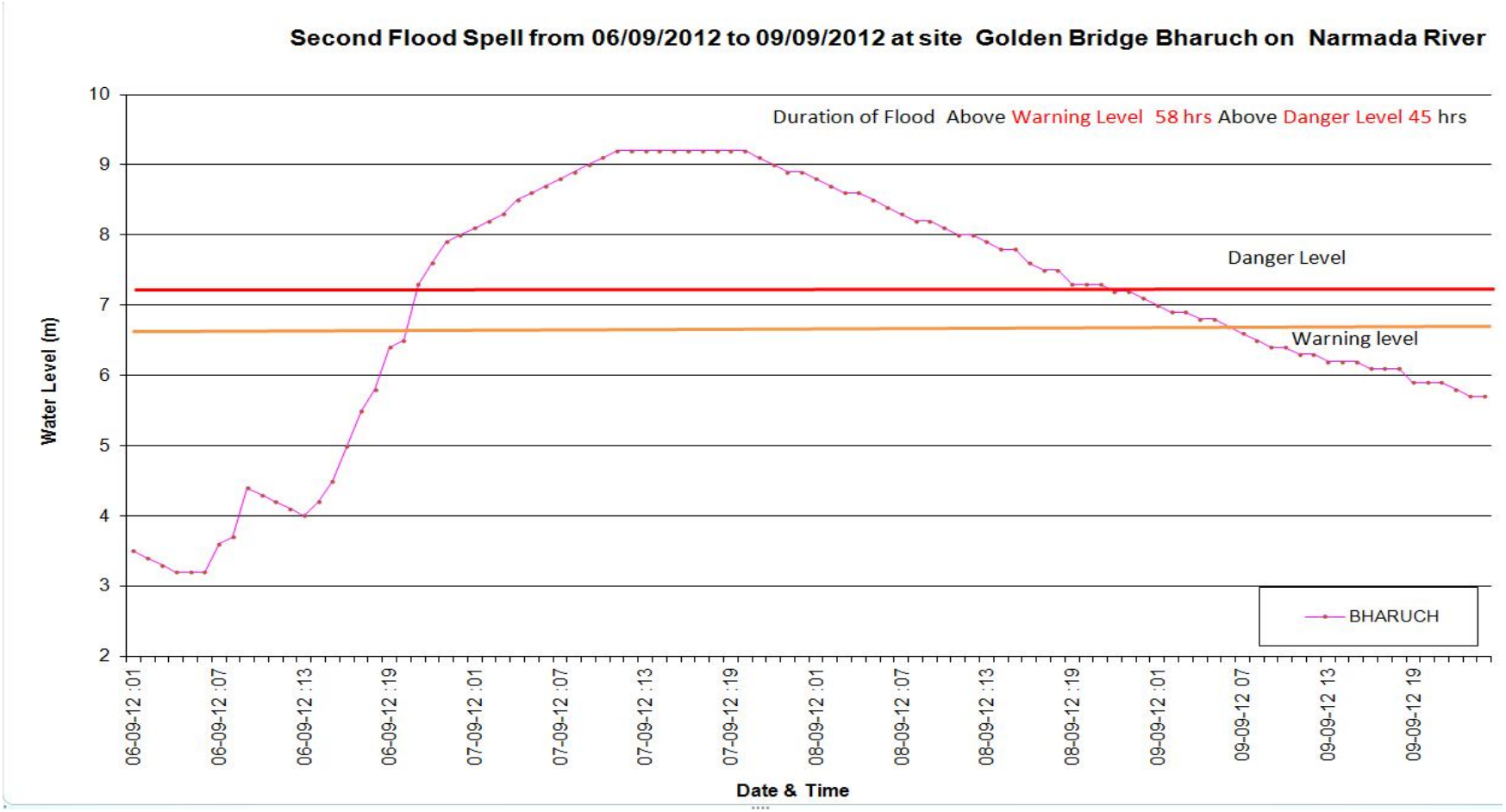
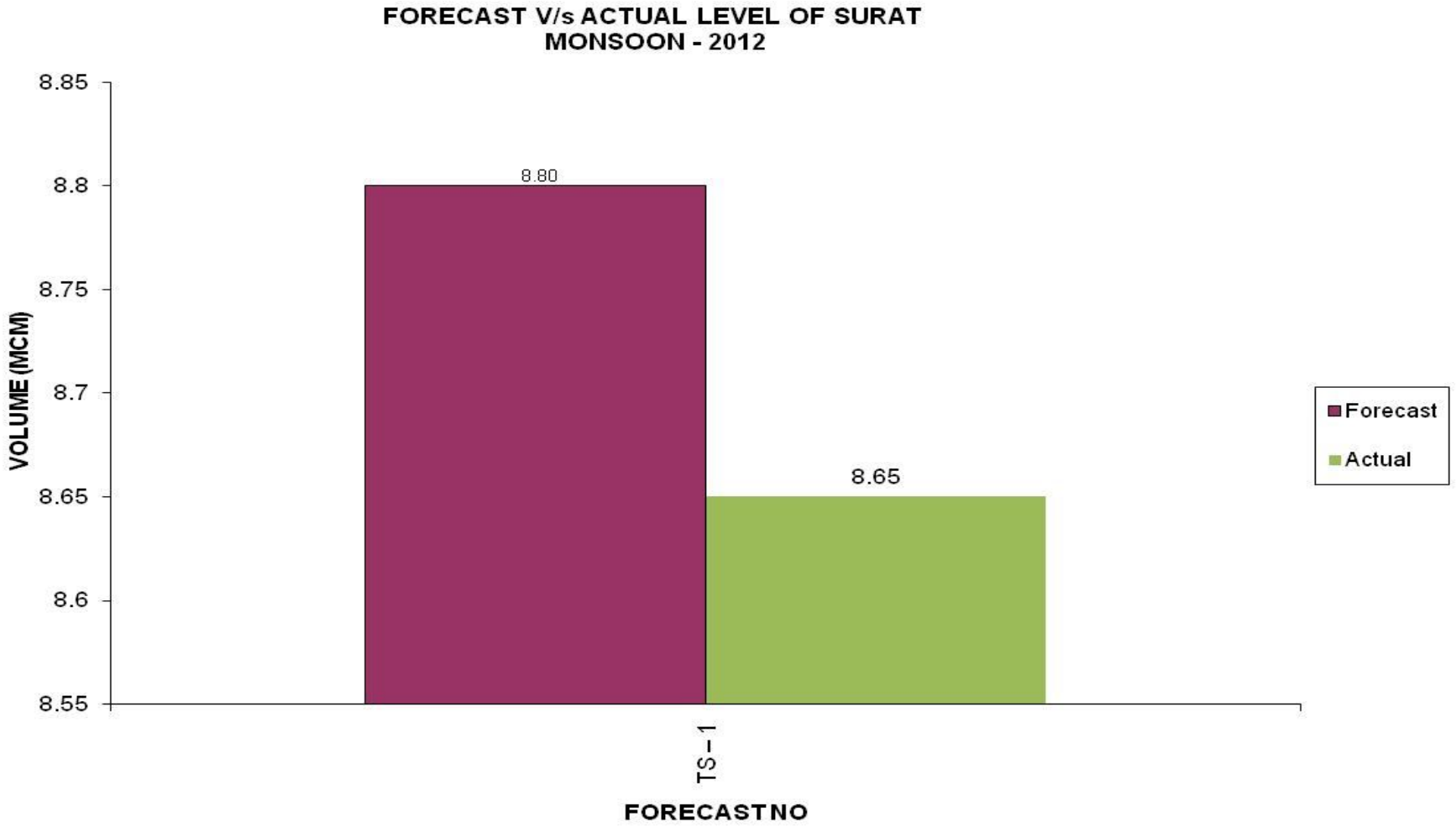
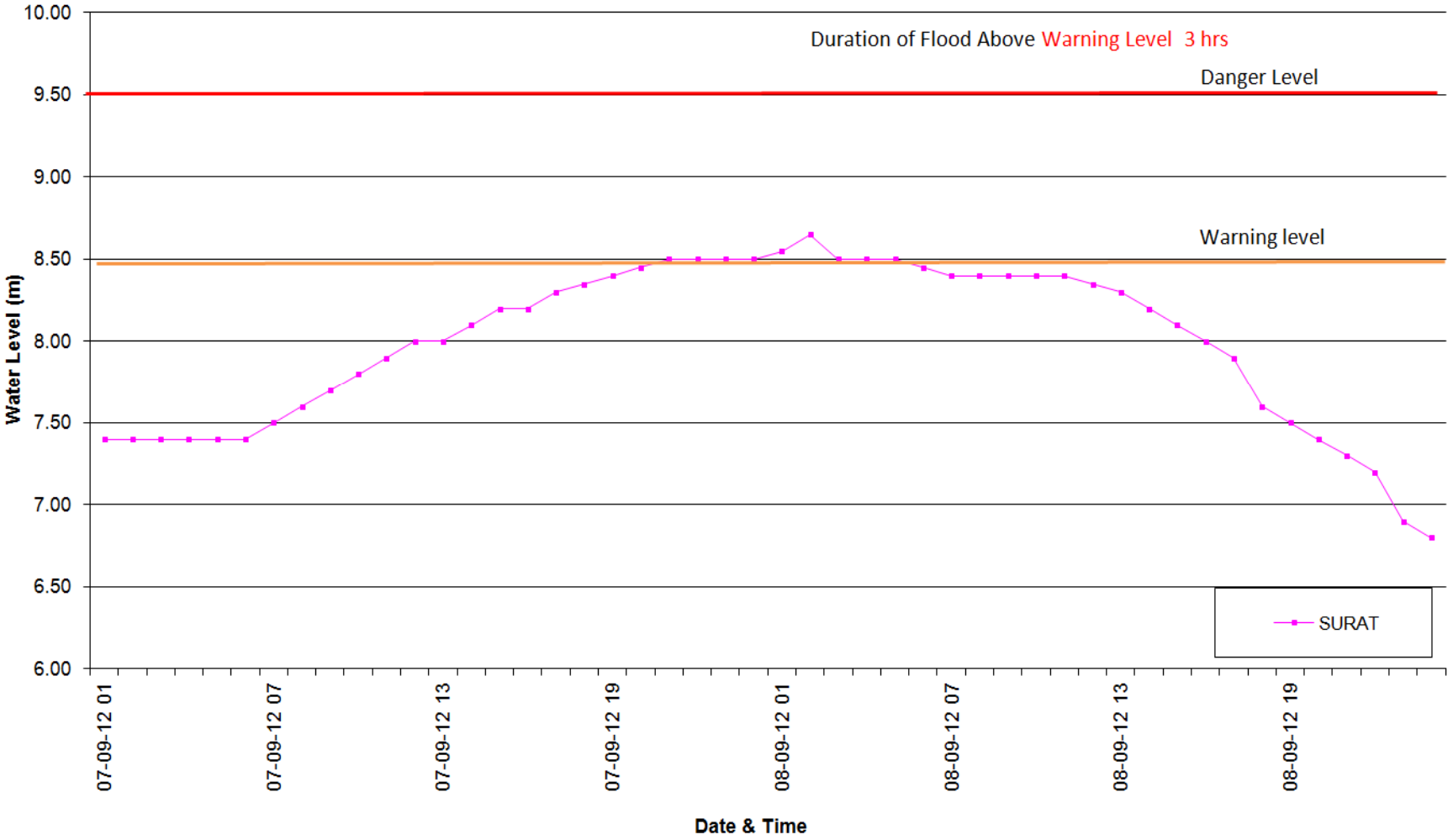

First Flood Spell from 07/08/2012 to 12/08/2012 at site Golden Bridge Bharuch on Narmada River
Duration of Flood Above Warning Level 40 hrs Above Danger Level 26 hrs
Danger Level
Warning level
BHARUCH
Water Level (m)
Date & Time
10
9
8
7
6
5
4
3
2
07-08-12: 01
07-08-12: 07
07-08-12: 13
07-08-12: 19
08-08-12 :01
08-08-12 :07
08-08-12 :13
08-08-12 :19
09-08-12: 01
09-08-12: 07
09-08-12: 13
09-08-12: 19
10-08-12: 01
10-08-12: 07
10-08-12: 13
10-08-12: 19
11-08-12 :01
11-08-12 :07
11-08-12 :13
11-08-12 :19
12-08-12 :01
12-08-12 :07
12-08-12 :13
12-08-12 :19

Plate – 23


Second Flood Spell from 06/09/2012 to 09/09/2012 at site Golden Bridge Bharuch on Narmada River
Duration of Flood Above Warning Level 58 hrs Above Danger Level 45 hrs
Danger Level
Warning level
BHARUCH
Water Level (m)
Date & Time
10
9
8
7
6
5
4
3
2
06-09-12 :01
06-09-12 :07
06-09-12 :13
06-09-12 :19
07-09-12 :01
07-09-12 :07
07-09-12 :13
07-09-12 :19
08-09-12 :01
08-09-12 :07
08-09-12 :13
08-09-12 :19
09-09-12 :01
09-09-12 07
09-09-12 13
09-09-12 19


FORECAST V/s ACTUAL LEVEL OF SURAT
MONSOON - 2012
8.85
8.8
8.75
8.7
8.65
8.6
8.55
VOLUME (MCM)
8.80
8.65
Forecast
Actual
TS – 1
FORECASTNO

Flood Spell from 08/09/2012 to 08/09/2012 at site Neharu Bridge Surat on Tapi River



Flood Photograph of Surat During Monsoon 2012

Flood Photograph of Surat During Monsoon 2012