

PART VII: AGRICULTURE

Gujarat State covers an area of about 20 million hectares or about six per cent of the geographical area of India. Of this, 53 per cent is net sown, 10 per cent is under forests, 4.5 per cent is under permanent pasture and grazing land, 13 per cent is barren and uncultivable, and 6 per cent is under non-agricultural use.

The State comprises eight agro-climatic zones, of which six are semi-arid. Only south Gujarat receives heavy rainfall and has a humid climate, whereas the rest of the State is a semi-arid zone.

The irrigated area served by canals increased from 0.64 million hectares in 1997-98 to 0.77 million hectares in 2010-11. Wells and tubewells continued to be the major source of irrigation, accounting for 78 per cent of the irrigated area in 2010-11. Areas irrigated through other sources increased in terms of both area as well as share.

The groundwater status in Gujarat improved and the number of talukas under the semi-critical, critical and over-exploited categories declined. However, 33 out of 45 talukas in north Gujarat continue to be classified under the semi-critical, critical, over-exploited and saline categories.

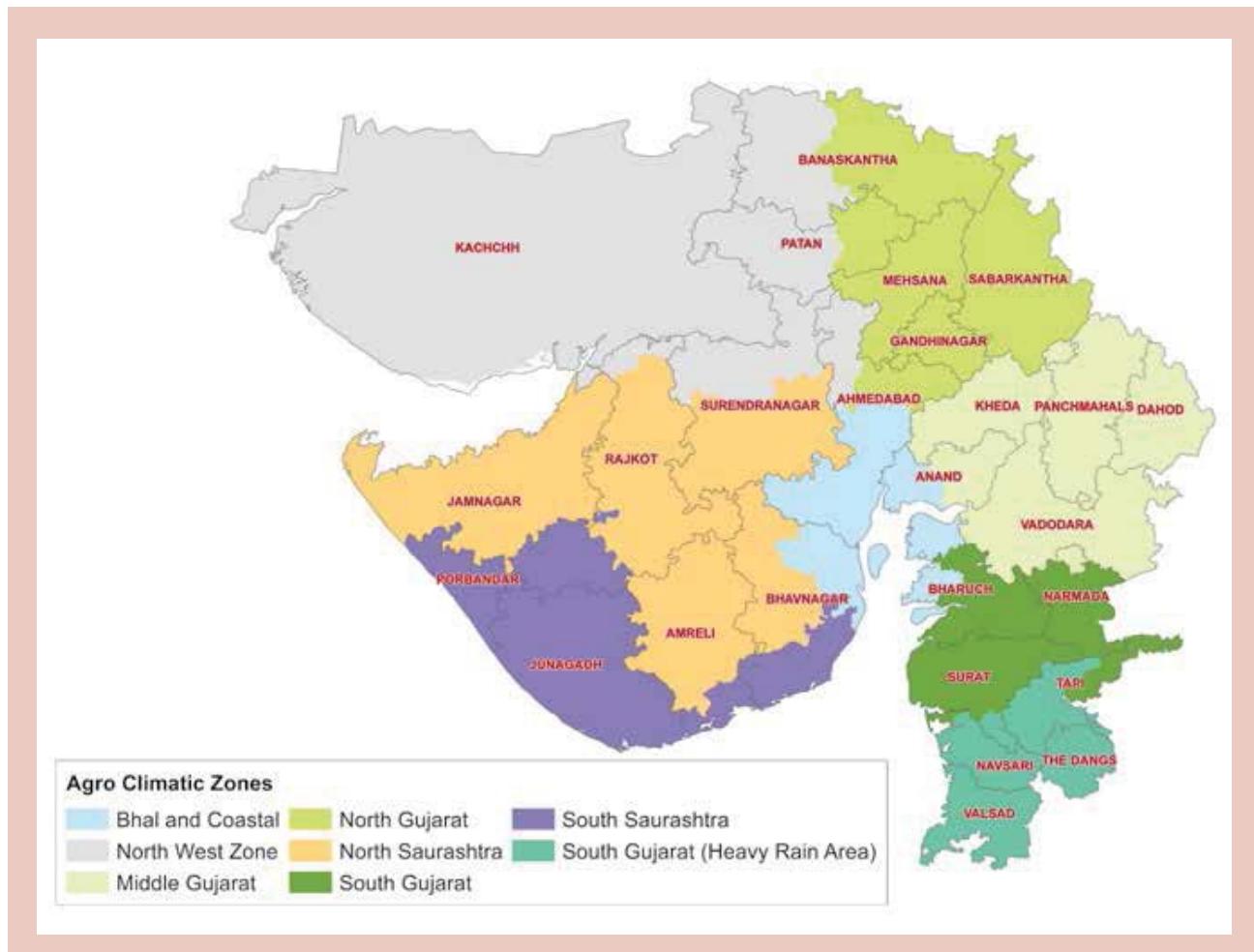
Cereals, Oilseeds, Cotton, Pulses and Sugarcane are the major crops and accounted for 34 per cent, 27 per cent, 23 per cent, 8 per cent and 2 per cent respectively, of the total gross cropped area of about 11.6 million hectares in 2010-11. In the last decade, the total area under food grains, oilseeds and cash crops like cotton and tobacco has gone up significantly.



**TABLE VII.1: Gujarat Agro-climatic Zones**

1) Southern Heavy Rainfall Area & Hilly Area <i>Semi-arid to dry sub-humid climate</i>	5) North-West Arid <i>Arid to semi-arid climate</i>
2) South Gujarat <i>Semi-arid to dry sub-humid climate</i>	6) North Saurashtra <i>Dry sub-humid climate</i>
3) Middle Gujarat <i>Semi-arid climate</i>	7) South Saurashtra <i>Dry sub-humid climate</i>
4) North Gujarat <i>Arid to semi-arid climate</i>	8) Bhal & Coastal Area

SOURCE: Agriculture & Co-operation Department, Govt of Gujarat.



**TABLE VII.2: Details of Agro-climatic Zones**

Particulars	South Gujarat (Heavy Rain Area)	South Gujarat	Middle Gujarat	North Gujarat
Districts/ Talukas	1) Whole of The Dangs and Valsad districts 2) Part Navsari districts (excluding Navsari and Gandevi talukas) 3) Part of Tapi district (Valod, Vyara, Uchchhal and Songadh) 4) Part of Surat district (Mahuva)	1) Part of Navsari district (Navsari, Gandevi taluka) 2) Part of Tapi district (Nizar taluka) 3) Part of Surat district (Kamrej, Palsana, Bardoli and Mandvi talukas) 4) Part of Bharuch district (Ankleshwar, Valia, Jhagadia, 5) Part of Narmada district (Dediapada and Sagbara talukas)	1) Whole of Panchmahals district 2) Whole of Vadodara district 3) Part of Bharuch district (Bharuch, Amod and Jambusar talukas) 4) Part of Anand district (Borsad taluka)	1) Whole of Sabarkantha district 2) Part of Ahmedabad district (includes Daskroi and Sanand talukas) 3) Part of Gandhinagar district (Dehgam) 4) Whole of Anand district (except Borsad and part of Khambat) 5) Whole of Kheda district (except Matar taluka) 6) Whole of Mehsana district 7) Whole of Patan district (except Chanasma, Sami and Harij talukas) 8) Part of Banaskantha district (Deesa, Dhanera, Palanpur, Danta and Vadgam talukas)
Rainfall (mm)	1500 and above	1000 to 1500	800 to 1000	625 to 875
Climate	Semi-arid to dry sub-humid	Semi-arid to dry sub-humid	Semi-arid	Arid to semi-arid
Type of Soil	Deep black with patches of coastal alluvial lateritic and medium black	Deep black clayey	Deep black, medium black to loamy sand (Goradu)	Sandy loam to sandy
Soil Characteristics and Land Use Classification	Most of the area cultivated, some area non-cultivated under shallow and partly forest	Most of the area cultivated, some area non-cultivated under fallow and pasture forest	Most of the area cultivated, some area non-cultivated under fallow and pasture forest	Most of the area cultivated
Crops	Cotton, sorghum, paddy and vegetables	Cotton, sorghum, wheat, sugarcane and horticulture crops	Cotton, pearl millet tobacco, pulses, wheat, paddy, maize, sorghum and sugarcane	Tobacco, wheat, sorghum, millet, vegetables, oilseeds, spices and condiments
General Fertility	N - poor, P - medium, K - medium	N - poor, P - medium, K - medium	N - low, P - medium, K - high	N - poor, P - medium, K - medium

N: Nitrogen, P: Phosphorus, K: Potash

Contd...

SOURCE: Agriculture & Co-operation Department, Govt of Gujarat & www.dacnet.nic.in



Particulars	North-West Zone	North Saurashtra	South Saurashtra	Bhal & Coastal Area
Districts/Talukas	1) Whole of Kuchchh district 2) Part of Rajkot district (Maliya taluka) 3) Part of Surendranagar district (Halvad, Dhrangadhra and Dasada talukas) 4) Part of Patan district (Sami, Harij, Chanasma, Santalpur and Radhanpur talukas) 5) Part of Banaskantha district (Kankrej, Deodar, Vav and Tharad talukas) 6) Part of Ahmedabad district (Viramgam and Daskroi talukas)	1) Whole of Jamnagar 2) Part of Rajkot district Paddhari, Lodhika, Jasdan, Rajkot, Wankaner, Morvi, Jamkanandorna and Kotda Sangani talukas) 3) Part of Surendranagar (Wadhwan, Muli, Chotila and Sayla talukas) 4) Part of Bhavnagar district (Gadhada, Umrala and Botad talukas)	1) Whole of Junagadh 2) Part of Bhavnagar (Sihor, Ghogha, Gariadhar, Palitana, Talaja and Mahua talukas) 3) Part of Amreli district (Dhari, Savarkundla, Rajula, Jafrabad, Khambha, Amreli, Babra, Lilia, Lathi and Kunkavav Vadia talukas) 4) Part of Rajkot district (Jetpur, Dhoraji Upleta and Gondal talukas) 5) Part of Junagadh district (Kodinar taluka)	1) Area around the Gulf of Khambhat, Bhal and coastal region in Bharuch, Anand and Surat districts 2) Part of Surat district (Olpad taluka) 3) Part of Bharuch district (Hansot and Vagra talukas) 4) Part of Ahmedabad district (Dholka and Dhandhuka talukas) 5) Part of Bhavnagar district (Vallabhipur and Bhavnagar talukas) 6) Part of Surendranagar district (Limbidi taluka)
Rainfall (mm)	250 to 500	400 to 700	645 to 700	625 to 1000
Climate	Arid to semi-arid	Dry sub-humid	Dry sub-humid	-
Type of Soil	Sandy and saline	Shallow medium black	Shallow medium black and calcareous	Medium black poorly drained and saline
Soil Characteristics and Land Use Classification	Cultivated and grassland	Cultivated and grassland	Cultivated forest and grassland	Dry land cultivation
Crops	Groundnut, cotton, pearl millet, pulse, wheat and sorghum	Groundnut, cotton, pulses, wheat, sorghum, pearl millet and sugarcane	Groundnut, cotton, wheat, bajra, sorghum and sugarcane	Cotton, sorghum, groundnut, pearl millet and wheat
General Fertility	N - low, P - low	N - medium to high, P - low, K - low to medium	N - medium to high, P - low, K - high	N - poor, P - medium, K - medium

N: Nitrogen, P: Phosphorus, K: Potash

SOURCE: Agriculture & Co-operation Department, Govt of Gujarat & www.dacnet.nic.in



TABLE VII.3: Land Use Pattern

('000 ha)

Districts	Reporting Area		Forest Area		Fallow Land		Permanent Pasture & Grazing Land		Net Sown Area	
	2001-02	2007-08	2001-02	2007-08	2001-02	2007-08	2001-02	2007-08	2001-02	2007-08
GUJARAT	18,868	18,866	1,865	1,834	744	529	850	851	9,678	9,965
Ahmedabad	775	775	11	11	72	22	28	28	506	564
Amreli	739	739	37	36	26	9	54	54	541	560
Anand	295	295	-	-	41	4	14	14	155	197
Banaskantha	1,045	1,045	105	111	33	24	65	65	736	747
Bharuch	525	525	25	25	25	41	16	16	331	318
Bhavnagar	858	858	28	27	39	47	61	61	547	541
Dahod	371	371	91	88	26	6	11	11	197	218
Gandhinagar	216	216	2	2	12	6	12	12	160	169
Jamnagar	1,020	1,020	48	45	46	28	76	76	600	616
Junagadh	880	880	176	176	28	8	89	89	524	544
Kachchh	4,565	4,565	288	307	79	124	70	70	669	641
Kheda	394	394	10	10	13	9	15	15	309	313
Mehsana	439	439	7	7	17	8	27	27	346	358
Narmada	280	280	117	115	5	4	9	9	109	110
Navsari	220	220	31	25	1	2	5	5	147	137
Panchmahals	514	514	126	117	35	27	15	15	271	281
Patan	567	567	47	47	31	25	28	28	387	391
Porbandar	230	230	24	24	29	7	26	26	112	137
Rajkot	1,107	1,107	36	37	55	27	89	89	738	768
Sabarkantha	730	730	127	126	38	21	34	34	438	458
Surat	776	431	142	38	8	11	24	17	432	286
Surendranagar	1,046	1,046	50	53	66	48	46	46	686	709
Tapi	-	344	-	74	-	1	-	9	-	162
The Dangs	229	229	160	160	-	-	-	-	56	56
Vadodara	753	753	80	79	20	15	33	33	520	526
Valsad	294	294	98	93	0.4	7	2	2	161	158

(-) Not reported/not available or reported zero.

SOURCE: Directorate of Economics and Statistics, Ministry of Agriculture, Govt of India.



**TABLE VII.4: District-wise Area under Crops and Production – Cereals and Pulses**

Districts	Cereals						Pulses					
	Area ('000 ha)			Production ('000 MT)			Area ('000 ha)			Production ('000 MT)		
	*2004-10	2010-11	2011-12	*2004-10	2010-11	2011-12	*2004-10	2010-11	2011-12	*2004-10	2010-11	2011-12
GUJARAT	3,265	4,014	3,778	5,768	9,349	8,477	821	890	957	576	722	780
Ahmedabad	238	360	348	458	882	876	27	19	46	17	11	31
Amreli	51	70	41	127	233	129	13	12	10	10	9	8
Anand	190	225	242	389	511	559	5	8	7	3	5	5
Banaskantha	329	423	390	446	812	766	57	40	51	30	29	31
Bharuch	65	51	59	75	86	100	56	80	66	36	72	55
Bhavnagar	86	87	63	195	227	147	6	12	10	4	9	7
Dahod	203	196	225	227	311	322	75	75	79	62	64	78
Gandhinagar	70	71	78	164	188	201	7	7	12	5	4	6
Jamnagar	57	73	44	142	238	148	27	38	39	30	43	42
Junagadh	155	264	186	537	1004	648	16	27	30	15	28	39
Kachchh	97	99	81	134	167	143	85	96	135	38	46	53
Kheda	254	318	301	506	737	688	9	8	6	8	6	5
Mehsana	128	161	183	255	381	445	27	27	21	14	16	11
Narmada	31	36	47	36	57	66	20	21	32	19	18	28
Navsari	51	91	83	123	241	219	9	18	12	7	16	8
Panchmahals	221	222	273	205	291	404	43	49	39	48	53	44
Patan	112	120	104	117	227	213	43	41	41	21	24	24
Porbandar	17	49	36	35	134	83	12	16	29	15	18	29
Rajkot	97	186	120	278	702	461	18	24	21	14	21	23
Sabarkantha	232	277	265	415	627	574	47	49	37	31	31	28
Surat	121	108	101	223	226	236	36	27	32	34	24	22
Surendranagar	94	103	97	157	255	260	19	32	30	13	31	37
Tapi	64	63	75	99	122	152	25	30	31	17	20	22
The Dangs	38	38	42	48	47	64	9	13	30	8	9	27
Vadodara	151	249	217	211	490	416	93	102	97	87	102	106
Valsad	65	78	76	117	154	158	15	18	17	11	13	12

* Average from 2004-05 to 2009-10.

SOURCE: Agriculture and Co-operation Department, Govt of Gujarat.

**TABLE VII.5: District-wise Area under Crops and Production – Food Grains and Oilseeds**

Districts	Food Grains						Oilseeds					
	Area (000 ha)			Production ('000 MT)			Area (000 ha)			Production ('000 MT)		
	*2004-10	2010-11	2011-12	*2004-10	2010-11	2011-12	*2004-10	2010-11	2011-12	*2004-10	2010-11	2011-12
GUJARAT	4,085	4,905	4,735	6,344	10,071	9,257	2,896	3,110	3,130	3,594	5,142	5,035
Ahmedabad	265	378	395	475	894	907	25	85	43	25	77	86
Amreli	65	82	50	137	242	137	298	243	132	210	394	53
Anand	194	233	249	392	515	564	6	7	9	9	8	13
Banaskantha	386	463	441	475	841	797	299	252	355	451	426	660
Bharuch	121	131	125	111	157	155	9	19	14	10	22	24
Bhavnagar	92	99	73	199	236	154	168	156	138	163	287	164
Dahod	277	271	304	289	375	401	4	37	32	4	32	26
Gandhinagar	77	77	90	170	193	207	38	40	38	68	81	72
Jamnagar	84	111	84	172	281	190	416	431	389	603	753	701
Junagadh	171	291	217	552	1,033	686	419	490	452	611	980	759
Kachchh	182	195	216	173	213	196	164	240	297	223	339	512
Kheda	262	326	306	514	743	693	20	15	32	23	19	42
Mehsana	155	188	204	268	397	456	98	108	155	151	184	263
Narmada	50	58	79	55	75	94	3	11	8	6	13	15
Navsari	60	109	95	130	257	226	0	2	1	0	2	1
Panchmahals	264	270	312	252	344	448	6	10	23	9	15	39
Patan	155	161	145	137	251	236	84	90	160	115	148	275
Porbandar	29	65	64	50	152	112	88	95	94	148	79	183
Rajkot	115	210	141	292	722	483	426	365	335	487	683	452
Sabarkantha	279	326	302	446	658	602	118	168	165	153	267	242
Surat	157	135	133	256	250	258	15	20	12	22	20	16
Surendranagar	113	135	127	170	286	297	129	123	140	117	175	269
Tapi	89	93	106	116	142	173	8	21	18	18	27	32
The Dangs	47	51	72	56	56	91	4	12	9	6	12	9
Vadodara	244	350	314	298	592	522	28	67	74	41	96	126
Valsad	80	96	94	128	167	171	0	6	6	0	2	2

* Average from 2004-05 to 2009-10

SOURCE: Agriculture and Co-operation Department, Govt of Gujarat.

**TABLE VII.6: District-wise Area under Crops and Production – Sugarcane and Cotton**

Districts	Sugarcane						Cotton					
	Area ('000 ha)			Production ('000 MT)			Area ('000 ha)			Production ('000 bales)		
	*2004-10	2010-11	2011-12	*2004-10	2010-11	2011-12	*2004-10	2010-11	2011-12	*2004-10	2010-11	2011-12
GUJARAT	201.9	190.1	201.9	14,654	13,763	12,749	2,218	2,623	3,003	7,192	9825	1,0375
Ahmedabad	0.1	0.1	0	4.8	7	0	188	209	222	288	592	392
Amreli	0.2	0.1	0	12.2	7	0	188	269	389	665	1,143	1,010
Anand							4	3	5	13	14	23
Banaskantha							19	32	48	73	114	182
Bharuch	21.7	20.8	18.8	1,582.4	1,514	1,163	133	118	125	267	223	261
Bhavnagar	0.2	0.1	0.4	6.7	7	21	263	301	305	1,034	1,424	1,093
Dahod							1	0	0	3	0	0
Gandhinagar							28	30	33	106	113	137
Jamnagar	0.4	0.5	0	31.0	36	0	133	193	231	641	763	1,077
Junagadh	10.6	8.8	12.8	968.0	679	923	44	50	69	229	188	289
Kachchh	0.2	0.1	0	13.4	7	0	56	77	87	204	337	392
Kheda							21	22	30	68	85	73
Mehsana							48	57	65	139	224	291
Narmada	4.6	11.7	10.0	323.4	899	704	44	41	46	112	117	134
Navsari	29.0	22.0	21.0	1,976.4	1,584	1,327	0	0	0	0	0	0
Panchmahals	0.1	0.1	0	5.4	7	0	10	10	10	25	18	18
Patan							79	69	73	114	151	199
Porbandar							10	7	24	39	21	62
Rajkot	0.2	0.2	0.1	14.4	14	5	261	357	387	1,339	1,658	1,823
Sabarkantha							93	107	157	286	347	490
Surat	119.1	98.9	105.9	9,199.8	7,411	6,942	6	1	9	15	4	34
Surendranagar	0.3	0.1	0.1	19.4	7	6	434	499	477	1,046	1,620	1,715
Tapi	15.8	10.1	18.1	1,122.0	516	803	4	4	14	5	8	45
The Dangs	0.1	0	0.1	3.2	0	5	0	0	0	0	0	0
Vadodara	3.3	7.7	7.0	246.8	470	317	174	166	197	468	662	639
Valsad	12.9	8.8	7.6	855.6	598	532	0	0	0	0	0	0

* Average from 2004-05 to 2009-10, 1 bale = 170 kg.

SOURCE: Agriculture and Co-operation Department, Govt of Gujarat.

**TABLE VII.7: Operational Holdings in Gujarat**

Size of Holding (ha)	Total Holdings		Average Size of Holding (ha)
	Number ('000)	Area ('000 ha)	
Marginal	1,585	792	0.50
Small	1,345	1,959	1.46
Semi-medium	1,080	3,004	2.78
Medium	582	3,380	5.81
Large	68	1,133	16.72
All Classes	4,661	10,269	2.20

SOURCE: Agricultural Census Database, 2005-06, Ministry of Agriculture, Govt of India.

TABLE VII.8: District-wise Average Annual Rainfall

Districts	Average Rainfall (mm)		
	1998 - 2010	2011	2012
GUJARAT	942	930	649
Ahmedabad	721	612	458
Amreli	678	689	345
Anand	714	724	624
Banaskantha	607	775	457
Bharuch	717	634	507
Bhavnagar	613	587	380
Dahod	684	575	732
Gandhinagar	766	696	599
Jamnagar	723	858	377
Junagadh	961	1,069	425
Kachchh	422	667	244
Kheda	835	551	649
Mehsana	732	750	435
Narmada	1,058	1,013	771
Navsari	1,915	1,909	1,159
Panchmahals	775	792	791
Patan	546	717	349
Porbandar	826	937	232
Rajkot	651	853	348
Sabarkantha	830	978	772
Surat	1,535	1,394	906
Surendranagar	581	680	341
Tapi	341	955	877
The Dangs	2,477	1,635	1,603
Vadodara	956	839	711

SOURCE: Hydromet Division, India Meteorological Department, Ministry of Earth Sciences. Govt of India.

**TABLE VII.9: Net Irrigated Area under Different Sources of Irrigation**

("000 ha)

Particulars	1992-93	1997-98	2003-04	2005-06	2007-08	2008-09	2010-11
Net Irrigated Area	2,643	3,058	3,388	3,907	4,233	4,233	4,233
Net Sown Area		9,674	9,852	9,722	9,966	10,302	10,302
Gross Sown Area		11,156	11,421	11,495	12,211	11,637	12,247
Sources (net irrigated area)							
Canals	557	636	600	778	771	771	771
Tanks	26	30	26	42	45	45	45
Wells and Tube Wells	2,056	2,368	2,737	3,024	3,303	3,303	3,303
Other Sources	3	24	25	63	114	114	114

SOURCE: India Harvest (CMIE) and Directorate of Economics and Statistics, Ministry of Agriculture, Govt of India.

TABLE VII.10: Major River Basins of Gujarat

Rivers	Origin	Length (km)	Catchment Area (sq km)	States Falling in the Catchment Area
Sabarmati	Aravalli Hills (Rajasthan)	371	21,674	Rajasthan and Gujarat
Mahi	Dhar (Madhya Pradesh)	583	34,842	Madhya Pradesh, Rajasthan and Gujarat
Narmada	Amarkantak (Madhya Pradesh)	1,312	98,796	Madhya Pradesh, Gujarat and Maharashtra
Tapi	Betul (Madhya Pradesh)	724	65,145	Madhya Pradesh, Maharashtra and Gujarat

SOURCE: Hydrology and Water Resources Information System for India, National Institute of Hydrology, Roorkee.

TABLE VII.11: Medium River Basins of Gujarat – West-flowing Rivers with Catchment Area

Rivers	Village/District (origin)	Length (km)	Catchment Area (sq km)
Ozat	Kathiawar	128	3,189
Shetrunji	Dalkania	182	5,514
Bhadar	Rajkot	198	7,094
Aji	Rajkot	106	2,139
Dhadhar	Panchmahals	135	2,770

SOURCE: Hydrology and Water Resources Information System for India, National Institute of Hydrology, Roorkee.

TABLE VII.12: Distribution of River Basins across Regions

Regions	No. of River Basins
Gujarat Mainland	18
Saurashtra Region	73
Kachchh Region	96

SOURCE: <http://gui-nwrws.gujarat.gov.in/>. Accessed on 4th November, 2013.





TABLE VII.13: Taluka-wise Groundwater Status

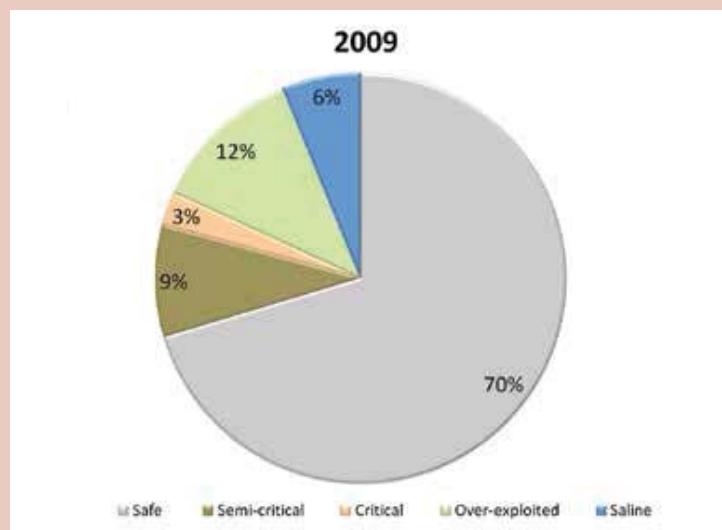
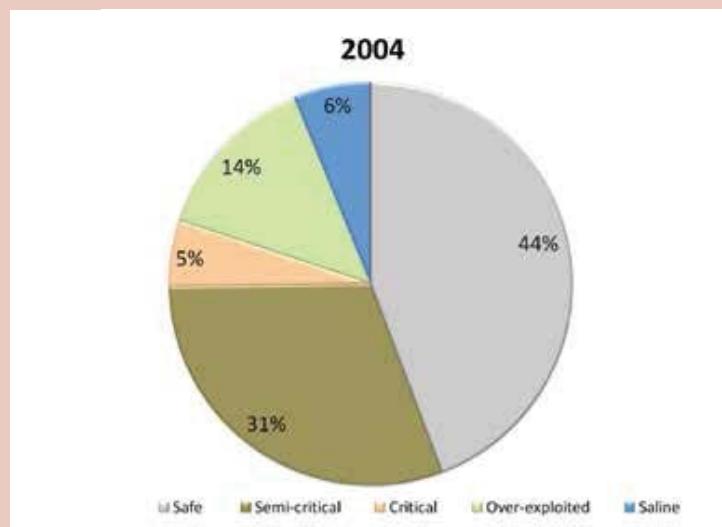
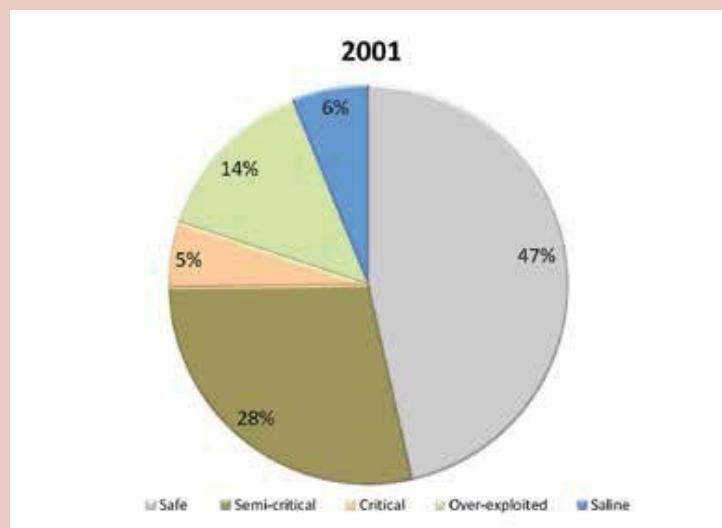
Districts	Number of Talukas (Sub-districts)									
	Semi-critical			Critical			Over-exploited			Saline*
	2001	2004	2009	2001	2004	2009	2001	2004	2009	
GUJARAT	64	69	20	12	12	6	31	31	27	14
Ahmedabad	4	4	4	3	2	0	2	2	2	1
Amreli	5	6	0	0	0	0	0	0	0	
Anand	1	1	0	0	0	0	0	0	0	
Banaskantha	1	1	1	2	2	1	6	6	6	2
Bharuch	1	2	1	0	0	0	0	0	0	2
Bhavnagar	5	4	0	0	1	0	0	0	0	
Dahod	2	2	0	0	0	0	0	0	0	
Gandhinagar	0	0	0	0	0	0	4	4	4	
Jamnagar	3	4	1	0	0	0	0	0	0	
Junagadh	7	8	2	2	2	0	1	1	0	
Kachchh	4	4	2	1	1	2	3	3	3	1
Kheda	3	3	4	1	1	0	0	0	0	
Mehsana	0	0	0	1	1	1	8	8	8	
Narmada	0	0	0	0	0	0	0	0	0	
Navsari	0	0	0	0	0	0	0	0	0	
Panchmahals	5	6	0	0	0	0	0	0	0	
Patan	0	0	0	0	0	0	3	3	3	4
Porbandar	2	2	0	0	0	0	1	1	1	
Rajkot	8	8	0	1	1	0	0	0	0	1
Sabarkantha	7	8	1	1	1	2	2	2	0	
Surat	1	1	0	0	0	0	0	0	0	
Surendranagar	3	3	1	0	0	0	0	0	0	3
Tapi			0	0	0	0	0	0	0	
The Dangs	0	0	0	0	0	0	0	0	0	
Vadodara	2	2	3	0	0	0	1	1	0	
Valsad	0	0	0	0	0	0	0	0	0	

* Number of saline talukas (Sub-districts) remains same for all the years.

SOURCE: Various Reports of Dynamics of Ground Water Resources, Central Ground Water Board, Ministry of Water Resources, Govt of India.

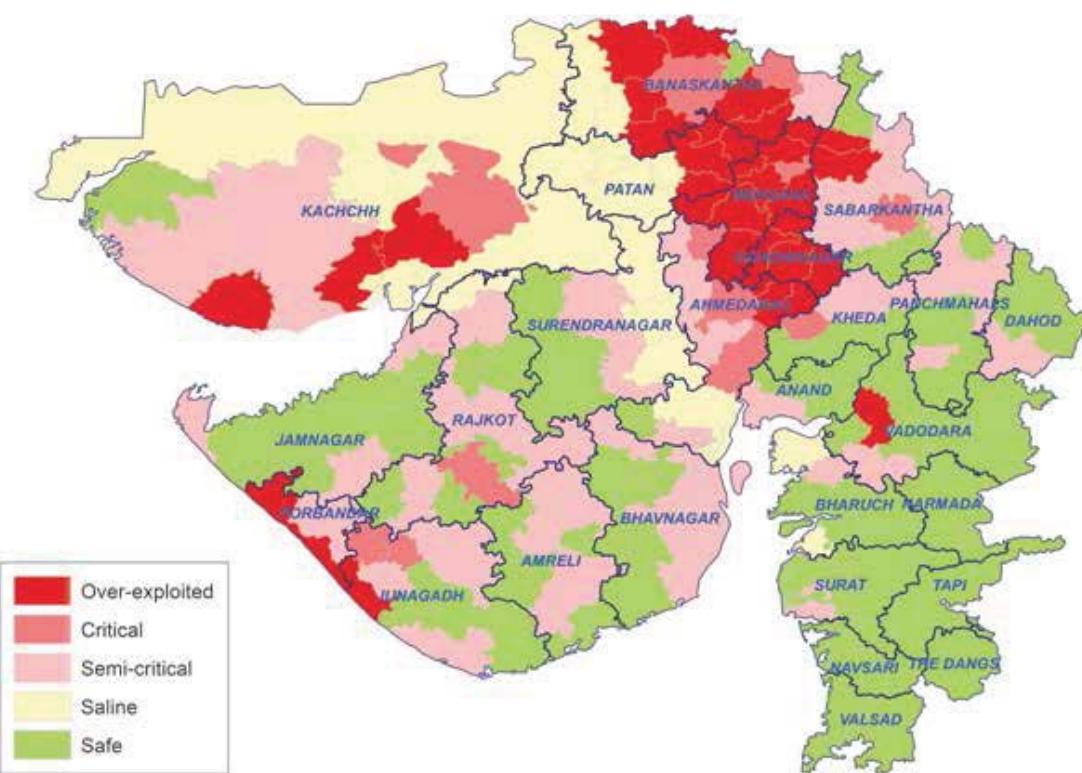


Ground Water Status in 2001, 2004 & 2009 (% of Talukas)





Taluka-wise Groundwater Status – 2001



Taluka-wise Groundwater Status – 2004

