

LIST OF TABLES

Table	Title	Page
1.1	Per Capita per year availability and utilizable Surface water in India Projected upto 2050	3
1.2	Groundwater Resources of India.	3
1.3	Annual Water Requirement for different uses in India Projected upto 2050	3
1.4	Water Potential of Gujarat State	8
1.5	Present Status of Irrigation Projects in Gujarat State	8
1.6	Utilization of Groundwater Potential in Gujarat State	9
1.7	Present Irrigation Potential of Gujarat State	9
1.8	Surface Water Potential of Saurashtra	10
1.9	Groundwater Potential and Development of Saurashtra	11
1.10	Classification of Saline Water	14
2.1	Scenario of World Seawater Intrusion Control Schemes	26
2.2	Scenario of U.S.A. – Seawater Intrusion Control Schemes & its outlook	31
2.3	Quality of Water Used For Injection, Injected Volume & Injection Costs	34
2.4	Crop Selection in Respect to the Quality of Irrigation Water	38
2.5	Tolerance of Different Crops to Boron	39
2.6	Cropping Pattern Suggested as Management Technique	39
3.1	Geological Succession in Order of Their Superposition in Saurashtra Region	51
3.2	Coastal Talukas of Saurashtra & its Area In km ²	52
3.3	Stratigraphic Sequence in Coastal Saurashtra Region	54
3.4	Rainfall Details for Bhavnagar to Una Reach for the Years 1981 – 2006	56
3.5	Geological Formations in Their Natural Order of Superposition for Bhavnagar to Una Reach	57
3.6	Details of Rainfall for Una to Madhavpur Reach for the Years 1980 – 1999	58
3.7	Geological Formations in Their Natural Order of Superposition for Una to Madhavpur Reach	59
3.8	Geological Formations in Their Natural Order of Superposition for Madhavpur to Maliya Reach	61

	Fable	Title distribution of the second seco	Page
	3.9	Rainfall Details for Madhavpur to Malia Reach for the Years 1985 – 2005	62
	4.1	Details of Area Affected and Countermeasures Proposed in Brief for Different Divisions of Saurashtra Coast as per Recommendations of HLC	67
	4.2	Salient Features of Various Tidal Regulators Constructed along Saurashtra Sea Coast	71
	4.3	Salient Features of Various Tidal Regulators Constructed along Saurashtra Sea Coast	72
	4.4	Salient Features of Various Tidal Regulators Constructed along Saurashtra Sea Coast	73
	4.5	Salient Features of Various Bandhara Constructed along Saurashtra Sea Coast	74
Ţ	4.6	Salient Features of Various Bandhara Constructed along Saurashtra Sea Coast	75
	4.7	Salient Features of Various Recharge Reservoirs & Recharge tanks along Saurashtra Sea Coast	76
	4.8	Classification of Area and Change into Freshwater Area from 1984 to 2007	77
	4.9	Yearwise Change in Area Affected by Seawater Intrusion, Freshwater Area & Rainfall from 1992 - 2007 for Bhavnagar to Una	78
,	4.10	Details of Rainfall at Medha Creek TR Area	80
1	4.11	Geology at Medha Creek TR Area	81
	4.12	Elevation, Area & Capacity Table for Medha Creek TR	84
,	4.13	Time – Water level Data for the Pumping Test at Village Ambarama	85
	4.14	Time – Water level Data for the Recuperation Test at Village Ambarama	85
	4.15	Rainfall, Water Level & Evaporation Data at Medha Creek TR - Year 1999 to 2003	86
,	4.16	Details of Observation Wells surrounding Medha Creek TR	88
	4.17	Geohydrological & Geochemical Parameters Observed in Obs. Wells Surrounding Medha Creek TR	88
,	4.18	Details of Seawater Intrusion Preventive structures constructed In Meghal Basin	92
1	4.19	Details of Rainfall Recorded at Meghal TR Hydromet Station	93
,	4.20	Geology at Meghal TR Area	94
	4.21	Aquifer Properties of Geological Formation at Meghal TR Site	94
į	4.22	Elevation, Area & Capacity Table for Meghal TR	97
	4.23	Time – Water level Data for the Pumping Test at Village Visanvel	98
	4.24	Time – Water level Data for the Recuperation Test at Village Visanvel near Meghal TR	98

1	Γable	Title	Page
	4.25	Rainfall, Water Level & Evaporation Data at Meghal TR - Year 1998 to 2003	99
1	4.26	Details of Observation Wells surrounding Meghal TR	101
1	4.27	Geohydrological & Geochemical Parameters Observed in Obs. Wells Surrounding Meghal TR	101
1	4.28	Details of Rainfall Recorded at Mul Dwarka TR Hydromet Station	105
1	4.29	Geology at Mul Dwarka TR Area	105
-	4.30	Elevation, Area & Capacity Table for Mul Dwarka TR	109
ļ	4.31	Time – Water level Data for the Pumping Test at Village Math	110
	4.32	Time – Water level Data for the Recuperation Test at Village Math	110
1	4.33	Rainfall, Water Level & Evaporation Data at Mul Dwarka TR - Year 1999 to 2003	111
1	4.34	Details of Observation Wells surrounding Mul Dwarka TR	112
	4.35	Geohydrological & Geochemical Parameters Observed in Obs. Wells Surrounding Mul Dwarka TR	112
	4.36	Elevation, Area & Capacity Table for Barda Bandhara	120
*	4.37	Rainfall – Water Level Data at Barda Bandhara – Year 1999 to 2003	121
į	4.38	Details of Observation Wells surrounding Barda Bandhara	122
	4.39	Geohydrological & Geochemical Parameters Observed in Obs. Wells Surrounding Barda Bandhara	122
	4.40	Details of Rainfall Recorded at Sheriaj Hydromet Station	125
-	4.41	Aquifer Properties of Geological Formation at Shardagram Bandhara Site	126
	4.42	Elevation, Area & Capacity Table for Shardagram Bandhara	129
	4.43	Time – Water level Data for the Pumping Test at Village Langodra	130
	4.44	Rainfall, Water Level & Evaporation Data at Shardagram Bandhara – Year 1998 to 2003	130
	4.45	Details of Observation Wells surrounding Shardagram Bandhara	132
	4.46	Geohydrological & Geochemical Parameters Observed in Obs. Wells Surrounding Shardagram Bandhara	132
	4.47	Change in Crop Production for Noli, Meghal & Shingoda Basin	134
1	4.48	Position of Limestone Mining Lease in Saurashtra	135
1	4.49	Major Mining Agencies of Limestone in Saurashtra	135
The second secon	5.1	Rainfall Details and Cumulative Departure from Normal for Bhavnagar to Una Reach for the Years 1981 – 2006	137
1	5.2	Details of Rainfall for Una to Madhavpur Reach for the Year 1980 - 1999	140
	5.3	Rainfall Details and Cumulative Departure from Normal for Madhavpur to Malia Reach for the Years 1985 – 2005	141

	Table	Title to the same and the same	Page
	5.4	Time – Drawdown Analysis for the Pumping Test at Village Ambarama near Medha Creek TR	147
	5.5	Analysis for the Recuperation Test at Village Ambarama	147
	5.6	Results of Pumping Test at Village Ambarama	148
	5.7	Recharge Rate Calculation for Medha Creek TR - Year 1999	151
,	5.8	Recharge Rate Calculation for Medha Creek TR - Year 2000	152
3	5.9	Recharge Rate Calculation for Medha Creek TR - Year 2002	153
,	5.10	Recharge Rate Calculation for Medha Creek TR - Year 2003	154
;	5.11	Recharge Rate Equation for Medha Creek TR	157
ì	5.12	Time – Drawdown Analysis for the Pumping Test at Village Visanvel	178
1	5.13	Time – Recovery Analysis for the Recuperation Test at Village Visanvel near Meghal TR	180
	5.14	Results of Pumping Test at Village Visanvel	180
	5.15	Recharge Rate Calculation for Meghal TR – Year 1998	182
	5.16	Recharge Rate Calculation for Meghal TR – Year 2000	183
	5.17	Recharge Rate Calculation for Meghal TR - Year 2001	184
	5.18	Recharge Rate Calculation for Meghal TR - Year 2003	185
i	5.19	Recharge Rate Equation for Meghal TR	188
1	5.20	Time – Drawdown Analysis for the Pumping Test at Village Math	212
i	5.21	Time - Recovery Analysis for the recuperation Test at Village Math	214
1	5.22	Results of Pumping Test at Village Math	215
;	5.23	Recharge Rate Calculation for Mul Dwarka TR - Year 1999	217
	5.24	Recharge Rate Calculation for Mul Dwarka TR - Year 2001	218
	5.25	Recharge Rate Calculation for Mul Dwarka TR - Year 2002	219
	5.26	Recharge Rate Calculation for Mul Dwarka TR – Year 2003	220
	5.27	Recharge Rate Equation for Mul Dwarka TR	224
1	5.28	Recharge Rate Calculation for Barda Bandhara - Year 1999	245
,	5.29	Recharge Rate Calculation for Barda Bandhara - Year 2001	246
	5.30	Recharge Rate Calculation for Barda Bandhara - Year 2002	247
	5.31	Recharge Rate Calculation for Barda Bandhara - Year 2003	247
i	5.32	Recharge Rate Equation for Barda Bandhara	251
;	5.33	Time – Drawdown Analysis for the Pumping Test at Village Langodra near Shardagram Bandhara	270
٠	5.34	Results of Pumping Test at Village Langodra	270
	5.35	Recharge Rate Calculation for Shardagram Bandhara – Year 1998	272
	5.36	Recharge Rate Calculation for Shardagram Bandhara - Year 2000	273
	5.37	Recharge Rate Calculation for Shardagram Bandhara - Year 2001	274

Table	Title	Page
5.38	Recharge Rate Calculation for Shardagram Bandhara – Year 2003	275
5.39	Recharge Rate Equation for Shardagram Bandhara	279
5.40	Classification of Groundwater Samples on the basis of Chloride to	2/3
3.40	Carbonate and Bicarbonate Ratio v/s Cl ⁻ (in meq/l)	289
6.1	Results of Pumping Test	295
6.2	Recharge Rate for Medha Creek TR	295
6.3	Recharge Rate for Meghal TR	296
6.4	Recharge Rate for Mul Dwarka TR	296
6.5	Recharge Rate for Barda Bandhara	296
6.6	Recharge Rate for Shardagram Bandhara	296
6.7	Recharge Rate Equation for Medha Creek TR	297
6.8	Recharge Rate Equation for Meghal TR	297
6.9	Recharge Rate Equation for Mul Dwarka TR	297
6.10	Recharge Rate Equation for Barda Bandhara	297
6.11	Recharge Rate Equation for Shardagram Bandhara	298
6.12	Volume of Water Stored, Lost, Recharged and % Recharge Efficiency for Medha Creek TR	298
6.13	Volume of Water Stored, Lost, Recharged and % Recharge Efficiency for Meghal TR	298
6.14	Volume of Water Stored, Lost, Recharged and % Recharge Efficiency for Mul Dwarka TR	299
6.15	Volume of Water Stored, Lost, Recharged and % Recharge Efficiency for Barda Bandhara	299
6.16	Volume of Water Stored, Lost, Recharged and % Recharge Efficiency for Shardagram Bandhara	299
6.17	Change in Crop Production for Noli, Meghal & Shingoda Basin	301