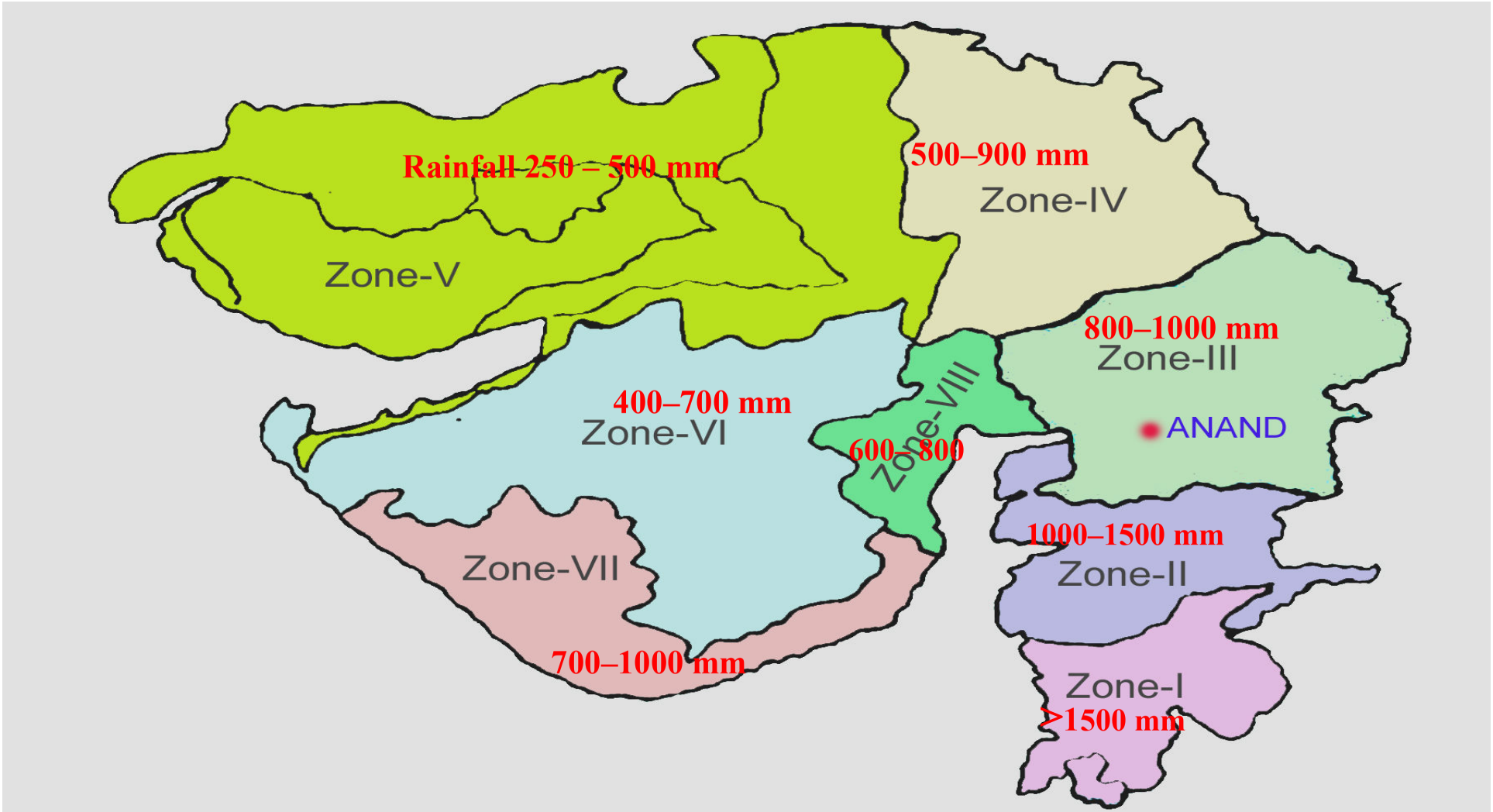
Validation of Astro-meteorological Rainfall Forecast for Gujarat

M.C. Varshneya,
V.B. Vaidya, Vyas Pandey, A.M. Shekh and B.I. Karande

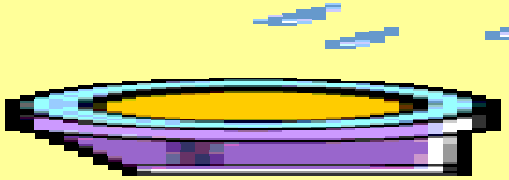
Anand Agricultural University,
Anand – 388 110, Gujarat



Agro-climatic Zones of Gujarat State

Zone –I	**South Gujarat (Heavy Rainfall Area)**	**Zone-V**	**North West Zone**
Zone-II	**South Gujarat**	**Zone-VI**	**North Saurashtra**
Zone-III	**Middle Gujarat**	**Zone-VII**	**South Saurashtra**
Zone-IV	**North Gujarat**	**Zone-VIII**	**Bhal & Coastal Area**

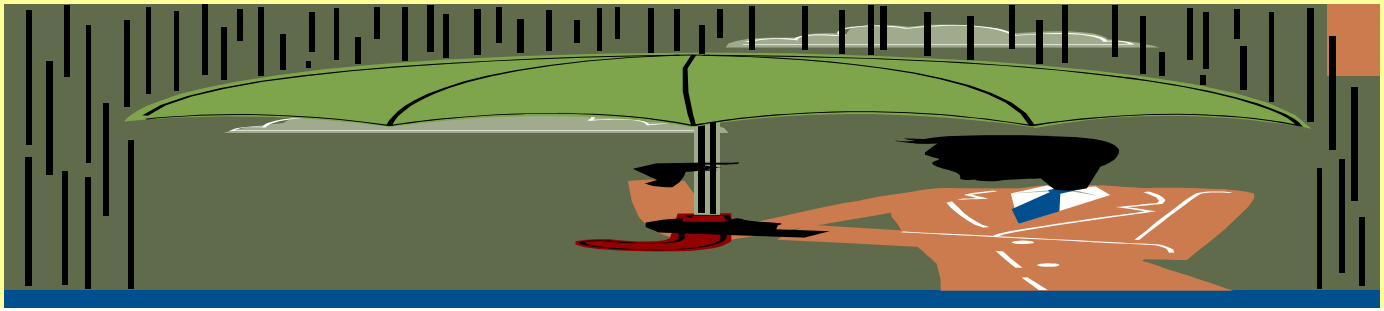
Agro-climatic zones of Gujarat		HQ Location	Rainfall range (mm)
Zone I	South Gujarat (Heavy rainfall)	Navsari	1500-2500
Zone II	South Gujarat	Surat	1200-1500
Zone III	Middle Gujarat	Anand	800-1000
Zone IV	North Gujarat	SK Nagar	625-835
Zone V	North West zone	Bhuj	350-550
Zone VI	North Saurashtra	Rajkot	400-700
Zone VII	South Saurashtra	Junagadh	750-900
Zone VIII	Bhal & Coastal zone	Arnej	625-1000



Nakshtra-Charan wise forecast For Gujarat

Based on astrology, Anand Agricultural University, Anand in 2005 prepared Nakshtra-Charan wise forecast for eight agro climatic zones of Gujarat.

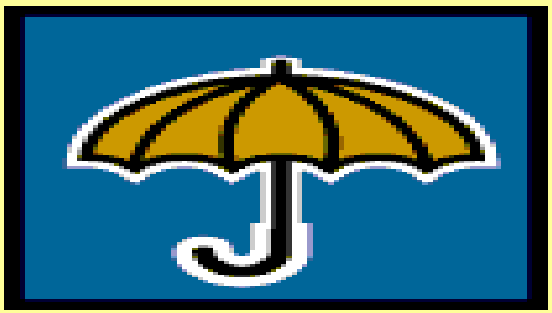
The validation of this forecast on Yes/No basis indicated that accuracy varied between 42 % to 73% for various zones.



Agroclimatic Zones	Salient features of agreement or disagreement	Ratio Scores
South Gujarat (heavy rainfall)	In 3rd and 4th charan of Adra and Purva Nakshtra and 1st and 2nd Charan of Uttara Nakshatra, the actual rainfall was as per forecast. Amount was little bit over /under estimated. Less rainfall was recorded in Punarvasu and Magha Nakshatra as compared to rainfall forecast	69%
South Gujarat	In 3rd and 4th charan of Adra and Purva Nakshtra and 1st and 2nd Charan of Uttara Nakshatra, the actual rainfall was as per forecast. Amount was little bit over /under estimated. Less rainfall was recorded in Punarvasu and Magha Nakshatra as compared to rainfall forecast	73%
Middle Gujarat	Adra, 3rd and 4th charan of pushya, 1st and 2nd charan of Ashlesha, 3rd and 4th charan of Purva and 2nd charan of Uttara Nakshatra, rainfall was recorded as per forecast	58%
North Gujarat	Adra, Pushya (2 to 4 charan), Ashlesha (1st charan), Purva (3-4 charan), Uttara (1-2 charan) was found comparable with actual rainfall. Forecasted amount was less than actual rainfall	61%
North-west Gujarat	In Adra (2-3 charan), Pushya(3-4 charan), Purva (3-4 charan) and Uttara (1-2 charan), the actual rainfall was as per forecasted rainfall with some deviation. Rainfall was forecasted in Ashlesha but there was no rainfall. . In rest of the Nakshatra the rainfall was very less than forecasted	42%
North Saurashtra	In Adra, Pushya (3-4 charan), Ashlesha (1-2 charan), Magha (1,3, and 4th charan), Purva, Uttara (1-2 charan) the actual rainfall was as per forecast with deviation. In rest of the Nakshatra the rainfall was very less than forecasted.	73%
South Saurashtra	In Adra. Pushya (1,3,4 charan), Ashlesha (1-3 charan), Purva (2-4 charan) and Uttara (1-2 charan) the rainfall was as per forecast but with less quantity.	73%
Bhal Zone	In Adra, Pushya (3-4charan) Ashlesha (1st charan), Purva (4th charan) and Uttara (1-2 charan) the rainfall was as per forecast with some deviation. In rest of the Nakshatra the forecast was not valid.	50%

In the year 2006, almanac was prepared by Anand Agricultural University, Anand, to predict rainfall distribution in next Monsoon season on temporal (day to day) and spatial (different zones) basis, for the farmers of Gujarat state.

This calendar was distributed in 18,600 villages in 225 Talukas of 25 districts of Gujarat state.



Sample page Of AAU almanac July - 2006



ZODIC	DAY	DATE	AGRO-CLIMATIC ZONES OF GUJARAT						
			ZONE - I	ZONE - II	ZONE - III	ZONE - IV	ZONE - V	ZONE - VI	Z
Leo	SAT	1	74	70	64	39	24	56	
Leo 10-17	SUN	2							
Virgo	MON	3							
Virgo 24-47	TUE	4							
Libra	WED	5	83	83	71	55	41	55	
Libra	THU	6							
Libra 08-32	FRI	7							
Scorpio	SAT	8							
Scorpio 14-28	SUN	9							
Sagittarius	MON	10							
Sagittarius 17-16	TUE	11							
Capricorn	WED	12	80	77	80	57	44	54	
Capricorn 18-34	THU	13							
Aquarius	FRI	14							
Aquarius 20-02	SAT	15							
Pisces	SUN	16							
Pisces 22-47	MON	17							
Aries	TUE	18							
Aries 27-19	WED	19	86	81	77	64	38	55	
Taurus	THU	20							
Taurus	FRI	21							
Taurus 09-44	SAT	22							
Gemini	SUN	23							
Gemini 18-14	MON	24							
Cancer	TUE	25							
Cancer 29-00	WED	26	83	81	79	58	46	46	
Leo	THU	27							
Leo	FRI	28							
Leo 17-37	SAT	29							
Virgo	SUN	30							
Virgo	MON	31	71	79	73	62	37	44	
MONTHLY AVERAGE MAXIMUM TEMPERATURE (°C)			30.9	32.4	32.4	33.9	35.2	32.8	
MONTHLY AVERAGE MINIMUM TEMPERATURE (°C)			26.1	25.4	25.7	25.8	27.1	25.0	

No rainfall | Low rainfall < 2.5 mm | Medium rainfall 5-10 mm | Heavy

Validation of AAU Rainfall prediction calendar during 2006 for Gujarat



Skill score (%)



Agroclimatic Zone	June	July	August	September	Average
South Gujarat (Heavy rainfall)	43	65	58	53	55
South Gujarat	40	71	52	50	53
Middle Gujarat	37	61	58	50	52
North Gujarat	40	74	52	57	56
North-West Gujarat	30	61	52	57	50
North Saurashtra	57	42	48	47	48
South Saurashtra	33	61	48	53	49
Bhal & Coastal Zone	43	65	52	40	50
Average	40	63	52	51	52

Methodology for AAU Monsoon Research Almanac preparation

1. **Nakshatra Pravesh of Sun: The Kundali at the time of Sun's entry into each Nakshatra is casted for each required place (i.e. district) for the period of Rainy Season. This gives average rainfall for a period of 12-13 days for that Nakshatra, at that place.**



Methodology for Calendar Preparation

2. **Nakshatra Charan Pravesh of Sun: The Kundali at the time of Sun's entry into each Nakshatra Charan is casted for each required place (i.e. district) for the period of Rainy Season. This gives average rainfall for a period of 2-3 days for that Nakshatra Charan, at that place. Daily rainfall was predicted by using Chandra Nakshatra.**

A finer astrological technique was used to distinguish planetary positions/aspects between two adjoining districts.

Methodology for calendar preparation

3. From each Kundali, various aspects like Mandal of the Lagna, Planets in Saptanadi Chakra, Vedhas amongst the planets, and different aspects between planets like Yuti, Pratiyuti, Navapancham Yoga, Kendra Yoga, etc., are taken into account. Importance is given if a planet changes its direction (Vakri or Margi), changes Rashi or Nakshatra, or becomes Asta or Udita.

4. Similarly, Poornimanta (Full moon day) and Aamanta (No moon day) Kundalis are cast for predictions. Kundalis are also cast for eclipses. Effects of sighting comets are also considered.

Meteorological Inputs used in the calendar

1. **Rainfall probability of getting ≥ 10 mm rainfall in standard MW was calculated by Markov chain model, is given for each district (Data of weekly rainfall for 50-100 years was used for analysis).**
2. **Monthly normal rainfall is given along with projected rainfall for each month for each district.**
3. **Monthly normal Maximum and Minimum temperature for each district is given.**

- **Computation of Rainfall Projection:**

  The predicted rainfall intensity on daily basis viz. No rainfall, Low, Medium, Heavy and Very Heavy for each district (25) of Gujarat state from June to October month was used to quantify the rainfall amount of the state. Criteria for quantifying daily rainfall from qualitative prediction for districts under each Agricultural University of the respective region was decided based on frequency analysis for given rainfall intensity and used in the calendar.

Criteria for quantifying daily rainfall from qualitative prediction in different regions of the state.

Sr. No.	Name of Region / SAU	Daily Rainfall quantification (mm)				
		No Rain	Low	Medium	Heavy	Very Heavy
1	Middle Gujarat (AAU, Anand)	0	2	10	35	75
2	North Gujarat (SDAU, Dantiwada) and Saurashtra (JAU, Junagadh)	0	2	10	30	50
3	For Kutch district*	0	1	6	25	50
4	South Gujarat (NAU, Navsari)	0	6	25	70	100

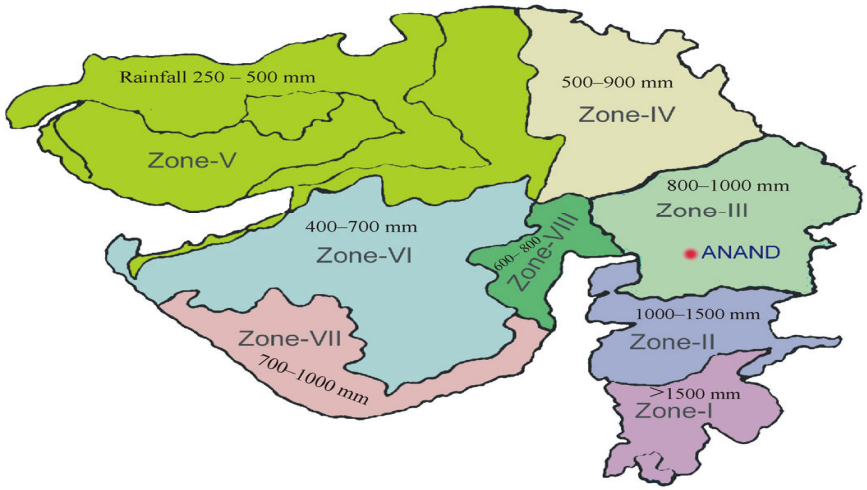
* Since the rainfall recorded in Kutch is very low, therefore, separate intensity was considered for this district in North Gujarat region.

MONSOON RESEARCH ALMANAC - 2007

SAMVAT : 2063

ANAND AGRICULTURAL UNIVERSITY
ANAND, GUJARAT

vibrant GUJARAT
Global Investors' Summit
12-13 January 2007



Agro-climatic Zones of Gujarat State

Zone –I	South Gujarat (Heavy Rainfall Area)	Zone-V	North West Zone
Zone-II	South Gujarat	Zone-VI	North Saurashtra
Zone-III	Middle Gujarat	Zone-VII	South Saurashtra
Zone-IV	North Gujarat	Zone-VIII	Bhal & Coastal Area

DISCLAIMER:
Prediction of rainfall provided in this almanac is based on Astrological principles & theory of probability thus, any claim or financial or other related losses like crop insurance does not lie either with **ANAND AGRICULTURAL UNIVERSITY OR GOVERNMENT OF GUJARAT**

JUNE-2007 A.JAITH-JAITH SAMVAT-2063

ANAND AGRICULTURAL UNIVERSITY
ANAND (GUJARAT)

MRUGH

Sun entry in Gemini : 15.6.07, 15-54
Sun entry in Nakshtra : 8.6.07, Mrughshirsh, 16-33 • 22.6.07, Aadra, 15-28

DATE	DAY	DISTRICT COVERED UNDER ANAND AGRICULTURAL UNIVERSITY		
		ANAND	KHEDA	VADODARA
1	FRI			
2	SAT			
3	SUN			
4	MON			
5	TUE			
6	WED	21	6	27
7	THU			
8	FRI			
9	SAT			
10	SUN			
11	MON			
12	TUE			
13	WED			
14	THU	37	42	35
15	FRI			
16	SAT			
17	SUN			
18	MON			
19	TUE			
20	WED			
21	THU	43	39	38
22	FRI			
23	SAT			
24	SUN			
25	MON			
26	TUE			
27	WED	64	61	58
28	THU			
29	FRI			
30	SAT			
No Rainfall	Low Rainfall (1 to 5mm)	Medium Rainfall (6 to 24mm)	Heavy Rainfall (25 to 74mm)	Very Heavy Rainfall (>75mm)
Monthly Projected Rainfall (mm)		34.0	24.0	34.0
Monthly Normal Rainfall (mm)		109.2	96.8	117.1
Monthly Average Maximum Temp. (°C)		37.1	37.9	38.4
Monthly Average Minimum Temp. (°C)		27.0	26.4	26.7

Note : Yellow, green, blue and orange colour indicate low, medium, heavy and very heavy rainfall, respectively based on Astrological forecast. Values given in the weekly block indicate the rainfall probability (%) of getting more than 10mm rainfall during the week.

JULY-2007 JAITH-ASHADH SAMVAT-2063

ANAND AGRICULTURAL UNIVERSITY
ANAND (GUJARAT)

ARDRA

Sun entry in Cancer : 16.7.07, 26-45
Sun entry in Nakshtra : 6.7.07, Punarvasu, 15-07 • 20.7.07, Pushya, 14-35

DATE	DAY	DISTRICT COVERED UNDER ANAND AGRICULTURAL UNIVERSITY		
		ANAND	KHEDA	VADODARA
1	SUN			
2	MON			
3	TUE			
4	WED			
5	THU	71	73	65
6	FRI			
7	SAT			
8	SUN			
9	MON			
10	TUE			
11	WED			
12	THU	80	76	73
13	FRI			
14	SAT			
15	SUN			
16	MON			
17	TUE			
18	WED			
19	THU	77	81	73
20	FRI			
21	SAT			
22	SUN			
23	MON			
24	TUE			
25	WED			
26	THU	79	76	75
27	FRI			
28	SAT			
29	SUN			
30	MON			
31	TUE	73	79	63
No Rainfall	Low Rainfall (1 to 5mm)	Medium Rainfall (6 to 24mm)	Heavy Rainfall (25 to 74mm)	Very Heavy Rainfall (>75mm)
Monthly Projected Rainfall (mm)		388.0	445.0	437.0
Monthly Normal Rainfall (mm)		280.6	312.2	307.4
Monthly Average Maximum Temp. (°C)		32.6	32.5	33.4
Monthly Average Minimum Temp. (°C)		25.6	25.2	25.7

Note : Yellow, green, blue and orange colour indicate low, medium, heavy and very heavy rainfall, respectively based on Astrological forecast. Values given in the weekly block indicate the rainfall probability (%) of getting more than 10mm rainfall during the week.

AUGUST-2007 ASHADH-SHRAVAN SAMVAT-2063

ANAND AGRICULTURAL UNIVERSITY
ANAND (GUJARAT)

Sun entry in Leo : 17.8.07, 11-10
Sun entry in Nakshtra : 3.8.07, Aaslesha, 13-33 • 17.8.07, Magha, 11-10, • 31.8.07, Purva Bhadrapada, 7-13

DATE	DAY	DISTRICT COVERED UNDER ANAND AGRICULTURAL UNIVERSITY		
		ANAND	KHEDA	VADODARA
1	WED			
2	THU	73	79	63
3	FRI			
4	SAT			
5	SUN			
6	MON			
7	TUE			
8	WED			
9	THU	63	67	63
10	FRI			
11	SAT			
12	SUN			
13	MON			
14	TUE			
15	WED			
16	THU	62	70	60
17	FRI			
18	SAT			
19	SUN			
20	MON			
21	TUE			
22	WED			
23	THU	57	70	58
24	FRI			
25	SAT			
26	SUN			
27	MON			
28	TUE			
29	WED	67	55	65
30	THU			
31	FRI			

No Rainfall	Low Rainfall (1 to 5mm)	Medium Rainfall (6 to 24mm)	Heavy Rainfall (25 to 74mm)	Very Heavy Rainfall (>75mm)
Monthly Projected Rainfall (mm)		290.0	282.0	282.0
Monthly Normal Rainfall (mm)		302.2	254.9	223.2
Monthly Average Maximum Temp. (°C)		31.3	31.1	33.0
Monthly Average Minimum Temp. (°C)		24.9	24.9	23.8

Note : Yellow, green, blue and orange colour indicate low, medium, heavy and very heavy rainfall, respectively based on Astrological forecast. Values given in the weekly block indicate the rainfall probability (%) of getting more than 10mm rainfall during the week.

SEPTEMBER-2007 SHRAVAN-BHADRAVA SAMVAT-2063

ANAND AGRICULTURAL UNIVERSITY
ANAND (GUJARAT)

Sun entry in Virgo : 17.9.07, 11-08
Sun entry in Nakshtra : 14.9.07, Uttara Phalguni, 25-03 • 27.9.07, Hasta, 16-35

DATE	DAY	DISTRICT COVERED UNDER ANAND AGRICULTURAL UNIVERSITY		
		ANAND	KHEDA	VADODARA
1	SAT	67	55	65
2	SUN			
3	MON			
4	TUE			
5	WED			
6	THU	51	45	46
7	FRI			
8	SAT			
9	SUN			
10	MON			
11	TUE			
12	WED			
13	THU	45	24	44
14	FRI			
15	SAT			
16	SUN			
17	MON			
18	TUE			
19	WED			
20	THU	44	30	35
21	FRI			
22	SAT			
23	SUN			
24	MON			
25	TUE			
26	WED			
27	THU	23	27	27
28	FRI			
29	SAT			
30	SUN			

No Rainfall	Low Rainfall (1 to 5mm)	Medium Rainfall (6 to 24mm)	Heavy Rainfall (25 to 74mm)	Very Heavy Rainfall (>75mm)
Monthly Projected Rainfall (mm)		292.0	252.0	250.0
Monthly Normal Rainfall (mm)		119.4	121.0	133.2
Monthly Average Maximum Temp. (°C)		33.4	32.2	32.7
Monthly Average Minimum Temp. (°C)		24.2	24.3	23.6

Note : Yellow, green, blue and orange colour indicate low, medium, heavy and very heavy rainfall, respectively based on Astrological forecast. Values given in the weekly block indicate the rainfall probability (%) of getting more than 10mm rainfall during the week.

OCTOBER-2007 BHADRAVA-ASHO SAMVAT-2063

ANAND AGRICULTURAL UNIVERSITY
ANAND (GUJARAT)

CHITRA

Sun entry in Libra : 17.10.07, 23-06
Sun entry in Nakshtra : 11.10.07, Chitra, 05-36 • 24.10.07, Swati, 16-04

DATE	DAY	DISTRICT COVERED UNDER ANAND AGRICULTURAL UNIVERSITY		
		ANAND	KHEDA	VADODARA
1	MON			
2	TUE			
3	WED			
4	THU	15	3	17
5	FRI			
6	SAT			
7	SUN			
8	MON			
9	TUE			
10	WED			
11	THU	11	6	17
12	FRI			
13	SAT			
14	SUN			
15	MON			
16	TUE			
17	WED			
18	THU	5	3	15
19	FRI			
20	SAT			
21	SUN			
22	MON			
23	TUE			
24	WED			
25	THU	6	0	4
26	FRI			
27	SAT			
28	SUN			
29	MON			
30	TUE	2	3	6
31	WED			
No Rainfall	Low Rainfall (1 to 5mm)	Medium Rainfall (6 to 25mm)	Heavy Rainfall (26 to 74mm)	Very Heavy Rainfall (>75mm)
Monthly Projected Rainfall (mm)		6.0	8.0	8.0
Monthly Normal Rainfall (mm)		7.8	7.3	27.8
Monthly Average Maximum Temp. (°C)		35.4	34.0	35.6
Monthly Average Minimum Temp. (°C)		20.4	21.1	22.9

Note : Yellow, green, blue and orange colour indicate low, medium, heavy and very heavy rainfall, respectively based on Astrological forecast. Values given in the weekly block indicate the rainfall probability (%) of getting more than 10mm rainfall during the week.



Clean & Green Gujarat

A better place to live

"The single most important thing to attract investment in our cities is the cleanliness"

-Shri Narendra Modi
Hon'ble CM, Gujarat State

Monthly projected and normal rainfall (mm) for districts under Middle Gujarat

Month	June	July	August	September	October	Total
Ahmedabad	14 (76.4)	230 (257.3)	403 (186.8)	122 (136.1)	36 (11.0)	805 (667.6)
Anand	34 (109.2)	388 (280.6)	290 (302.2)	292 (119.4)	6 (7.8)	1010 (819.2)
Dahod	26 (106.3)	322 (240.4)	258 (247.8)	212 (153.2)	6 (26.6)	824 (774.3)
Kheda	24 (96.8)	445 (312.2)	282 (254.9)	252 (121.0)	8 (7.3)	1011 (792.2)
Panchmahal	26 (120.8)	322 (350.1)	258 (266.3)	212 (160.1)	6 (20.4)	824 (917.7)
Vadodara	34 (117.1)	437 (307.4)	282 (223.2)	250 (133.2)	8 (27.8)	1011 (808.7)

Percent departure from normal for projected rainfall (June to October) for districts under Middle Gujarat

Sr. No.	Name of District	Rainfall Projection (% departure from normal)
1	Ahmedabad	+ 20.0
2	Anand	+23.3
3	Dahod	+6.4
4	Kheda	+27.6
5	Panchmahal	- 10.2
6	Vadodara	+25.0

Monthly projected and normal rainfall (mm) for districts under North Gujarat

Month	June	July	August	Sept	Oct	Total
Banaskantha	4 (63.8)	270 (277.4)	378 (220.0)	114 (89.0)	36 (10.4)	802 (660.6)
Gandhinagar	6 (66.9)	278 (301.9)	378 (221.5)	112 (41.5)	36 (6.4)	810 (638.2)
Mehsana	6 (59.0)	278 (228.5)	378 (176.6)	112 (109.1)	36 (5.7)	810 (578.9)
Patan	6 (63.9)	278 (230.7)	378 (168.8)	112 (95.5)	36 (8.1)	810 (567.0)
Sabarkantha	14 (78.9)	418 (280.6)	262 (230.6)	214 (125.6)	8 (10.6)	916 (726.3)
Kutch	0 (31.6)	21 (144.0)	52 (97.5)	15 (49.1)	4 (9.4)	92 (331.6)

Percent departure from normal for projected rainfall (June to October) for districts under North Gujarat

Sr. No.	Name of District	Rainfall Projection (% Departure from normal)
1	Banaskantha	+ 21.4
2	Gandhinagar	+ 26.9
3	Mehsana	+ 39.9
4	Patan	+ 42.9
5	Sabarkantha	+ 26.1
6	Kutch	- 72.3

Monthly projected and normal rainfall (mm) for districts under South Gujarat

Month	June	July	August	Sept	Oct	Total
Bharuch	87 (89.2)	874 (201.0)	608 (263.3)	520 (117.8)	18 (11.4)	2107 (682.7)
Dang	87 (232.2)	969 (676.9)	585 (514.5)	626 (303.3)	24 (56.7)	2291 (1783.6)
Narmada	87 (267.2)	874 (723.5)	665 (433.2)	526 (296.7)	18 (34.2)	2170 (1754.8)
Navsari	68 (242.7)	680 (555.6)	585 (328.1)	530 (218.6)	24 (34.7)	1887 (1379.7)
Surat	68 (204.0)	680 (427.4)	585 (231.1)	530 (173.4)	24 (26.7)	1887 (1062.6)
Valsad	87 (338.2)	969 (691.4)	585 (497.5)	626 (302.9)	24 (31.8)	2291 (1861.8)

Percent departure from normal for projected rainfall (June to October) for districts under South Gujarat

Sr. No.	Name of District	Rainfall Projection (% Departure from normal)
1	Bharuch	+ 208.6
2	Dang	+28.4
3	Narmada	+23.7
4	Navsari	+36.8
5	Surat	+ 77.7
6	Valsad	+23.1

Monthly projected and normal rainfall (mm) for districts under Saurashtra

Month	June	July	August	Sept	October	Total
Amreli	6 (99.0)	278 (192.2)	278 (114.7)	112 (102.2)	36 (25.1)	810 (533.2)
Bhavnagar	6 (91.1)	278 (207.1)	354 (146.5)	112 (111.5)	36 (21.6)	786 (577.8)
Jamnagar	6 (106.5)	230 (202.1)	378 (185.8)	112 (40.6)	36 (10.8)	762 (545.8)
Junagadh	14 (162.8)	230 (351.5)	378 (175.5)	112 (122.8)	36 (28.1)	770 (840.7)
Porbandar	6 (111.8)	230 (248.7)	378 (115.8)	112 (64.5)	36 (8.4)	762 (596.7)
Rajkot	6 (93.1)	278 (248.2)	378 (135.8)	112 (80.0)	36 (17.6)	810 (574.7)
Surendranagar	6 (66.6)	230 (149.0)	370 (106.6)	110 (53.9)	36 (11.0)	762 (387.1)

Percent departure from normal for projected rainfall (June to October) for districts under Saurashtra

Sr. No.	Name of District	Rainfall Projection (% Departure from normal)
1	Amreli	+ 51.9
2	Bhavnagar	+ 36.0
3	Jamnagar	+ 39.6
4	Junagadh	- 8.4
5	Porbandar	+ 27.7
6	Rajkot	+ 40.9
7	Surendranagar	+ 96.8

Rainfall Projection

(Zonewise % Departure from Normal)

- **Middle Gujarat- +15.4%**
- **North Gujarat- +14.2%**
- **South Gujarat- + 66.4%**
- **Saurashtra - +47.4%**
- **Gujarat state as a whole :-**

+35.9%

Yes/No Skill score (%) of rainfall prediction in AAU's Calendar during June to October 2007.

Sr. No.	Region	June	July	Aug.	Sept.	Oct.	Avg.
i.	Middle Gujarat	72.2	57.4	83.9	38.3	87.6	67.9
ii.	North Gujarat	72.2	55.4	63.5	43.4	82.2	63.3
iii.	South Gujarat	64.5	76.9	87.1	48.9	88.2	73.1
iv.	Saurashtra	63.3	39.6	68.2	43.9	78.3	58.8

Yes/No skill score (%) of rainfall prediction given by different Astro-meteorologists for Gujarat during 2007.

Sr. No.	Name of Astro-meteorologists	June	July	August	Sept.	Oct.	Average
I	AAU's Monsoon Research Almamnac-2007 State Average	68.1	57.3	75.7	43.9	84.1	**65.8**
II	Dhansukh Shah for Saurashtra	41.9	48.8	43.3	50.0	93.5	55.5
III	Sudhakar Joshi for Anand station	70.0	61.3	45.4	63.3	90.3	66.1
IV	Pravinbhai Vora for Gujarat	66.7	64.5	64.5	63.3	77.4	**67.3**
V	H.S. Nimavat for Gujarat state	53.3	71.0	64.5	63.3	77.4	65.9

- **On an average Monsoon Research Almanac published by AAU, Anand has shown 65.8% accuracy for Gujarat state.**

- **Rainfall predictions made by other astro-meteorologists for Gujarat were also validated. The average Y/N skill score was 55.5%, 66.1%, 67.3% and 65.9% for Dhansukh Shah, Sudhakar Joshi, Pravinbhai Vora and H.S. Nimavat respectively for June to October, 2007.**

However, other workers have predicted rainfall region wise (Saurashtra, south Gujarat, north Gujarat, middle Gujarat etc.) or state as a whole, while, AAU's almanac made predictions district wise on daily basis. Thus, AAU's almanac had fine grid (≈ 1 district) and more accuracy.

Validation of rainfall projection for four regions of Gujarat.

Sr. No	Region	Rainfall Projection (mm)	Actual Rainfall (mm)	Normal Rainfall (mm)	Rainfall Projection (% Dep. From actual)	Rainfall Projection (% Dep. From normal)	Actual Rainfall (% Dep. From normal)
1	Middle Gujarat	930.7	987.5	796.6	6.1	16.8	24.0
2	North Gujarat	706.7	971.2	583.8	37.4	21.1	66.4
3	South Gujarat	2105.5	1613.8	1420.9	-37.6	48.2	13.6
4	Saurashtra	766.6	1146.7	579.4	49.6	32.3	97.9
	State	1127.4	1179.8	845.2	4.6	33.4	39.6

The rainfall projection for the state as a whole was quite good with +4.6% departure from actual rainfall which was less than 10% (i.e. 95.4% accuracy).

For Middle Gujarat also departure was +6.1% from actual rainfall. The actual rainfall was above normal for all zones of Gujarat and state rainfall was 39.6% higher than normal whereas our projections were also showing above normal rainfall for all zones.

Our projection for the state as a whole was 33.4% higher than normal, which gave correct trend of above normal prediction in Monsoon 2007.

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THANK YOU

