CHAPTER – 7

RESULTS, ANALYSIS, CONCLUSIONS AND RECOMMENDATIONS

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7.1 INTRODUCTION

Kakrapar Left Bank Main Canal of Kakrapar weir consists of eight branch canals. Under each branch canal, there are number of minors and subminors, as discussed earlier. For this study, the entire network of irrigation distribution system under the main canal is selected for conjunctive use studies and optimization models are developed. The main objective of present work is to determine the optimal cropping pattern and operational plans for conjunctive use of water for the entire command area of Kakrapar weir. For optimization, Simplex method is used based on linear programming technique. The formulation of mathematical model involves 34 variables (10 for different crop area, 12 each for monthly surface water release and ground water release) and 64 to 80 constraint equations depending upon the type of strategy. For achieving the solution the computer program is used. The optimization is also carried out by fuzzy linear programming and results by both techniques are analyzed.

7. 2 COMPUTER RUNS

Depending upon the type of strategy discussed in chapter 6 objective function and constraint equations are formulated for different irrigation intensities for the entire Kakrapar Left Bank Main Canal of Kakrapar weir for the year 1999-2000.

The introduction to MATLAB, which uses simplex method to solve the linear programming problem, is given in Appendix IV. The methods of input, the way to run and the method of output are given in the Appendix V,enclosed in CD.

7.3 RESULTS

The results of the analytical solutions and computer programming solutions carried out so far are either presented earlier in chapter 4 or presented here.

General Strategy

Linear programming (LP) model

The optimal cropping pattern, ha and values of surface water release and ground water release, ha.m for different irrigation intensities and the maximum net benefits, Rs./ha.m under each irrigation intensity are discussed below.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 17 of Surat branch canal, for general strategy are given in Tables 7.1 to 7.17, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Bardoli branch canal, for general strategy are given in Tables 7.18 to 7.24, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Chalthan branch canal, for general strategy are given in Tables 7.25 to 7.31, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 4 of Umbhrat branch canal upto 58 R.D., for general strategy are given in Tables 7.32 to 7.35, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Umbhrat

branch canal beyond 58 R.D., for general strategy are given in Tables 7.36 to 7.42, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Navsari branch canal, for general strategy are given in Tables 7.43 to 7.49.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Amalsad branch canal, for general strategy are given in Tables 7.50 to 7.56, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 10 of Valsad branch canal, for general strategy are given in Tables 7.57 to 7.66, enclosed in C.D.

Table 7.43: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Dandeswar Minor of Navsari Branch Canal for General Strategy

Irrigation Intensity,%	200	210	220	230	240	250	260	270
Area Irrigated, ha								
A_1	6.8658	9.1212	6.9328	6.8776	6.6195	7.1488	8.3674	6.6189
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0336	0.5684	0.0995	0.9524	0.3683	0.0008	0.8610	0.0000
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	213.7914	126.4361	212.0222	136.1713	198.9243	211.2802	124.4523	125.0959
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	40.3535	43.3345	40.7824	45.5890	41.3219	40.3768	44.0251	50.0000
Total	**261.0443**	**179.4602**	**259.8369**	**189.5903**	**247.2340**	**258.8066**	**177.7058**	**181.7148**
Surface Water Releases, ha.m								
SW_1	37.3922	41.8270	37.8299	44.8177	39.1265	37.3199	43.2404	46.9032
SW_2	38.8719	43.7873	39.3173	46.2999	40.5531	38.8582	45.0437	48.3297
SW_3	0.1448	1.3987	0.1029	0.1517	0.0004	0.2827	1.0258	0.0000
SW_4	1.6245	3.3589	1.5850	1.6339	1.4270	1.8188	2.8291	1.4265
SW_5	1.9260	3.7583	1.8880	1.9359	1.7176	2.1322	3.1964	1.7171
SW_6	32.2945	20.2069	31.9724	20.5290	29.9051	32.0365	19.5663	18.7079
SW_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{10}	44.6001	27.1210	44.1675	28.1869	41.3383	44.1714	26.4156	25.7214
SW_{11}	40.8260	49.2191	41.1060	43.9955	40.6686	41.6249	47.5187	45.8620
SW_{12}	38.7075	43.5694	39.1520	46.1352	40.3946	38.6873	44.8434	48.1712
Total	**236.3875**	**234.2466**	**237.1210**	**233.6857**	**235.1312**	**236.9319**	**233.6794**	**236.8390**
Ground Water Releases, ha.m								
GW_1	1.0395	1.0796	1.0895	1.0396	1.0395	1.0571	1.0396	1.0395
GW_2	1.0395	1.0796	1.0895	1.0396	1.0395	1.0571	1.0396	1.0395
GW_3	1.0395	1.0796	1.0881	1.0396	1.0395	1.0565	1.0396	1.0395
GW_4	1.0395	1.0796	1.0895	1.0396	1.0395	1.0571	1.0396	1.0395
GW_5	1.0395	1.0796	1.0895	1.0396	1.0395	1.0571	1.0396	1.0395
GW_6	1.0395	1.0796	1.0895	1.0396	1.0395	1.0571	1.0396	1.0395
GW_7	0.0000	0.0255	0.0318	0.0000	0.0000	0.0112	0.0000	0.0000
GW_8	0.0000	0.0255	0.0318	0.0000	0.0000	0.0112	0.0000	0.0000
GW_9	0.0000	0.0255	0.0318	0.0000	0.0000	0.0112	0.0000	0.0000
GW_{10}	1.0395	1.0796	1.0895	1.0396	1.0395	1.0571	1.0396	1.0395
GW_{11}	1.0395	1.0797	1.0896	1.0396	1.0395	1.0571	1.0396	1.0395
GW_{12}	1.0395	1.0796	1.0895	1.0396	1.0395	1.0571	1.0396	1.0395
Total	**9.3555**	**9.7930**	**9.8996**	**9.3564**	**9.3555**	**9.5469**	**9.3564**	**9.3555**
Optimal Benefits, Rs./ha.m	**61,50,800**	**48,35,400**	**61,40,800**	**51,31,800**	**59,58,700**	**61,07,300**	**48,52,000**	**51,31,900**

Table 7.44: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Dandi Minor of Navsari Branch Canal for General Strategy

Irrigation Intensity,%	10	20	30	40	50	60	70	80
Area Irrigated, ha								
A_1	31.4478	38.8945	47.1627	54.9598	58.9290	67.1989	68.8947	63.1894
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0105	0.2974	14.4051	8.0064	9.1558	19.5830	13.8980	6.0781
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	121.6723	120.1737	116.8778	98.9096	97.8899	66.8857	87.0943	94.6915
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	69.4919	65.0393	28.5633	41.7338	41.0385	12.4149	19.9730	48.3982
Total	**222.6225**	**224.4049**	**207.0089**	**203.6096**	**207.0132**	**166.0825**	**189.8600**	**212.3572**
Surface Water Releases, ha.m								
SW_1	3.3018	5.4261	6.3772	6.3442	9.0478	6.5776	0.5247	9.4749
SW_2	7.6453	11.5294	14.1815	16.0069	19.5300	18.8479	13.1428	20.8508
SW_3	0.0012	0.0000	0.0029	0.0047	1.8377	6.5287	8.2801	4.4121
SW_4	0.0026	0.0032	2.1805	8.9328	12.1690	18.7108	20.0389	15.3735
SW_5	0.0032	0.0821	3.8499	10.9007	14.2272	21.2124	22.5347	17.6708
SW_6	0.0004	0.0000	0.0179	0.0000	0.0002	0.0002	0.0081	0.0096
SW_7	0.0004	0.0000	0.0176	0.0000	0.0001	0.0002	0.0080	0.0096
SW_8	0.0004	0.0000	0.0176	0.0000	0.0001	0.0002	0.0080	0.0096
SW_9	0.0004	0.0000	0.0176	0.0000	0.0001	0.0002	0.0080	0.0096
SW_{10}	0.4395	1.2428	6.9815	6.3244	7.8946	6.2202	10.1059	9.1622
SW_{11}	13.1792	16.7601	0.0059	12.0772	13.4748	0.0089	5.2082	19.6608
SW_{12}	7.1627	10.8513	13.2904	14.9331	18.3586	17.4841	11.7408	19.5845
Total	**31.7371**	**45.8950**	**46.9405**	**75.5240**	**96.5402**	**95.5914**	**91.6082**	**116.2280**
Ground Water Releases, ha.m								
GW_1	22.4525	20.8951	20.1211	19.7623	19.7305	19.7236	19.7875	19.7566
GW_2	22.4525	20.8951	20.1605	19.7624	19.7283	19.7248	19.7877	19.7563
GW_3	17.3963	17.6919	18.5736	19.5659	19.6723	19.6999	19.5211	19.6325
GW_4	18.5587	19.3249	20.1192	19.7623	19.7236	19.7248	19.7513	19.7431
GW_5	18.7954	19.7469	20.1059	19.7622	19.7269	19.7245	19.7712	19.7508
GW_6	14.2313	13.2443	12.7752	12.5263	12.5045	12.5025	12.5402	12.5206
GW_7	14.2313	13.2443	12.7753	12.5263	12.5017	12.5024	12.5402	12.5204
GW_8	14.2313	13.2443	12.7753	12.5263	12.5017	12.5024	12.5402	12.5204
GW_9	14.2313	13.2443	12.7753	12.5263	12.5017	12.5024	12.5402	12.5204
GW_{10}	21.2530	20.8949	19.7280	19.7622	19.7175	19.7246	19.7868	19.7075
GW_{11}	22.4525	20.8951	20.1550	19.7623	19.7284	19.7245	19.7694	19.7508
GW_{12}	22.4525	20.8951	20.1625	19.7624	19.7267	19.7248	19.7876	19.7560
Total	**222.7386**	**214.2162**	**210.2269**	**208.0072**	**207.7638**	**207.7812**	**208.1234**	**207.9354**
Optimal Benefits, Rs./ha.m	**32,41,200**	**32,48,900**	**21,13,200**	**23,63,700**	**24,51,700**	**9,96,700**	**14,86,800**	**27,18,900**

Table 7.45: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Machhad Minor of Navsari Branch Canal for General Strategy

Irrigation Intensity,%	50	60	70	80	90	100	110	120
Area Irrigated, ha								
A_1	5.1313	5.1313	5.1313	5.1313	5.1313	5.1313	5.1313	5.1313
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	32.0000	38.4000	44.8000	51.2000	57.6000	64.0000	70.4000	76.8000
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	85.3072	85.0157	84.7241	84.4326	84.1410	83.8495	83.5579	83.2664
Total	**122.4385**	**128.5470**	**134.6554**	**140.7639**	**146.8723**	**152.9808**	**159.0892**	**165.1977**
Surface Water Releases, ha.m								
SW_1	80.6353	80.6353	80.6353	80.6353	80.6353	80.6353	80.6353	80.6353
SW_2	81.7412	81.7412	81.7412	81.7412	81.7412	81.7412	81.7412	81.7412
SW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{10}	2.2090	2.2090	2.2090	2.2090	2.2090	2.2090	2.2090	2.2090
SW_{11}	48.1860	48.1860	48.1860	48.1860	48.1860	48.1860	48.1860	48.1860
SW_{12}	81.6183	81.6183	81.6183	81.6183	81.6183	81.6183	81.6183	81.6183
Total	**294.3898**	**294.3898**	**294.3898**	**294.3898**	**294.3898**	**294.3898**	**294.3898**	**294.3898**
Ground Water Releases, ha.m								
GW_1	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860
GW_2	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860
GW_3	0.8059	0.8059	0.8059	0.8059	0.8059	0.8059	0.8059	0.8059
GW_4	1.1019	1.1019	1.1019	1.1019	1.1019	1.1019	1.1019	1.1019
GW_5	1.1622	1.1622	1.1622	1.1622	1.1622	1.1622	1.1622	1.1622
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_{10}	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860
GW_{11}	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860
GW_{12}	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860	1.3860
Total	**10.0000**	**10.0000**	**10.0000**	**10.0000**	**10.0000**	**10.0000**	**10.0000**	**10.0000**
Optimal Benefits, Rs./ha.m	**55,20,800**	**56,18,000**	**57,15,300**	**58,12,600**	**59,09,800**	**60,07,100**	**61,04,400**	**62,01,600**

Table 7.46: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Onjal Minor of Navsari Branch Canal for General Strategy

Irrigation Intensity,%	20	30	40	50	60	70	80	90
Area Irrigated, ha								
A_1	35.6475	33.4220	41.6460	40.3803	44.1929	47.9702	51.8681	56.0147
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.2566	2.7014	3.4322	2.6352	4.3322	4.4653	3.5936	0.0018
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	119.8762	119.9945	118.5858	118.7718	118.5026	118.1650	117.9989	117.9104
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	65.3745	73.6635	59.6636	60.6833	62.0946	57.3515	57.0810	56.5182
Total	**221.1548**	**229.7814**	**223.3276**	**222.4706**	**229.1223**	**227.9520**	**230.5416**	**230.4451**
Surface Water Releases, ha.m								
SW_1	5.1088	18.4990	12.0270	10.3087	17.1130	14.3096	12.9833	4.5773
SW_2	10.5172	23.4032	18.8559	16.8320	24.4782	22.5177	22.0397	14.5239
SW_3	0.0001	0.0000	0.0029	0.0001	0.1357	0.0566	0.5238	2.8349
SW_4	0.0001	0.0000	0.0105	0.0018	2.2044	4.3159	7.6941	11.1949
SW_5	0.0001	0.0000	0.0181	0.0309	2.8544	5.9873	9.5389	13.1378
SW_6	0.0001	0.0000	0.0007	0.0000	0.0418	0.0000	0.0000	0.0069
SW_7	0.0001	0.0000	0.0007	0.0000	0.0429	0.0000	0.0000	0.0070
SW_8	5.0605	0.7078	4.0420	3.4887	4.7782	5.7579	6.7144	7.6281
SW_9	0.0001	0.0000	0.0007	0.0000	0.0429	0.0000	0.0000	0.0070
SW_{10}	0.0001	0.0000	0.0014	0.0000	0.0825	0.0000	0.0000	0.0112
SW_{11}	4.2386	8.9738	3.4177	3.3238	4.6141	2.3544	2.4629	2.2498
SW_{12}	9.9162	22.8586	18.0971	16.1069	23.6678	21.6059	21.0334	13.4188
Total	**34.8420**	**74.4424**	**56.4747**	**50.0929**	**80.0559**	**76.9053**	**82.9905**	**69.5976**
Ground Water Releases, ha.m								
GW_1	20.9331	21.0693	19.5893	19.7969	19.5346	19.1823	19.0200	18.9562
GW_2	20.9331	21.0693	19.5893	19.7966	19.5345	19.1822	19.0200	18.9563
GW_3	17.2095	16.9285	17.3922	17.3022	17.7127	18.1249	18.5151	18.5052
GW_4	18.6573	18.2414	19.2182	19.0484	19.1304	19.1820	19.0200	18.9300
GW_5	18.9522	18.5088	19.5886	19.3959	19.3580	19.1822	19.0200	18.9523
GW_6	13.2683	13.3547	12.4164	12.5483	12.3710	12.1586	12.0558	12.0136
GW_7	13.2683	13.3546	12.4164	12.5479	12.3707	12.1586	12.0558	12.0135
GW_8	19.8634	20.9980	19.5846	19.7969	19.4772	19.1822	19.0200	18.9436
GW_9	13.2683	13.3546	12.4164	12.5479	12.3707	12.1586	12.0558	12.0135
GW_{10}	15.8657	15.7976	15.4450	15.4835	15.5530	15.6094	15.7665	16.0415
GW_{11}	20.9331	21.0693	19.4935	19.7968	19.5328	19.1823	19.0200	18.9516
GW_{12}	20.9331	21.0693	19.5893	19.7970	19.5324	19.1823	19.0200	18.9563
Total	**214.0854**	**214.8154**	**206.7392**	**207.8583**	**206.4780**	**204.4856**	**203.5890**	**203.2336**
Optimal Benefits, Rs./ha.m	**32,04,600**	**37,87,500**	**32,70,900**	**32,44,300**	**35,18,500**	**33,45,900**	**33,63,100**	**31,97,200**

Table 7.47: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Sadlav Minor of Navsari Branch Canal for General Strategy

Irrigation Intensity,%	250	260	270	280	290	300	310	320
Area Irrigated, ha								
A_1	8.0086	7.7468	7.4919	7.3917	7.3342	7.2830	7.2304	97.7188
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	193.7818	195.2400	196.7156	198.2053	199.7090	201.2261	202.7569	204.2990
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	58.5073	58.3549	58.1809	58.0785	57.9824	57.8721	57.7789	48.5941
Total	**260.2977**	**261.3417**	**262.3884**	**263.6755**	**265.0256**	**266.3812**	**267.7662**	**350.6119**
Surface Water Releases, ha.m								
SW_1	23.9869	23.9169	23.8445	23.8029	23.7677	23.7307	23.6985	60.3151
SW_2	22.8951	22.8242	22.7510	22.7080	22.6711	22.6327	22.5990	63.7070
SW_3	25.8904	25.8581	25.8282	25.8004	25.7741	25.7487	25.7275	48.3845
SW_4	23.3677	23.3230	23.2814	23.2445	23.2104	23.1780	23.1504	51.7196
SW_5	22.8686	22.8214	22.7776	22.7390	22.7035	22.6698	22.6410	52.3829
SW_6	20.6888	20.6190	20.5511	20.5003	20.4546	20.4100	20.3725	60.3490
SW_7	33.3102	33.3182	33.3260	33.3288	33.3295	33.3285	33.3302	38.6172
SW_8	33.3102	33.3182	33.3260	33.3288	33.3295	33.3285	33.3302	38.6172
SW_9	33.3102	33.3182	33.3260	33.3288	33.3295	33.3285	33.3302	38.6172
SW_{10}	21.1548	21.0835	21.0137	20.9629	20.9175	20.8730	20.8356	62.0721
SW_{11}	7.0083	6.9189	6.8324	6.7713	6.7186	6.6684	6.6255	90.7169
SW_{12}	23.0163	22.9455	22.8724	22.8295	22.7929	22.7546	22.7211	63.3352
Total	**290.8075**	**290.2651**	**289.7303**	**289.3452**	**288.9989**	**288.6514**	**288.3617**	**668.8339**
Ground Water Releases, ha.m								
GW_1	51.4599	51.4075	51.3523	51.3079	51.2640	51.2169	51.1732	42.1785
GW_2	49.6757	49.6223	49.5665	49.5207	49.4754	49.4273	49.3825	44.4075
GW_3	42.6062	42.5739	42.5448	42.5130	42.4815	42.4508	42.4188	50.5344
GW_4	41.2050	41.1748	41.1480	41.1169	41.0857	41.0554	41.0236	52.7786
GW_5	40.9156	40.8859	40.8595	40.8284	40.7972	40.7670	40.7352	53.2401
GW_6	49.4780	49.4517	49.4287	49.3993	49.3690	49.3394	49.3078	51.8158
GW_7	46.2727	46.2329	46.1959	46.1609	46.1270	46.0936	46.0596	44.6094
GW_8	46.2727	46.2329	46.1959	46.1609	46.1270	46.0936	46.0596	44.6094
GW_9	46.2727	46.2329	46.1959	46.1609	46.1270	46.0936	46.0596	44.6094
GW_{10}	52.0565	52.0294	52.0055	51.9750	51.9436	51.9128	51.8799	52.3082
GW_{11}	26.8725	26.8224	26.7756	26.7204	26.6649	26.6115	26.5578	75.0736
GW_{12}	49.8739	49.8207	49.7650	49.7193	49.6741	49.6262	49.5815	44.1584
Total	**542.9614**	**542.4873**	**542.0336**	**541.5836**	**541.1364**	**540.6881**	**540.2391**	**600.3233**
Optimal Benefits, Rs./ha.m	**20,33,600**	**20,13,800**	**19,95,100**	**19,68,900**	**19,41,200**	**19,14,100**	**18,85,700**	**17,62,500**

Table 7.48: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Vachharvad Minor of Navsari Branch Canal for General Strategy

Irrigation Intensity,%	240	250	260	270	280	290	300	310
Area Irrigated, ha								
A_1	29.2556	52.1415	52.0997	52.0603	52.0232	51.9882	51.9550	51.9234
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	23.3879	59.8089	60.0236	60.2308	60.4305	60.6230	60.8085	60.9874
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	162.6687	163.2466	163.9251	164.6053	165.2870	165.9704	166.6555	167.3422
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	85.0342	4.3815	4.3797	4.3779	4.3761	4.3744	4.3728	4.3711
Total	300.3464	**279.5785**	**280.4281**	**281.2743**	**282.1168**	**282.9560**	**283.7918**	**284.6241**
Surface Water Releases, ha.m								
SW_1	8.4295	12.2760	12.5218	12.7616	12.9954	13.2230	13.4447	13.6606
SW_2	8.2609	14.9178	15.1667	15.4100	15.6477	15.8796	16.1060	16.3270
SW_3	25.6211	29.2327	29.2601	29.2877	29.3155	29.3435	29.3719	29.4007
SW_4	23.7165	28.9311	28.9665	29.0020	29.0376	29.0736	29.1098	29.1465
SW_5	23.3156	28.8634	28.9005	28.9376	28.9750	29.0125	29.0504	29.0887
SW_6	11.7031	26.1456	26.2329	26.3206	26.4086	26.4970	26.5857	26.6749
SW_7	30.2555	29.7745	29.7821	29.7897	29.7974	29.8054	29.8136	29.8222
SW_8	30.2555	29.7745	29.7821	29.7897	29.7974	29.8054	29.8136	29.8222
SW_9	30.2555	29.7745	29.7821	29.7897	29.7974	29.8054	29.8136	29.8222
SW_{10}	9.3048	25.5619	25.6638	25.7661	25.8687	25.9718	26.0754	26.1794
SW_{11}	1.8623	20.7541	20.8929	21.0339	21.1769	21.3220	21.4692	21.6183
SW_{12}	8.2781	14.6299	14.8786	15.1217	15.3590	15.5907	15.8167	16.0372
Total	**211.2584**	**290.6360**	**291.8301**	**293.0103**	**294.1766**	**295.3299**	**296.4706**	**297.5999**
Ground Water Releases, ha.m								
GW_1	46.8738	48.5070	48.5774	48.6446	48.7087	48.7699	48.8283	48.8841
GW_2	46.1342	48.3771	48.4472	48.5142	48.5782	48.6393	48.6975	48.7532
GW_3	33.0298	35.7723	35.7616	35.7513	35.7412	35.7314	35.7219	35.7124
GW_4	32.7550	36.4304	36.4181	36.4064	36.3951	36.3843	36.3737	36.3634
GW_5	32.7024	36.5660	36.5535	36.5415	36.5300	36.5188	36.5081	36.4976
GW_6	41.9258	41.5179	41.4904	41.4633	41.4363	41.4096	41.3830	41.3565
GW_7	33.9253	34.0559	34.0488	34.0418	34.0346	34.0274	34.0202	34.0128
GW_8	33.9253	34.0559	34.0488	34.0418	34.0346	34.0274	34.0202	34.0128
GW_9	33.9253	34.0559	34.0488	34.0418	34.0346	34.0274	34.0202	34.0128
GW_{10}	44.8129	43.4657	43.4339	43.4023	43.3709	43.3396	43.3085	43.2774
GW_{11}	39.1697	40.1043	40.0712	40.0396	40.0093	39.9802	39.9521	39.9249
GW_{12}	46.2168	48.3900	48.4601	48.5271	48.5911	48.6521	48.7104	48.7660
Total	**465.3963**	**481.2984**	**481.3598**	**481.4157**	**481.4646**	**481.5074**	**481.5441**	**481.5739**
Optimal Benefits, Rs./ha.m	**22,10,100**	**1,83,040**	**1,59,830**	**1,36,910**	**1,14,270**	**91,903**	**69,789**	**47,914**

Table 7.49: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Veraval Minor of Navsari Branch Canal for General Strategy

Irrigation Intensity,%	240	250	260	270	280	290	300	310
Area Irrigated, ha								
A_1	62.3670	61.9237	61.4362	60.6152	59.6010	58.8138	58.2278	57.8267
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	12.3349	11.9998	11.6858	11.4512	11.2794	11.1197	10.9679	10.8219
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	109.8043	110.0102	110.2178	110.4274	110.6382	110.8500	111.0624	111.2755
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	27.1774	28.3885	29.5533	30.5694	31.4431	32.2126	32.8979	33.5094
Total	**211.6836**	**212.3222**	**212.8931**	**213.0632**	**212.9617**	**212.9961**	**213.1560**	**213.4335**
Surface Water Releases, ha.m								
SW_1	6.5038	6.7298	6.9303	7.1434	7.3665	7.5454	7.6877	7.7969
SW_2	17.3991	17.5631	17.7262	17.8606	17.9666	18.0732	18.1796	18.2862
SW_3	6.7251	6.5704	6.3482	6.0033	5.6556	5.3948	5.2253	5.1434
SW_4	22.0102	22.0368	22.0773	21.1881	19.5644	18.3439	17.4829	16.9562
SW_5	15.5767	15.2171	14.7601	14.0112	13.135	12.4427	11.9196	11.5524
SW_6	11.451	11.4245	11.2043	10.7882	10.3795	10.0238	9.7347	9.507
SW_7	0.3512	0.3276	0.3204	0.3313	0.3428	0.3502	0.3534	0.3534
SW_8	0.3512	0.3276	0.3204	0.3313	0.3428	0.3502	0.3534	0.3534
SW_9	0.3512	0.3276	0.3204	0.3313	0.3428	0.3502	0.3534	0.3534
SW_{10}	8.876	8.6625	8.5979	8.5858	8.5021	8.4515	8.418	8.4054
SW_{11}	4.907	4.9984	5.021	5.0304	5.0948	5.1879	5.3139	5.4726
SW_{12}	15.9864	16.1521	16.3274	16.4839	16.6106	16.734	16.8529	16.9679
Total	**110.4889**	**110.3375**	**109.9539**	**108.0888**	**105.3035**	**103.2478**	**101.8748**	**101.1482**
Ground Water Releases, ha.m								
GW_1	18.331	18.3695	18.4163	18.4589	18.4925	18.5263	18.5597	18.5927
GW_2	18.2493	18.2806	18.3105	18.328	18.336	18.3454	18.3562	18.3685
GW_3	16.9206	16.9162	16.9291	16.9229	16.882	16.8541	16.8332	16.8176
GW_4	15.6638	15.587	15.5027	15.596	15.8398	16.025	16.157	16.2391
GW_5	17.9635	17.9852	18.0286	18.075	18.1071	18.1419	18.177	18.212
GW_6	16.0751	16.0505	16.0789	16.1195	16.1293	16.1532	16.1836	16.2198
GW_7	10.9096	10.935	10.9637	10.9879	11.0056	11.0251	11.0456	11.0665
GW_8	10.9096	10.935	10.9637	10.9879	11.0056	11.0251	11.0456	11.0665
GW_9	10.9096	10.935	10.9637	10.9879	11.0056	11.0251	11.0456	11.0665
GW_{10}	18.3389	18.3689	18.3606	18.302	18.236	18.1868	18.155	18.1376
GW_{11}	18.0617	18.2025	18.3551	18.4511	18.4836	18.5172	18.5505	18.5835
GW_{12}	18.3125	18.3459	18.3756	18.3923	18.4011	18.4108	18.4219	18.4343
Total	**190.6452**	**190.9113**	**191.2485**	**191.6094**	**191.9242**	**192.2360**	**192.5309**	**192.8046**
Optimal Benefits, Rs./ha.m	**23,82,200**	**24,24,400**	**24,63,200**	**24,91,200**	**25,11,900**	**25,31,400**	**25,50,600**	**25,69,500**

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Surat branch canal, for general strategy are given in Table 7.67.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Bardoli branch canal, for general strategy are given in Table 7.68.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Chalthan branch canal, for general strategy are given in Table 7.69.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Umbhrat branch canal upto 58 R.D., for general strategy are given in Table 7.70.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Umbhrat branch canal beyond 58 R.D., for general strategy are given in Table 7.71.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Navsari branch canal, for general strategy are given in Table 7.72.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Amalsad branch canal, for general strategy are given in Table 7.73.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Valsad branch canal, for general strategy are given in Table 7.74.

Table 7.67: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Surat Branch Canal for General Strategy

Name of Minor	Bhairav	Dumas distributary	Kalsad	Katargam distributary	Khajod
Optimal Irrigation Intensity,%	**130**	**360**	**280**	**200**	**220**
Area Irrigated, ha					
A_1	0.0000	49.7700	73.4656	20.8321	27.8751
A_2	0.0000	9.4290	0.0000	10.0928	51.3023
A_3	2.3054	2.3675	0.0000	0.0000	0.4892
A_4	9.2083	14.6367	0.0000	28.0587	32.7464
A_5	11.2769	97.0257	114.7532	90.9491	25.1936
A_6	0.0000	4.7928	0.0000	0.0000	0.0000
A_7	0.0000	17.0377	0.0000	19.1383	5.9955
A_8	0.0000	0.0034	0.0000	0.0000	0.0000
A_9	0.0000	7.1911	0.0000	20.5043	0.0000
A_{10}	75.9163	19.1251	45.6887	71.3752	31.0484
Total	**98.7069**	**221.3790**	**233.9075**	**260.9505**	**174.6505**
Surface water releases, ha.m					
SW_1	9.6800	0.7539	11.2119	12.2654	8.0983
SW_2	9.6800	10.5396	14.5875	13.8642	20.3983
SW_3	0.0000	1.5052	8.4601	5.5075	13.6304
SW_4	0.0000	9.9221	11.0688	5.6210	21.0302
SW_5	0.0000	10.5476	12.0425	5.6383	21.6729
SW_6	0.0000	0.4333	9.5409	5.1999	0.1583
SW_7	0.0000	0.4216	9.3195	5.0292	0.3548
SW_8	3.3305	0.4216	9.3195	6.5512	0.3548
SW_9	3.8706	0.3904	9.3195	8.8267	0.3622
SW_{10}	3.4205	11.0038	10.3495	7.9509	9.7974
SW_{11}	9.6800	0.9455	8.5384	8.7085	10.4783
SW_{12}	9.6800	3.0017	5.1135	11.4553	3.6207
Total	**49.3416**	**49.8863**	**118.8716**	**96.6181**	**109.9566**
Ground Water Releases, ha.m					
GW_1	20.4128	13.0370	17.8310	28.1844	17.6454
GW_2	20.5308	13.5680	20.1495	29.4728	17.8062
GW_3	0.0000	13.6268	14.8688	13.1813	17.9750
GW_4	0.0000	13.4566	17.3926	13.3510	18.0520
GW_5	0.0000	13.4325	17.7883	12.8204	16.4474
GW_6	0.0000	12.5972	10.7011	9.3141	16.2142
GW_7	0.0000	4.2882	5.8676	8.5432	10.7447
GW_8	0.0000	4.2882	5.8676	10.4596	10.7447
GW_9	0.0000	7.4982	5.8676	19.9760	11.3664
GW_{10}	0.0000	13.2254	8.9216	16.3416	13.4024
GW_{11}	10.0175	13.0182	17.8906	20.3912	17.8665
GW_{12}	20.0389	13.4339	22.3276	27.6040	17.4864
Total	**71.0000**	**135.4702**	**165.4739**	**209.6396**	**185.7513**
Optimal Benefits, Rs./ha.m	**49,75,100**	**56,65,000**	**34,38,200**	**88,93,400**	**1,34,50,000**

Table 7.67: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Surat Branch Canal for General Strategy (contd.)

Name of Minor	Kholwad	Nagod Dist.	Palsod	Pasodra	Puna subminor
Optimal Irrigation Intensity,%	**130**	**170**	**130**	**220**	**130**
Area Irrigated, ha					
A_1	54.3049	16.1643	13.8176	57.7968	63.4846
A_2	9.0591	0.0000	0.0000	0.0000	0.4268
A_3	0.0000	0.0000	0.0000	0.0000	0.0000
A_4	6.8481	31.5960	41.5748	4.8762	34.6136
A_5	18.1885	100.0000	145.0231	24.5172	7.2599
A_6	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	8.7446	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	16.4848	0.0000	0.0000	0.0000
A_{10}	48.7002	33.5864	98.1728	20.4744	12.4901
Total	**145.8454**	**197.8315**	**298.5883**	**107.6646**	**118.2750**
Surface water releases, ha.m					
SW_1	8.9716	0.0000	24.3431	0.0000	0.0302
SW_2	9.2589	5.0000	21.3345	2.0552	8.6060
SW_3	8.1469	0.0000	20.5398	0.0000	0.8234
SW_4	8.1304	0.0000	20.1838	6.3130	5.8486
SW_5	8.1115	0.0000	20.0472	8.7004	8.6860
SW_6	8.1603	0.0000	20.6294	0.0000	0.0207
SW_7	8.5579	0.0000	20.9176	0.0000	0.0143
SW_8	8.2526	0.0000	20.9176	0.0000	0.0143
SW_9	8.2159	0.0000	20.9176	0.0000	0.0172
SW_{10}	8.1743	0.0000	20.7764	1.0439	0.0214
SW_{11}	8.6694	0.0000	21.8238	0.0001	0.0560
SW_{12}	9.1926	0.0000	21.5758	0.4766	0.5399
Total	**101.8423**	**5.0000**	**254.0066**	**18.5892**	**24.6780**
Ground Water Releases, ha.m					
GW_1	19.6139	13.8450	46.2972	9.7179	11.6678
GW_2	21.4350	15.0000	46.4192	12.3391	13.1524
GW_3	14.2806	5.3699	23.5948	10.8959	11.2426
GW_4	16.2056	6.2329	22.7927	12.3391	13.2973
GW_5	16.5922	5.6874	22.6465	12.3386	13.2930
GW_6	11.9482	1.4161	24.6511	6.1381	9.8581
GW_7	8.9307	0.0000	25.9367	2.3666	2.3938
GW_8	12.0528	9.0285	25.9367	3.9338	2.3938
GW_9	12.7120	10.5696	25.9367	12.2139	3.6796
GW_{10}	14.9373	10.6237	25.2054	12.3391	10.6079
GW_{11}	18.6937	8.8357	36.6974	12.3390	12.6703
GW_{12}	21.3333	13.3911	45.5624	12.2557	13.3011
Total	**188.7353**	**99.9999**	**371.6768**	**119.2168**	**117.5577**
Optimal Benefits, Rs./ha.m	**37,57,900**	**70,74,400**	**134,83,000**	**14,95,500**	**50,36,400**

Table 7.67: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Surat Branch Canal for General Strategy (contd.)

Name of Minor	Sania	Saroli subminor	Segwa	Simada	Surat branch	Umbhel	Vihan
Optimal Irrigation Intensity,%	**200**	**160**	**290**	**210**	**150**	**330**	**180**
Area Irrigated, ha							
A_1	0.5874	2.1255	43.3475	53.2158	2.1654	34.5978	24.6897
A_2	43.2834	73.1097	0.0000	3.7079	77.9898	0.0000	0.0000
A_3	0.0077	0.3154	0.0000	0.5311	0.7890	0.0000	0.0000
A_4	14.6999	62.5110	8.8166	11.4260	43.7648	11.1841	4.6269
A_5	67.8680	0.0000	79.3776	16.9714	32.1551	71.7182	92.2198
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0050	0.0000	0.0000	0.4488	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	37.5794	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	**25.2425**	0.2135	28.3527	31.6517	0.2257	41.7643	49.9337
Total	**151.6889**	**138.2751**	**159.8994**	**117.5039**	**194.6692**	**159.7132**	**171.4701**
Surface water releases, ha.m							
SW_1	0.6311	5.2355	3.3156	4.9160	4.0640	2.0817	2.5616
SW_2	4.9955	9.2457	3.3766	4.8952	5.9822	4.9023	5.0107
SW_3	1.7694	5.9842	4.4354	4.9343	4.8940	1.7976	1.5628
SW_4	1.8186	1.1335	4.4565	4.9258	6.7980	1.8812	1.6973
SW_5	1.7762	5.8260	4.4590	4.9245	4.7319	1.8917	1.7130
SW_6	1.1318	4.1664	4.3057	4.9827	3.4436	1.4133	1.1803
SW_7	0.0000	2.8596	0.0012	0.0077	2.2435	0.2740	0.0171
SW_8	0.4108	2.8147	0.6919	4.7458	2.2435	1.2842	1.1425
SW_9	0.6333	4.2628	0.7017	4.9231	2.2435	1.8768	1.1852
SW_{10}	0.5540	4.7392	0.6920	4.9203	2.9166	1.6647	1.2301
SW_{11}	0.5167	4.7678	3.2486	4.9206	3.8890	1.6945	1.4428
SW_{12}	0.5733	5.1581	3.3428	4.8696	3.9669	3.7105	4.2965
Total	**14.8107**	**56.1935**	**33.0270**	**53.9656**	**47.4167**	**24.4725**	**23.0399**
Ground Water Releases, ha.m							
GW_1	13.4032	15.5830	9.4568	11.3738	14.1917	13.4586	14.1820
GW_2	15.0001	19.1236	12.0543	14.8134	18.4880	14.8278	15.0091
GW_3	9.0069	16.2891	5.6209	7.8417	17.2220	5.0180	3.4664
GW_4	10.4144	19.5539	8.1159	11.0325	18.9581	6.9686	4.8538
GW_5	8.8604	15.6805	8.6246	11.5236	16.7135	7.3707	5.1396
GW_6	1.3121	4.5025	2.6452	2.4980	5.3397	2.0877	1.8554
GW_7	0.0026	2.6443	0.0000	0.0000	1.9712	0.0001	0.0053
GW_8	1.6433	2.5648	9.1009	0.1332	1.9712	2.1929	8.7077
GW_9	10.8391	4.7932	10.8106	7.8067	1.9712	13.4080	10.2739
GW_{10}	9.1076	7.3040	12.9753	8.6186	3.2875	10.7838	10.9900
GW_{11}	8.6157	10.4046	9.2851	11.0098	10.8220	10.9680	10.7989
GW_{12}	11.8344	11.2615	11.3144	13.5640	11.1523	14.3218	14.7953
Total	**100.0398**	**129.7050**	**100.0040**	**100.2153**	**122.0884**	**101.4060**	**100.0774**
Optimal Benefits, Rs./ha.m	**1,07,97,000**	**1,95,33,000**	**35,38,300**	**38,42,200**	**1,87,37,000**	**43,39,600**	**41,15,300**

Table 7.68: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Bardoli Branch Canal for General Strategy

Name of Minor	Baleswar	Ena distributary	Gangadhara	Kareli	Kharwasa	Palsana	Tundi
Optimal Irrigation Intensity,%	**220**	**130**	**100**	**170**	**240**	**180**	**140**
Area Irrigated, ha							
A_1	54.3864	46.4545	58.7648	50.1370	54.1627	56.5527	53.4102
A_2	0.0000	8.3189	0.0000	0.0000	0.0000	7.0641	11.6994
A_3	0.0000	0.0081	0.0000	0.0000	0.0000	0.5272	0.0000
A_4	8.6360	5.0062	21.9207	5.3464	6.5003	80.9295	42.9430
A_5	89.4226	99.9748	14.2744	98.0037	99.7792	98.6168	40.5674
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	2.7894	0.0997
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	37.2198	36.7887	28.3020	47.4237	39.3542	0.0010	11.0311
Total	**189.6648**	**196.5512**	**123.2619**	**200.9108**	**199.7964**	**246.4807**	**159.7508**
Surface Water Releases, ha.m							
SW_1	1.4064	0.8836	0.3922	2.9506	2.8524	2.8292	0.3531
SW_2	4.9582	5.0153	4.9986	6.9479	5.2446	6.7781	5.0044
SW_3	1.6699	1.6258	0.6782	2.4625	2.0390	3.0582	1.6107
SW_4	1.7588	1.6554	0.6717	2.3897	2.2353	3.2803	1.7003
SW_5	1.7908	1.6912	0.6609	2.3431	2.2929	3.3391	1.7338
SW_6	1.4086	1.5201	0.6425	1.9287	1.7092	2.6689	1.4792
SW_7	0.0562	0.0443	0.0000	0.7958	0.2186	1.5899	0.0132
SW_8	1.0901	1.3425	0.3458	1.5552	1.4829	2.5421	1.0087
SW_9	1.1845	1.4568	0.3257	1.7440	1.6055	2.7790	1.1933
SW_{10}	1.1070	1.2035	0.3250	1.6228	1.3720	2.4234	1.1317
SW_{11}	1.6125	1.5398	0.3832	1.7438	2.4625	2.7975	1.3914
SW_{12}	3.7095	2.9418	0.7260	2.1373	4.6888	2.7716	0.9243
Total	**21.7525**	**20.9201**	**10.1498**	**28.6214**	**28.2037**	**36.8573**	**17.5441**
Ground Water Releases, ha.m							
GW_1	12.7209	12.8860	12.5651	15.7625	12.6970	13.6170	11.9308
GW_2	15.0160	15.0110	15.0029	17.4854	15.2470	17.0293	15.0031
GW_3	8.1031	8.6710	9.0497	8.9133	8.0779	10.4383	10.5002
GW_4	11.2146	11.6082	12.4413	11.6784	11.1340	13.6284	13.9285
GW_5	11.8447	11.8424	13.1348	12.2502	11.7518	14.0323	14.1223
GW_6	3.4121	3.1312	3.9115	4.8870	3.4456	4.6617	3.7412
GW_7	0.0002	0.0000	0.0030	1.8853	0.1027	0.9759	0.0000
GW_8	3.1940	3.2726	1.3741	5.2227	3.5111	4.4125	1.8303
GW_9	5.2440	5.3173	2.5669	7.2210	5.6769	6.5244	3.2138
GW_{10}	2.4477	2.0212	2.8665	4.0536	2.4997	3.4703	2.3823
GW_{11}	12.4638	12.0446	12.5204	14.8383	12.5424	11.3598	10.9171
GW_{12}	14.5412	14.3179	14.5992	18.2709	14.7099	12.9584	12.4945
Total	**100.2023**	**100.1234**	**100.0354**	**122.4686**	**101.3960**	**113.1083**	**100.0641**
Optimal Benefits, Rs./ha.m	**44,25,900**	**54,07,300**	**44,75,700**	**42,78,400**	**44,17,300**	**1,35,16,000**	**87,96,100**

Table 7.69: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Chalthan Branch Canal for General Strategy

Name of Minor	Bhesthan	Chalthan branch	Devdha	Lajpur distributary	Talangpur	Udhna distributary	vanj
Optimal Irrigation Intensity,%	**200**	**230**	**220**	**160**	**140**	**130**	**210**
Area Irrigated, ha							
A_1	46.2435	55.5339	41.2485	59.7202	35.8946	0.0000	34.1224
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	65.6343	0.0000
A_3	0.0194	0.0000	0.0000	0.0000	0.0123	0.0000	0.2932
A_4	45.0957	12.9680	7.0404	0.0000	5.9134	34.9420	12.5054
A_5	99.9418	99.2019	99.1851	99.3962	99.9440	100.0000	98.2235
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.2085	0.0000	0.0000	1.7256	0.1475	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.6401
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	19.8137	38.2392	47.8257	47.6143	45.1977	0.0000	43.8874
Total	**211.3226**	**205.9430**	**195.2997**	**208.4563**	**187.1095**	**200.5763**	**210.6720**
Surface Water Releases, ha.m							
SW_1	1.1667	2.5845	3.3674	3.0266	0.4209	5.0000	2.8196
SW_2	4.9920	6.3581	6.3902	7.1884	4.9909	5.0000	5.2668
SW_3	1.7891	2.6730	2.6508	3.3133	1.2076	5.0000	1.9441
SW_4	1.8736	2.7194	2.7856	3.4619	1.2626	5.0000	2.0261
SW_5	1.8904	2.7280	2.8232	3.4640	1.2768	5.0000	2.0407
SW_6	1.8165	2.4513	2.6923	1.5409	0.0041	5.0000	0.6045
SW_7	0.0000	1.5774	1.4354	1.5520	0.0000	0.0000	0.6111
SW_8	0.0000	2.3412	1.4354	1.5520	0.0000	0.0000	0.6111
SW_9	1.3326	2.4768	2.3345	2.5831	0.9552	0.1205	2.0755
SW_{10}	1.6405	2.2437	2.8071	2.8724	1.0934	0.0419	5.0518
SW_{11}	1.5971	2.7012	2.9872	2.7124	1.0947	5.0000	2.2067
SW_{12}	1.5755	2.8564	4.8294	6.2614	3.6112	5.0000	4.6400
Total	**19.6740**	**33.7110**	**36.5385**	**39.5284**	**15.9174**	**40.1624**	**29.8980**
Ground Water Releases, ha.m							
GW_1	12.8135	13.8457	15.0386	15.5525	14.0894	10.6953	14.1239
GW_2	15.0296	16.1279	16.6006	17.7553	15.0093	15.0000	15.5453
GW_3	6.8068	8.6840	6.6554	10.1018	5.3259	12.8963	5.0638
GW_4	9.4422	11.8065	8.9116	13.3747	7.3756	15.0000	6.9616
GW_5	9.9806	12.4427	9.3685	14.0504	7.7934	12.6158	7.3487
GW_6	7.6602	3.9831	7.6813	1.5314	0.0086	6.7620	0.1963
GW_7	0.0232	0.4436	0.7408	1.5284	0.0097	0.0000	0.1946
GW_8	0.0232	3.9626	0.7408	1.5284	0.0097	0.0000	0.1946
GW_9	3.1170	6.1182	3.7846	13.8957	10.8799	2.5318	12.1449
GW_{10}	11.9454	2.9937	11.7708	18.0357	13.3890	10.4628	14.9422
GW_{11}	10.4664	13.2539	12.8977	15.4917	11.5377	6.3018	13.2143
GW_{12}	13.2353	16.0607	16.4351	17.6298	14.8297	7.7340	15.1967
Total	**100.5434**	**109.7226**	**110.6258**	**140.4758**	**100.2579**	**99.9998**	**105.1269**
Optimal Benefits, Rs./ha.m	**98,86,600**	**66,72,800**	**61,40,800**	**54,66,600**	**57,82,800**	**1,80,14,000**	**66,73,000**

Table 7.70: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Umbhrat Branch Canal upto 58 R.D. for General Strategy

Name of Minor	Mahuwa	Malekpur	Nizar	Pera distributary
Optimal Irrigation Intensity,%	**200**	**250**	**270**	**130**
Area Irrigated, ha				
A_1	67.3106	37.2487	61.3335	43.5324
A_2	0.0000	0.0000	0.0000	63.8201
A_3	0.0000	0.0000	0.0000	43.9946
A_4	4.9862	0.0000	6.7150	58.0705
A_5	98.1591	99.1434	99.9797	158.3591
A_6	0.0000	0.0000	0.0170	0.0000
A_7	2.0551	0.0000	0.0835	0.0000
A_8	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000
A_{10}	29.0694	72.5472	31.6276	97.9923
Total	**201.5804**	**208.9393**	**199.7563**	**465.7690**
Surface Water Releases, ha.m				
SW_1	2.1637	10.5417	0.6877	31.5685
SW_2	7.7293	8.7587	5.0259	32.8541
SW_3	0.5851	6.5119	1.2109	18.8941
SW_4	7.7328	6.8738	1.5443	20.6497
SW_5	8.3986	6.9451	1.8914	20.7521
SW_6	0.6850	5.9999	1.1172	16.5505
SW_7	0.6981	5.1345	0.0648	15.7712
SW_8	0.6981	5.1345	0.0648	15.7712
SW_9	0.6981	5.1345	0.0648	15.7712
SW_{10}	0.5138	6.5583	0.9378	17.5648
SW_{11}	0.7647	7.4266	0.9522	18.6844
SW_{12}	6.2645	14.9838	3.7209	27.8129
Total	**36.9318**	**90.0033**	**17.2827**	252.6447
Ground Water Releases, ha.m				
GW_1	11.6530	22.6508	11.4209	63.9047
GW_2	13.7740	24.6846	13.8812	65.1694
GW_3	11.7947	8.9753	9.3238	39.0214
GW_4	13.4438	10.4349	12.7681	38.9201
GW_5	13.9937	10.7329	13.3956	37.5434
GW_6	7.4538	7.2388	5.0887	35.0186
GW_7	2.0227	5.1069	0.0000	34.5451
GW_8	2.0227	5.1069	0.0000	34.5451
GW_9	2.0227	5.1069	0.0000	34.5451
GW_{10}	13.2454	11.8711	11.0220	39.8699
GW_{11}	11.5098	17.4619	10.0642	46.6624
GW_{12}	13.5879	22.8452	13.4775	62.3934
Total	**116.5242**	**152.2162**	**100.4420**	**532.1386**
Optimal Benefits, Rs./ha.m	**52,24,800**	**64,42,700**	**55,65,000**	**3,02,70,000**

Table 7.71: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Umbhrat Branch Canal beyond 58 R.D. for General Strategy

Name of Minor	Bhinar	Borsi	Kalkachha	Kasba	Maroli	Nagod	Umrath
Optimal Irrigation Intensity,%	**110**	**10**	**160**	**230**	**60**	**170**	**120**
Area Irrigated, ha							
A_1	54.2428	0.0000	20.7528	66.5226	60.7556	78.1832	35.3173
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	93.1340	141.4872	107.7742	98.3740	52.3700	91.4691	104.4250
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	49.4887	0.0000	65.0331	33.7840	35.7706	34.7709	66.3612
Total	**196.8655**	**141.4872**	**193.5601**	**198.6806**	**148.8962**	**204.4232**	**206.1035**
Surface Water Releases, ha.m							
SW_1	12.1220	0.0000	24.3666	5.9895	7.3358	22.4257	13.3884
SW_2	25.8653	0.0000	24.1703	11.6056	16.5487	17.5881	14.8819
SW_3	3.8166	0.0000	0.0029	8.6093	5.0274	6.1099	6.5227
SW_4	4.7423	0.0000	0.0043	10.9778	12.5430	19.6952	7.9320
SW_5	5.0049	0.0000	0.0046	11.6396	12.3322	19.1602	8.2677
SW_6	3.1096	0.0000	0.0008	8.8569	0.8793	2.6085	4.9850
SW_7	2.7994	0.0001	0.0008	5.8111	0.8725	2.3081	4.1694
SW_8	2.7994	0.0001	0.0008	5.8111	0.8725	2.3081	4.1694
SW_9	2.7994	0.0001	0.0060	5.8111	4.7913	2.3081	4.1694
SW_{10}	3.4133	0.0001	2.1491	9.8547	13.4415	2.5330	5.4492
SW_{11}	9.6502	0.0000	4.4073	10.5701	9.8233	4.3033	7.8000
SW_{12}	16.2801	0.0000	24.0752	19.9261	15.2271	16.5455	14.7226
Total	**92.4025**	**0.0004**	**79.1887**	**115.4629**	**99.6946**	**117.8937**	**96.4577**
Ground Water Releases, ha.m							
GW_1	21.8323	25.1909	20.8372	17.5097	17.5078	14.1986	28.9190
GW_2	20.3511	25.1909	20.8333	19.1775	17.7298	18.7003	29.7262
GW_3	18.2327	25.1909	13.3970	16.5811	16.3924	18.3641	19.3000
GW_4	20.1827	25.1909	13.7816	19.1182	17.0688	17.9342	20.1298
GW_5	20.5600	25.1909	13.8600	19.5870	17.6728	18.7307	20.2858
GW_6	15.0846	25.1909	12.3493	16.5061	10.1849	14.4319	17.8787
GW_7	12.5222	25.1908	12.3493	8.6976	10.1867	10.6523	16.6441
GW_8	12.5222	25.1908	12.3493	8.6976	10.1867	10.6523	16.6441
GW_9	12.5222	25.1908	20.7665	8.6976	16.4509	10.6523	16.6441
GW_{10}	16.8234	39.7421	20.3279	17.5222	17.6253	16.4575	19.5235
GW_{11}	19.6683	25.1909	20.8292	17.5902	17.7814	18.2445	25.5595
GW_{12}	22.6727	25.1909	20.8306	16.5978	17.7849	18.6231	29.6347
Total	**212.9744**	**316.8417**	**202.5112**	**186.2826**	**186.5724**	**187.6418**	**260.8895**
Optimal Benefits, Rs./ha.m	**21,17,300**	**27,55,300**	**28,42,900**	**19,47,600**	**11,42,000**	**20,98,400**	**21,57,600**

Table 7.72: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Navsari Branch Canal for General Strategy

Name of Minor	Dandeswar	Dandi	Machhad	Onjal	Sadlav	Vachharvad	Veraval
Optimal Irrigation Intensity,%	**200**	**20**	**120**	**30**	**250**	**240**	**310**
Area Irrigated, ha							
A_1	6.8658	38.8945	5.1313	33.4220	8.0086	29.2556	57.8267
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0336	0.2974	0.0000	2.7014	0.0000	23.3879	10.8219
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	213.7914	120.1737	76.8000	119.9945	193.7818	162.6687	111.2755
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	40.3535	65.0393	83.2664	73.6635	58.5073	85.0342	33.5094
Total	**261.0443**	**224.4049**	**165.1977**	**229.7814**	**260.2977**	**300.3464**	**213.4335**
Surface Water Releases, ha.m							
SW_1	37.3922	5.4261	80.6353	18.4990	23.9869	8.4295	7.7969
SW_2	38.8719	11.5294	81.7412	23.4032	22.8951	8.2609	18.2862
SW_3	0.1448	0.0000	0.0000	0.0000	25.8904	25.6211	5.1434
SW_4	1.6245	0.0032	0.0000	0.0000	23.3677	23.7165	16.9562
SW_5	1.9260	0.0821	0.0000	0.0000	22.8686	23.3156	11.5524
SW_6	32.2945	0.0000	0.0000	0.0000	20.6888	11.7031	9.5070
SW_7	0.0000	0.0000	0.0000	0.0000	33.3102	30.2555	0.3534
SW_8	0.0000	0.0000	0.0000	0.7078	33.3102	30.2555	0.3534
SW_9	0.0000	0.0000	0.0000	0.0000	33.3102	30.2555	0.3534
SW_{10}	44.6001	1.2428	2.2090	0.0000	21.1548	9.3048	8.4054
SW_{11}	40.8260	16.7601	48.1860	8.9738	7.0083	1.8623	5.4726
SW_{12}	38.7075	10.8513	81.6183	22.8586	23.0163	8.2781	16.9679
Total	**236.3875**	**45.8950**	**294.3898**	**74.4424**	**290.8075**	**211.2584**	**101.1482**
Ground Water Releases, ha.m							
GW_1	1.0395	20.8951	1.3860	21.0693	51.4599	46.8738	18.5927
GW_2	1.0395	20.8951	1.3860	21.0693	49.6757	46.1342	18.3685
GW_3	1.0395	17.6919	0.8059	16.9285	42.6062	33.0298	16.8176
GW_4	1.0395	19.3249	1.1019	18.2414	41.2050	32.7550	16.2391
GW_5	1.0395	19.7469	1.1622	18.5088	40.9156	32.7024	18.2120
GW_6	1.0395	13.2443	0.0000	13.3547	49.4780	41.9258	16.2198
GW_7	0.0000	13.2443	0.0000	13.3546	46.2727	33.9253	11.0665
GW_8	0.0000	13.2443	0.0000	20.9980	46.2727	33.9253	11.0665
GW_9	0.0000	13.2443	0.0000	13.3546	46.2727	33.9253	11.0665
GW_{10}	1.0395	20.8949	1.3860	15.7976	52.0565	44.8129	18.1376
GW_{11}	1.0395	20.8951	1.3860	21.0693	26.8725	39.1697	18.5835
GW_{12}	1.0395	20.8951	1.3860	21.0693	49.8739	46.2168	18.4343
Total	**9.3555**	**214.2162**	**10.0000**	**214.8154**	**542.9614**	**465.3963**	**192.8046**
Optimal Benefits, Rs./ha.m	**61,50,800**	**32,48,900**	**62,01,600**	**37,87,500**	**20,33,600**	**22,10,100**	**25,69,500**

Table 7.73: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Amalsad Branch Canal for General Strategy

Name of Minor	Abrama	Arda	Chijgam	Devdha	Mandher	Masa	Panar
Optimal Irrigation Intensity	**110**	**280**	**160**	**220**	**80**	**150**	**170**
Area Irrigated, ha							
A_1	48.0860	65.2495	18.1604	21.1415	17.3885	28.0445	21.5193
A_2	19.9865	0.0000	37.7816	17.5942	0.0000	0.0000	26.6220
A_3	6.3186	93.2104	30.5426	27.5445	0.5170	11.6851	7.1357
A_4	16.9447	0.0000	60.1253	17.8664	28.3406	33.0471	18.6533
A_5	67.8398	357.2151	77.4275	110.7839	115.8875	94.5229	88.2069
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	34.9766	116.1350	48.4575	4.4954	75.8795	31.7215	30.2641
Total	**194.1522**	**631.8100**	**272.4949**	**199.4259**	**238.0131**	**199.0211**	**192.4013**
Surface Water Releases, ha.m							
SW_1	5.8278	72.7018	26.7582	17.7438	14.1823	12.6276	9.3297
SW_2	19.6825	69.0405	28.8712	22.5000	17.5750	18.0624	15.3829
SW_3	9.6559	65.6794	23.0403	2.4820	0.2950	0.5635	0.7442
SW_4	18.6770	62.4582	22.9088	2.4161	0.2175	0.4423	4.2410
SW_5	19.2029	61.8278	23.0736	2.4313	0.1995	0.4146	0.3873
SW_6	0.8124	68.1172	24.0190	2.9386	0.0714	0.6666	0.3762
SW_7	0.8580	75.5308	24.4948	2.7069	0.4639	0.7183	0.2728
SW_8	0.8580	75.5308	24.4948	2.7069	0.4639	0.7183	0.2728
SW_9	17.4582	75.5308	24.7792	2.7069	0.4639	16.5885	18.5599
SW_{10}	22.5386	69.6048	24.3312	3.0807	0.0010	6.2288	12.1358
SW_{11}	12.8186	68.2775	23.9451	19.0303	25.8272	0.9797	2.7115
SW_{12}	12.3491	69.4472	26.3204	16.1259	13.2083	13.1277	8.6121
Total	**140.7390**	**833.7468**	**297.0366**	**96.8694**	**72.9689**	**71.1383**	**73.0262**
Ground Water Releases, ha.m							
GW_1	18.7516	100.0394	40.4271	20.0495	23.2445	19.9015	17.0585
GW_2	18.0339	93.5322	39.7568	19.9148	22.9523	19.7854	17.4215
GW_3	17.1466	79.9520	31.4133	15.7649	14.3010	15.0237	16.2936
GW_4	17.3251	73.3271	30.8192	16.6330	14.7092	16.0961	16.7154
GW_5	17.2407	71.9706	30.4157	16.4938	14.7929	16.3153	17.2346
GW_6	15.0052	87.4624	31.2291	18.8191	18.5672	13.7444	12.4390
GW_7	11.0143	97.6969	32.0374	12.4566	13.2012	12.1515	10.3371
GW_8	11.0143	97.6969	32.0374	12.4566	13.2012	12.1515	10.3371
GW_9	18.6634	97.6969	36.2545	12.4566	13.2012	20.3287	17.3835
GW_{10}	16.9442	92.1768	34.1974	19.8295	20.1456	20.3530	17.2722
GW_{11}	18.0315	89.0622	35.3244	19.8762	23.1251	18.8821	16.9845
GW_{12}	18.4107	94.2553	38.4994	20.5613	23.1258	19.7457	17.0764
Total	**197.5815**	**1074.8687**	**412.4117**	**205.3119**	**214.5672**	**204.4789**	**186.5534**
Optimal Benefits, Rs./ha.m	**72,17,700**	**22,78,500**	**1,46,32,000**	**65,34,100**	**73,26,300**	**60,33,000**	**84,45,300**

Table 7.74: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Valsad Branch Canal for General Strategy

Name of Minor	Minkachh	Matvad	Khapariya	Gadat	Pati
Optimal Irrigation Intensity,%	200	200	140	160	120
Area Irrigated, ha					
A_1	0.0000	0.0004	0.0007	0.0005	0.0000
A_2	0.0000	0.0001	0.0000	0.0004	0.0000
A_3	0.0000	0.0010	0.0028	0.0006	0.0042
A_4	0.0000	2.4282	0.0000	0.4309	0.0000
A_5	10.7536	14.0013	11.3144	13.3951	11.6041
A_6	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	13.1857	9.2135	12.5420	11.4628	16.0456
TOTAL	**23.9393**	**25.6445**	**23.8599**	**25.2903**	**27.6539**
Surface Water Releases, ha.m					
SW_1	0.0001	2.3329	0.0010	0.0009	0.1150
SW_2	0.0000	0.2202	0.0001	0.0009	0.0000
SW_3	0.0000	0.0006	0.0001	0.0009	0.0000
SW_4	0.0000	0.0008	0.0001	0.0009	0.0000
SW_5	0.0000	0.0005	0.0001	0.0009	0.0000
SW_6	0.0000	0.0003	0.0001	0.0009	0.0000
SW_7	0.0000	0.0003	0.0001	0.0009	0.0000
SW_8	0.0000	0.0003	0.0001	0.0009	0.0000
SW_9	0.0000	0.0003	0.0001	0.0009	0.0000
SW_{10}	0.0000	0.0003	0.0001	0.0009	0.0000
SW_{11}	0.0000	0.0004	0.0001	0.0009	0.0000
SW_{12}	0.0000	0.0004	0.0001	0.0009	0.0000
Total	**0.0001**	**2.5573**	**0.0021**	**0.0108**	**0.1150**
Ground Water Releases, ha.m					
GW_1	31.5807	30.7455	32.8438	28.9799	33.7920
GW_2	36.9171	30.3844	34.5943	29.1244	25.8310
GW_3	25.2200	25.3340	25.4480	23.7150	28.0530
GW_4	26.7859	27.1402	26.8242	25.4765	30.0363
GW_5	24.2338	24.4028	24.5815	22.7979	26.8050
GW_6	20.9567	18.7374	21.7017	17.3654	22.6560
GW_7	20.9567	18.7374	21.7017	17.3654	22.6560
GW_8	21.1758	18.8794	21.8992	17.5016	22.9260
GW_9	20.9567	18.7374	21.7017	17.3654	22.6569
GW_{10}	22.3371	19.9872	22.9148	18.6003	24.4044
GW_{11}	24.4141	23.9051	24.9510	65.6061	26.7081
GW_{12}	27.1087	25.3593	27.5849	23.8520	29.7611
Total	**302.6433**	**282.3501**	**306.7468**	**307.7499**	**316.2858**
Optimal Benefits, Rs./ha.m	1,86,190	3,89,740	1,48,050	1,73,030	3,35,040

Table 7.74: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Valsad Branch Canal for General Strategy (contd.)

Name of Minor	Dhakawad	Bamanvel	Khambada	Dhamadachi	Chanvai distributary
Optimal Irrigation Intensity,%	**80**	**270**	**140**	**110**	**120**
Area Irrigated, ha					
A_1	0.0623	0.0000	0.0000	0.0004	0.0003
A_2	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	9.6773	0.0000	0.0000	0.0000	0.0003
A_4	2.2576	0.2991	0.0000	0.0000	0.0000
A_5	4.4679	12.6608	5.8092	0.0006	2.0783
A_6	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	18.7730	11.5165	17.9031	25.2271	22.9819
TOTAL	**35.2381**	**24.4764**	**23.7123**	**25.2281**	**25.0608**
Surface Water Releases, ha.m					
SW_1	6.6814	0.0001	0.0000	0.0008	0.0006
SW_2	7.0771	0.0000	0.0000	0.0009	0.0006
SW_3	0.4782	0.0000	0.0000	0.0009	0.0006
SW_4	0.5036	0.0000	0.0000	0.0009	0.0006
SW_5	0.4621	0.0000	0.0000	0.0009	0.0006
SW_6	0.4111	0.0000	0.0000	0.0009	0.0006
SW_7	0.3041	0.0000	0.0000	0.0009	0.0006
SW_8	0.2946	0.0000	0.0000	0.0009	0.0006
SW_9	0.3041	0.0000	0.0000	0.0009	0.0006
SW_{10}	0.3218	0.0000	0.0000	0.0009	0.0006
SW_{11}	0.2476	0.0000	0.0000	0.0009	0.0006
SW_{12}	20.7317	0.0000	0.0000	0.0010	0.0006
Total	**37.8174**	**0.0001**	**0.0000**	**0.0108**	**0.0072**
Ground Water Releases, ha.m					
GW_1	64.2675	25.6179	27.9288	29.9138	34.7734
GW_2	65.6078	34.2252	46.5528	31.6998	63.9497
GW_3	50.5680	26.0240	22.7603	33.7327	30.0710
GW_4	52.6916	27.6157	23.9023	35.0085	32.1863
GW_5	49.2311	25.0218	22.0412	32.9294	28.7391
GW_6	44.7865	21.6910	19.6514	30.2597	24.3126
GW_7	44.8342	21.6910	19.6514	30.2597	24.3126
GW_8	45.3971	21.8961	19.8722	30.6541	24.7255
GW_9	44.8342	21.6910	19.6514	30.2597	24.3126
GW_{10}	46.7081	23.0941	20.6581	31.3843	26.1772
GW_{11}	52.6485	26.2572	21.3286	58.2841	27.7112
GW_{12}	65.7709	29.5333	27.6645	45.6098	38.5681
Total	**627.3455**	**304.3583**	**291.6630**	**419.9956**	**379.8393**
Optimal Benefits, Rs./ha.m	**4,65,390**	**1,56,900**	**4,11,840**	**4,11,410**	**4,14,820**

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Surat branch canal, for general strategy are illustrated in Fig.7.1, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Bardoli branch canal, for general strategy are illustrated in Fig.7.2, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Chalthan branch canal, for general strategy are illustrated in Fig.7.3, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Umbhrat branch canal upto 58 R.D., for general strategy are illustrated in Fig.7.4, enclosed in C.D.

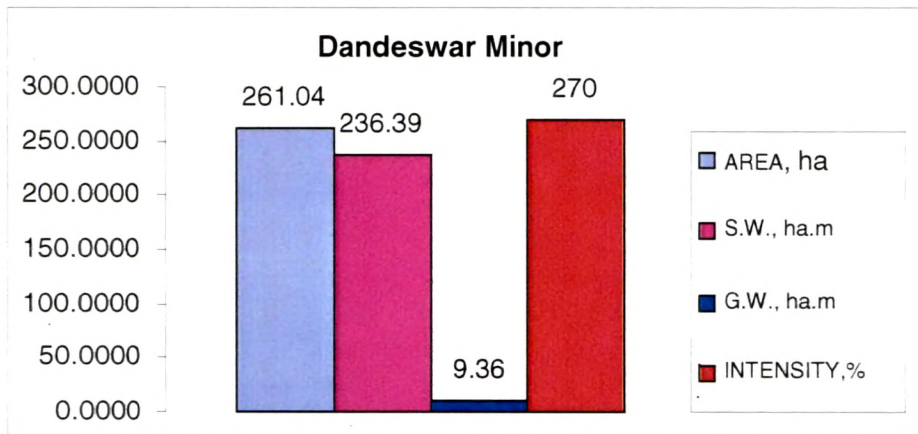
Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Umbhrat branch canal beyond 58 R.D., for general strategy are illustrated in Fig.7.5, enclosed in C.D.

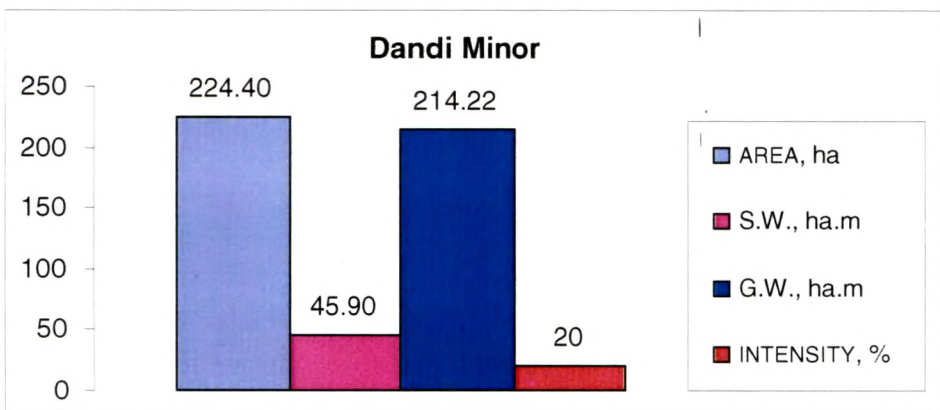
Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Navsari branch canal, for general strategy are illustrated in Fig.7.6.

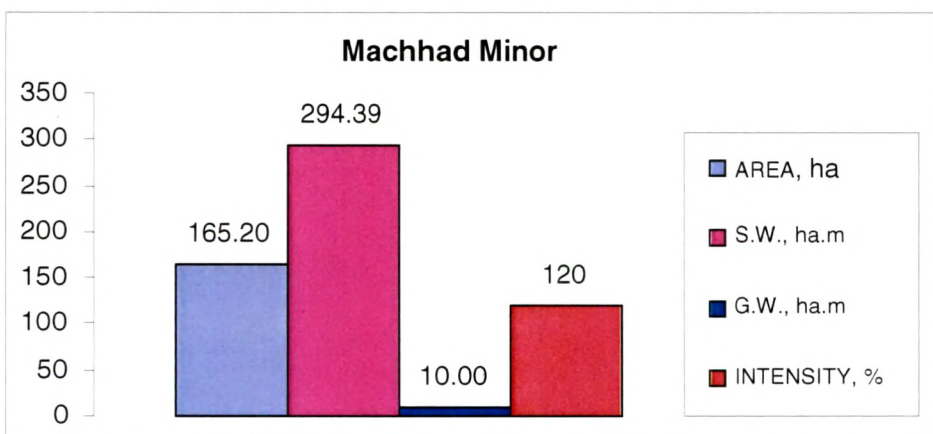
Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Amalsad branch canal, for general strategy are illustrated in Fig.7.7, enclosed in C.D.

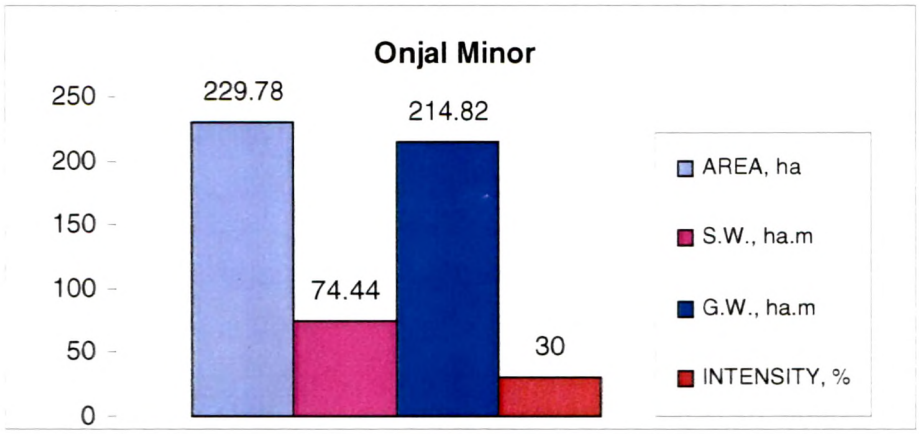
Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Valsad branch canal, for general strategy are illustrated in Fig.7.8, enclosed in C.D.

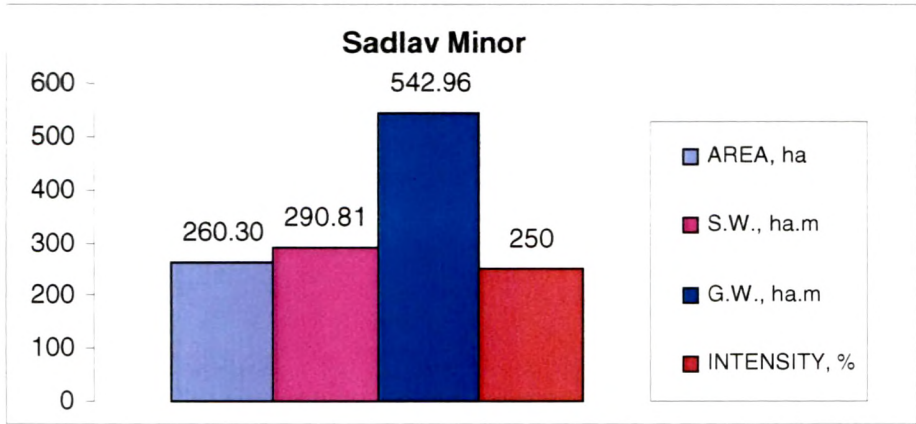
Fig. 7.6: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Navsari Branch Canal, for General Strategy

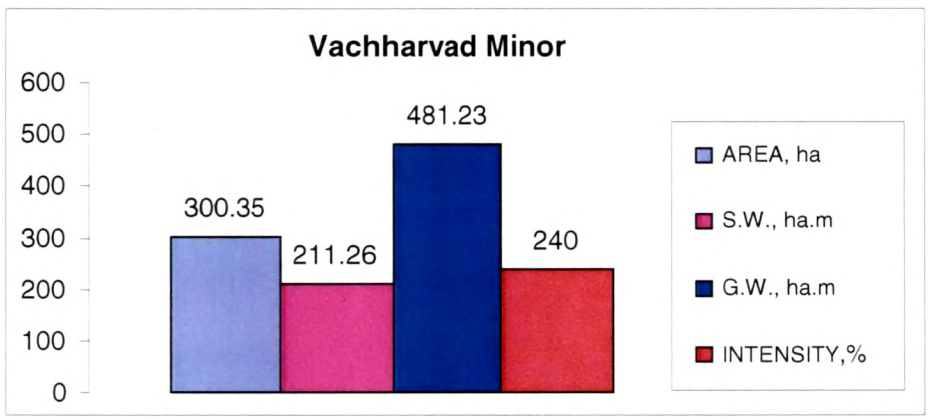


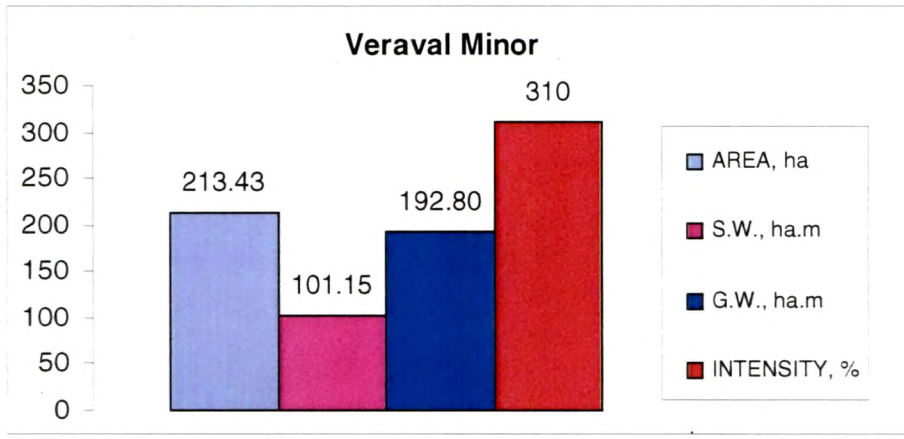


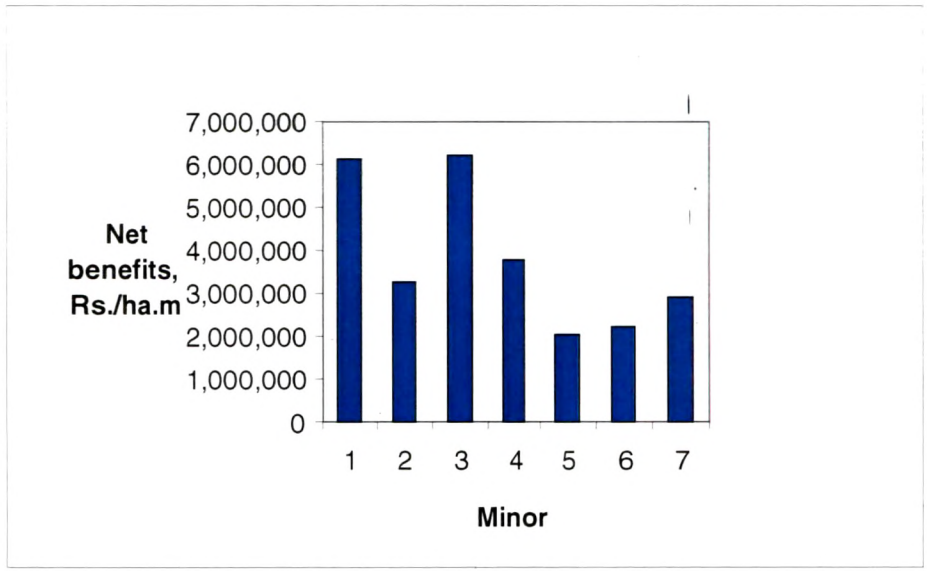



Onjal Minor
250
200
150
100
50
0
229.78
74.44
214.82
30
AREA, ha
S.W., ha.m
G.W., ha.m
INTENSITY, %


Sadlav Minor
600
500
400
300
200
100
0
260.30
290.81
542.96
250
AREA, ha
S.W., ha.m
G.W., ha.m
INTENSITY, %


Vachharvad Minor
600
500
400
300
200
100
0
300.35
211.26
481.23
240
AREA, ha
S.W., ha.m
G.W., ha.m
INTENSITY,%


Veraval Minor
350
300
250
200
150
100
50
0
213.43
101.15
192.80
310
AREA, ha
S.W., ha.m
G.W., ha.m
INTENSITY, %


Net benefits, Rs./ha.m
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1
2
3
4
5
6
7
Minor

The results of sensitivity analysis for Surat branch canal, in which net benefits considering different changes in unit cost of surface water determined, for general strategy are illustrated in Fig.7.9, enclosed in C.D.

The results of sensitivity analysis for Bardoli branch canal, in which net benefits considering different changes in unit cost of surface water determined, for general strategy are illustrated in Fig.7.10, enclosed in C.D.

The results of sensitivity analysis for Chalthan branch canal, in which net benefits considering different changes in unit cost of surface water determined, for general strategy illustrated in Fig.7.11, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal upto 58 R.D., in which net benefits considering different changes in unit cost of surface water determined, for general strategy are illustrated in Fig.7.12, enclosed in C.D.

The results of sensitivity analysis for Umbhrat beyond branch canal 58 R.D., in which net benefits considering different changes in unit cost of surface water determined, for general strategy are illustrated in Fig.7.13, enclosed in C.D.

The results of sensitivity analysis for Navsari branch canal, in which net benefits considering different changes in unit cost of surface water determined, for general strategy are illustrated in Fig.7.14.

The results of sensitivity analysis for Amalsad branch canal, in which net benefits considering different changes in unit cost of surface water determined, for general strategy are illustrated in Fig.7.15, enclosed in C.D.

The results of sensitivity analysis for Valsad branch canal, in which net benefits considering different changes in unit cost of surface water determined, for general strategy are illustrated in Fig.7.16, enclosed in C.D.

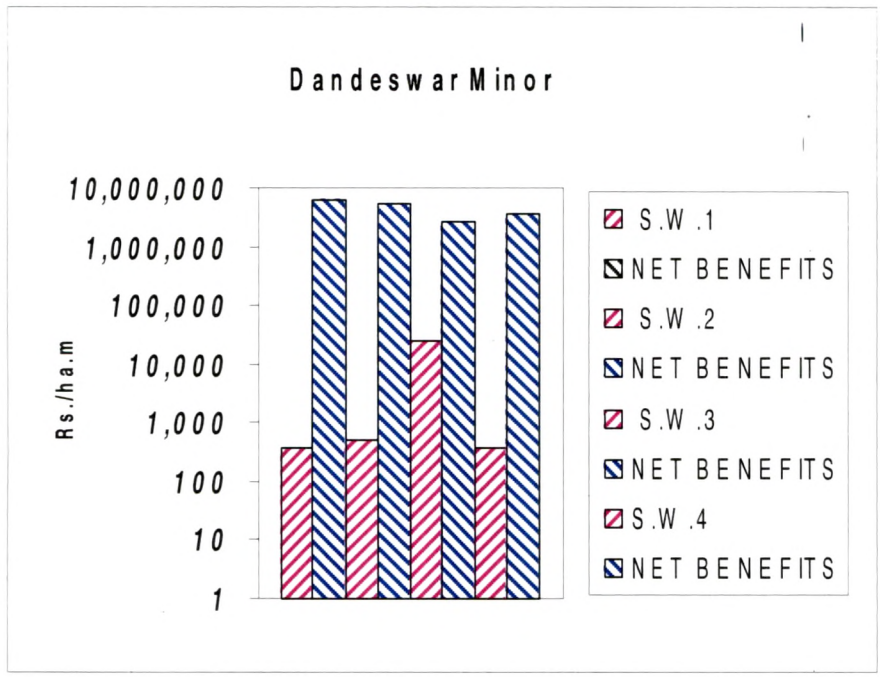
Fig. 7.14: Sensitivity Analysis: Net Benefits Considering Different Changes in Unit Cost of Surface Water and Unit Cost of Ground Water for Navsari Branch Canal, for General Strategy

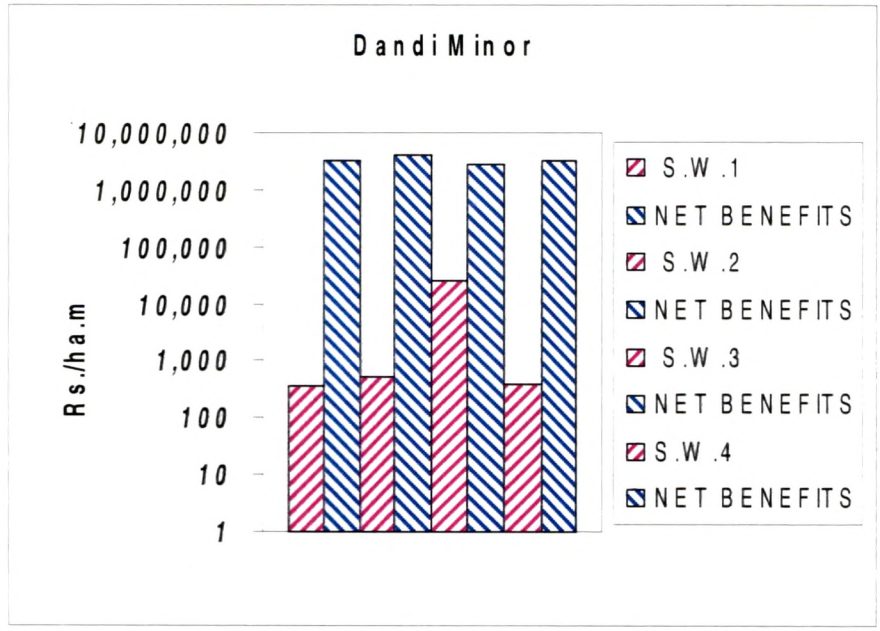
N.B.: S.W.1 = Unit cost of surface water charged by the N.W.R.W.S. & K. department to the farmers.

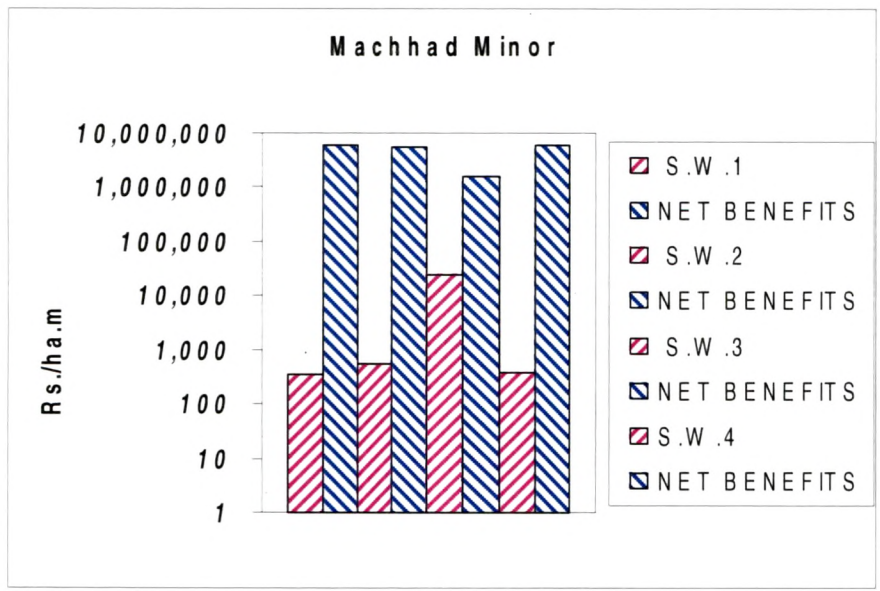
S.W.2 = Actual unit cost of surface water.

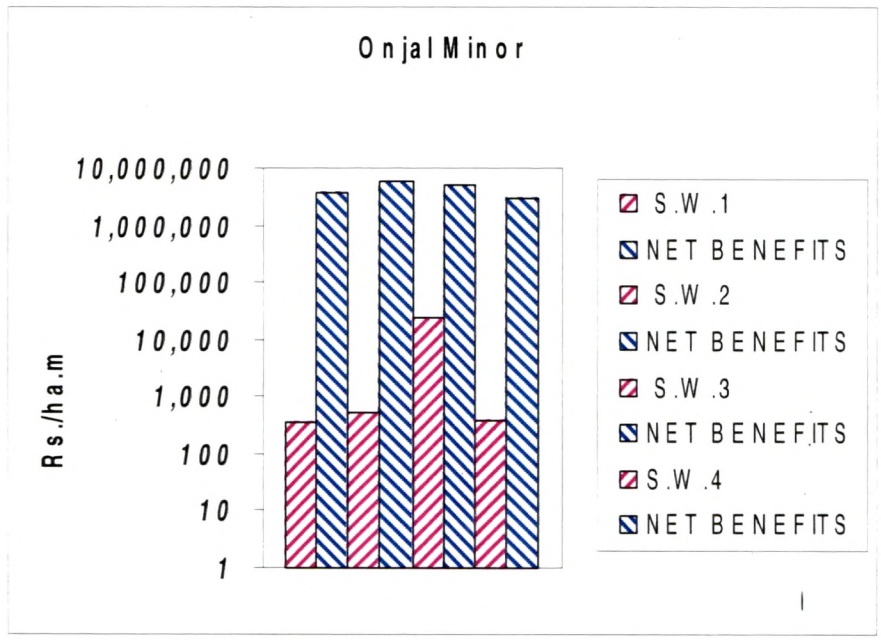
S.W.3 = Unit cost of surface water charged by the N.W.R.W.S. & K. department to the industries.

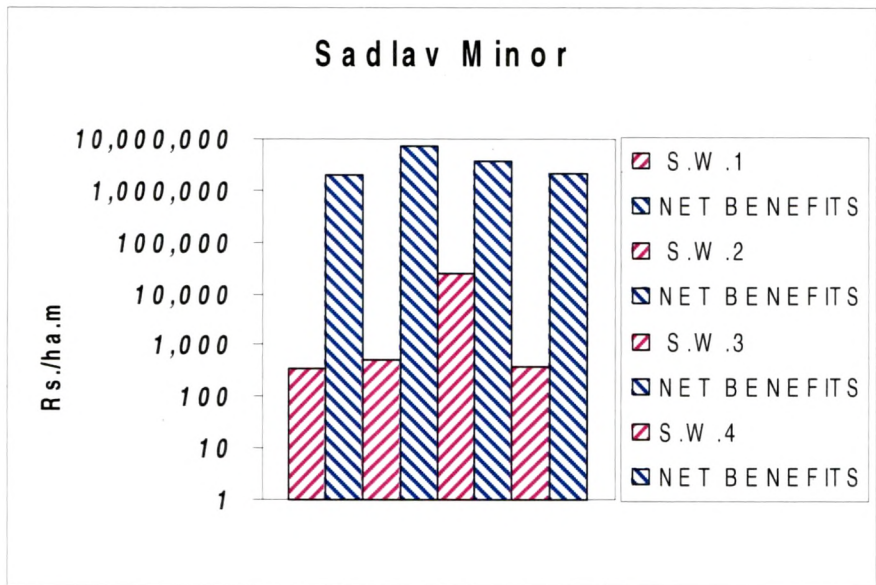
S.W.4 = Actual unit cost of surface water during the last 10 years,i.e. 1999-2000

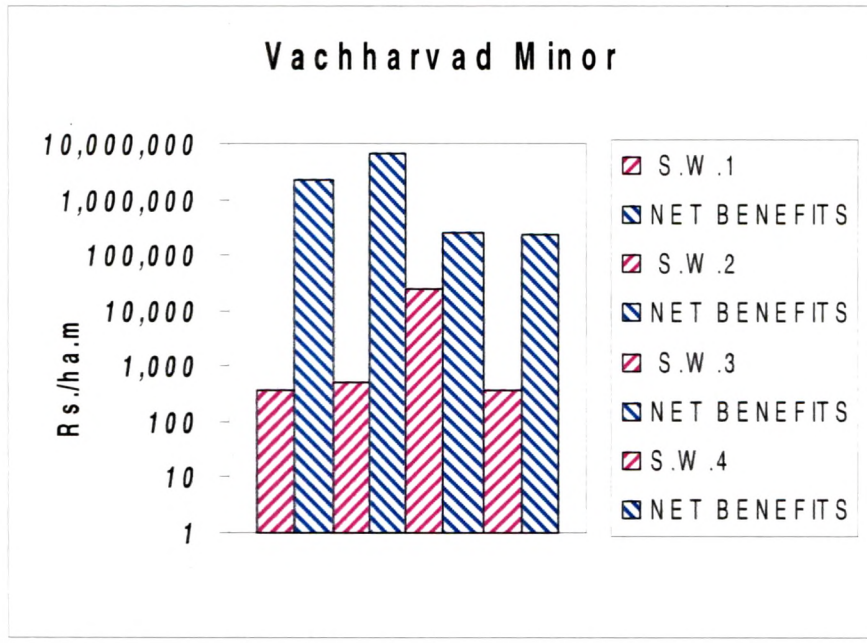


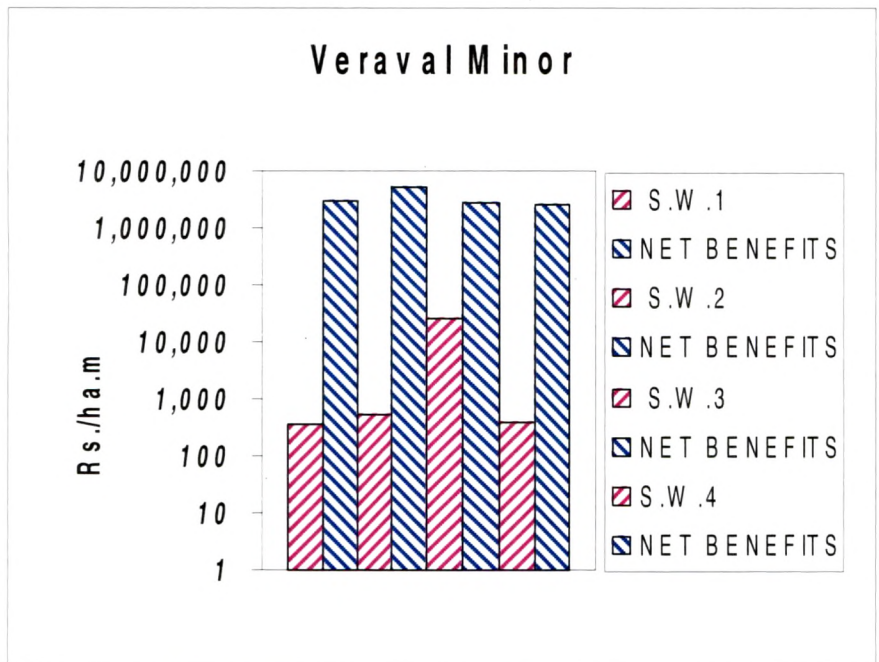

Dandi Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W .1
NET BENEFITS
S.W .2
NET BENEFITS
S.W .3
NET BENEFITS
S.W .4
NET BENEFITS


Machhad Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W .1
NET BENEFITS
S.W .2
NET BENEFITS
S.W .3
NET BENEFITS
S.W .4
NET BENEFITS


Onjal Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W .1
NET BENEFITS
S.W .2
NET BENEFITS
S.W .3
NET BENEFITS
S.W .4
NET BENEFITS


Sadlav Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W .1
NET BENEFITS
S.W .2
NET BENEFITS
S.W .3
NET BENEFITS
S.W .4
NET BENEFITS


Vachharvad Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W .1
NET BENEFITS
S.W .2
NET BENEFITS
S.W .3
NET BENEFITS
S.W .4
NET BENEFITS


Veraval Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W .1
NET BENEFITS
S.W .2
NET BENEFITS
S.W .3
NET BENEFITS
S.W .4
NET BENEFITS

The results of sensitivity analysis for Surat branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for general strategy are illustrated in Fig.7.17, enclosed in C.D.

The results of sensitivity analysis for Bardoli branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for general strategy are illustrated in Fig.7.18, enclosed in C.D.

The results of sensitivity analysis for Chalthan branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for general strategy are illustrated in Fig.7.19, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal upto 58 R.D., in which net benefits considering percentage increase and decrease in selling price/yield determined, for general strategy are illustrated in Fig.7.20, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal beyond 58 R.D., in which net benefits considering percentage increase and decrease in selling price/yield determined, for general strategy are illustrated in Fig.7.21, enclosed in C.D.

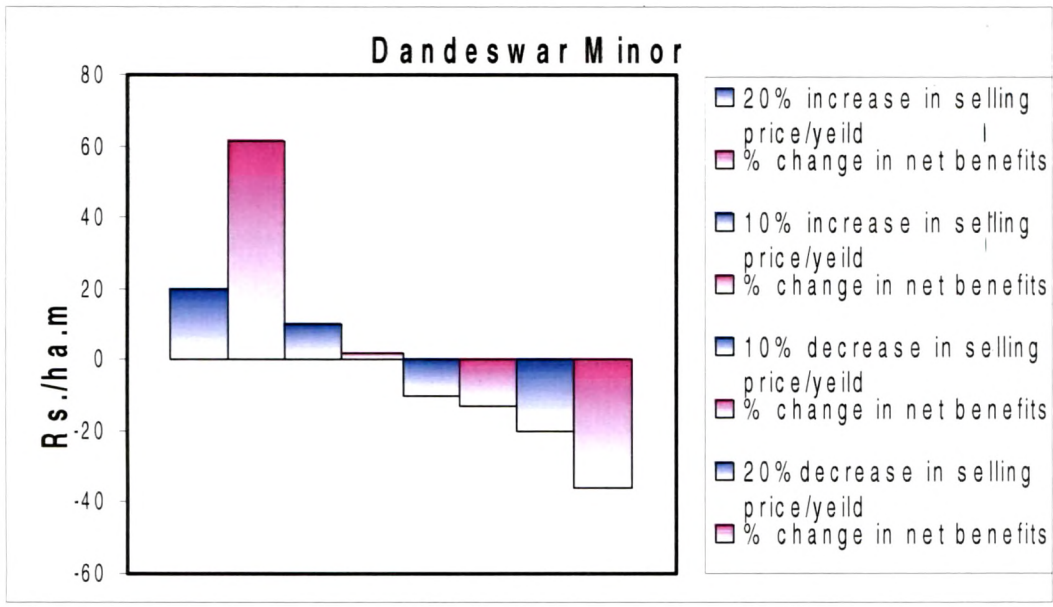
The results of sensitivity analysis for Navsari branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for general strategy are illustrated in Fig.7.22.

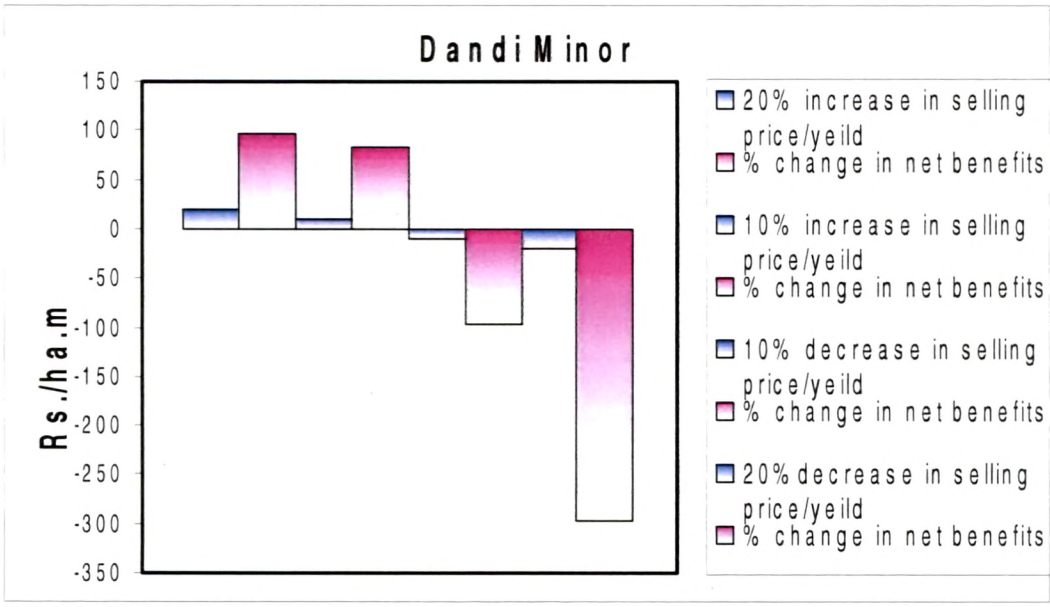
The results of sensitivity analysis for Amalsad branch canal, in which net benefits considering percentage increase and decrease in selling

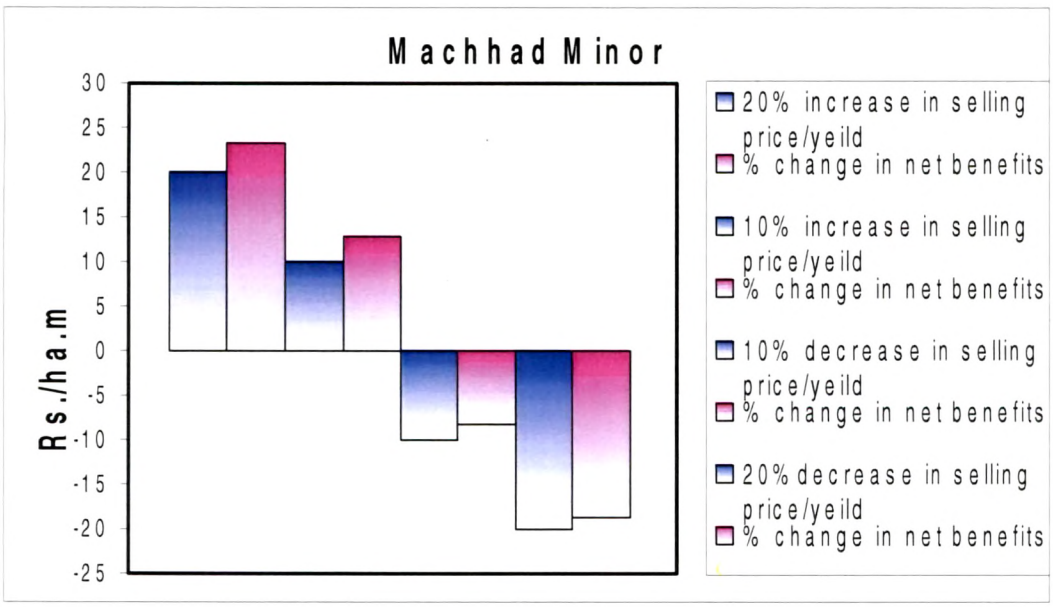
price/yield determined, for general strategy are illustrated in Fig.7.23, enclosed in C.D.

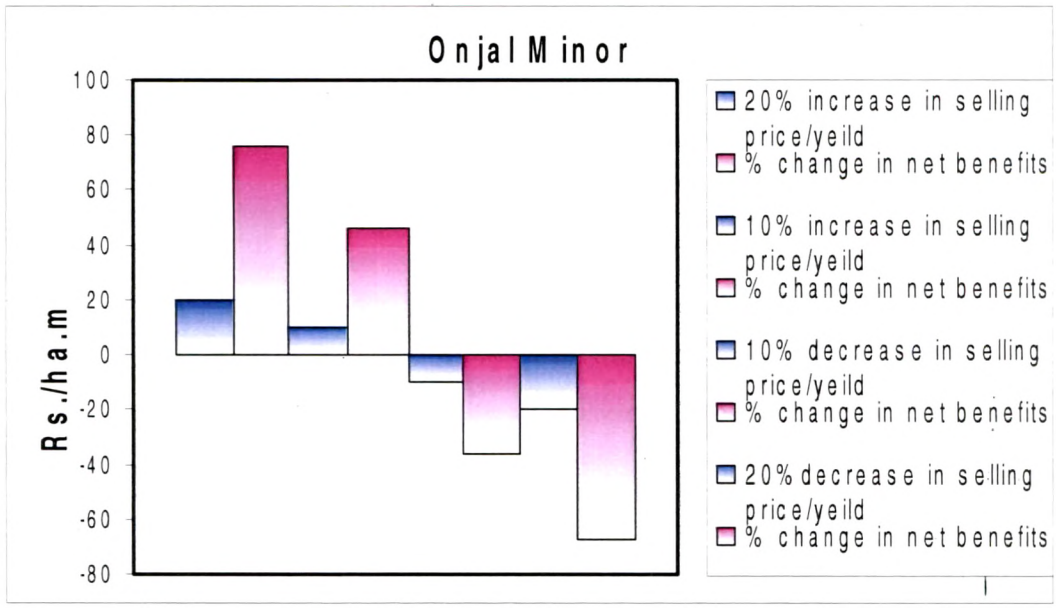
The results of sensitivity analysis for Valsad branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for general strategy are illustrated in Fig.7.24, enclosed in C.D.

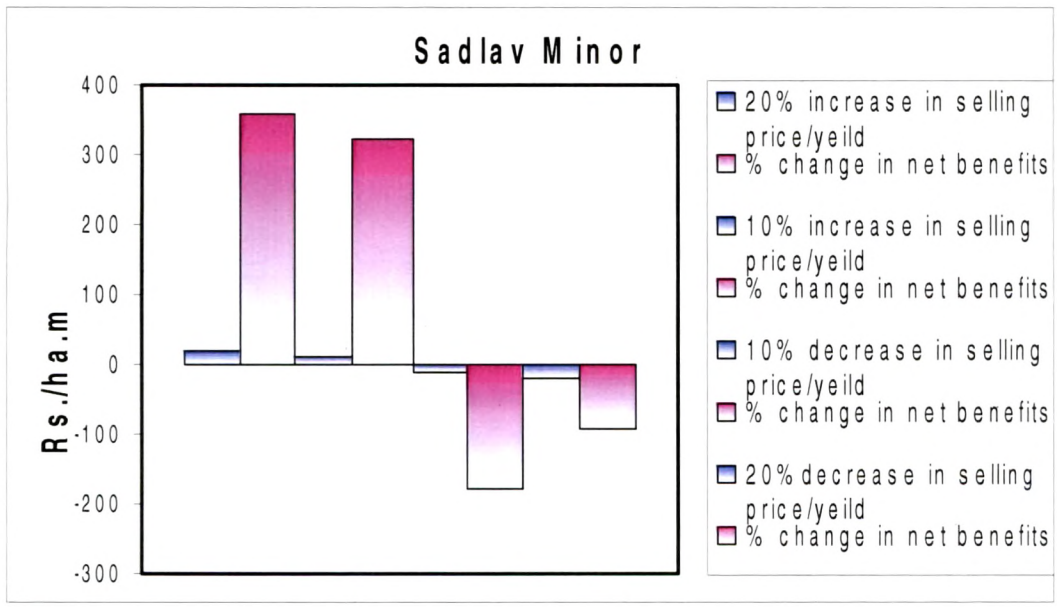
Fig. 7.22: Sensitivity Analysis: Net Benefits Considering Percentage Increase and Decrease in Selling Price/Yield for Navsari Branch Canal, for General Strategy

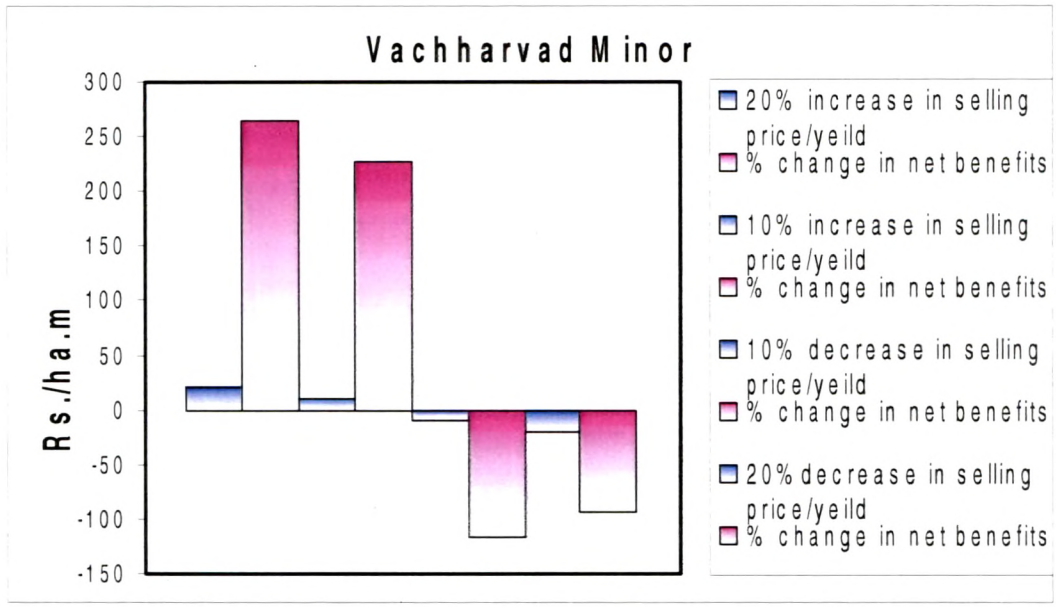


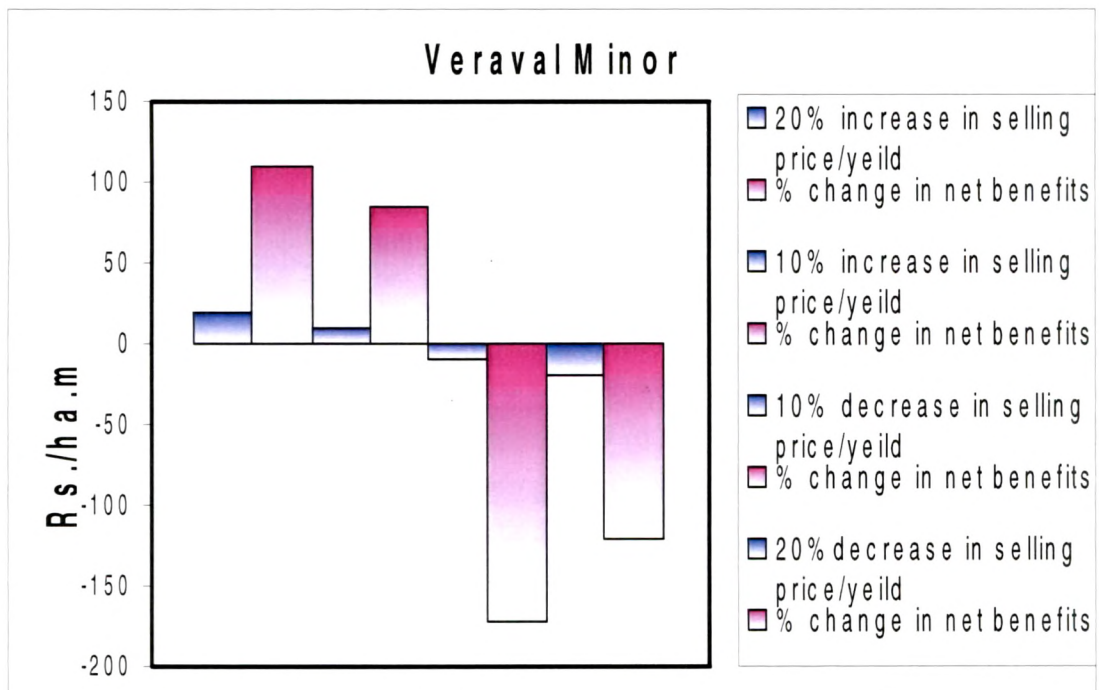

Dandi Minor
150
100
50
0
-50
-100
-150
-200
-250
-300
-350
Rs./ha.m
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Machhad Minor
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
Rs./ha.m
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Onjal Minor
Rs./ha.m
100
80
60
40
20
0
-20
-40
-60
-80
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Sadlav Minor
Rs./ha.m
400
300
200
100
0
-100
-200
-300
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Vachharvad Minor
Rs./ha.m
300
250
200
150
100
50
0
-50
-100
-150
20% increase in selling price/yeild % change in net benefits
10% increase in selling price/yeild % change in net benefits
10% decrease in selling price/yeild % change in net benefits
20% decrease in selling price/yeild % change in net benefits


Veraval Minor
Rs./ha.m
150
100
50
0
-50
-100
-150
-200
20% increase in selling price/yeild % change in net benefits
10% increase in selling price/yeild % change in net benefits
10% decrease in selling price/yeild % change in net benefits
20% decrease in selling price/yeild % change in net benefits

The results of sensitivity analysis for Surat branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for general strategy are illustrated in Fig.7.25, enclosed in C.D.

The results of sensitivity analysis for Bardoli branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for general strategy are illustrated in Fig.7.26, enclosed in C.D.

The results of sensitivity analysis for Chalthan branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for general strategy are illustrated in Fig.7.27, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal upto 58 R.D., in which net benefits using 10 years average evapotranspiration rate determined, for general strategy are illustrated in Fig.7.28, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal beyond 58 R.D., in which net benefits using 10 years average evapotranspiration rate determined, for general strategy are illustrated in Fig.7.29, enclosed in C.D.

The results of sensitivity analysis for Navsari branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for general strategy are illustrated in Fig.7.30.

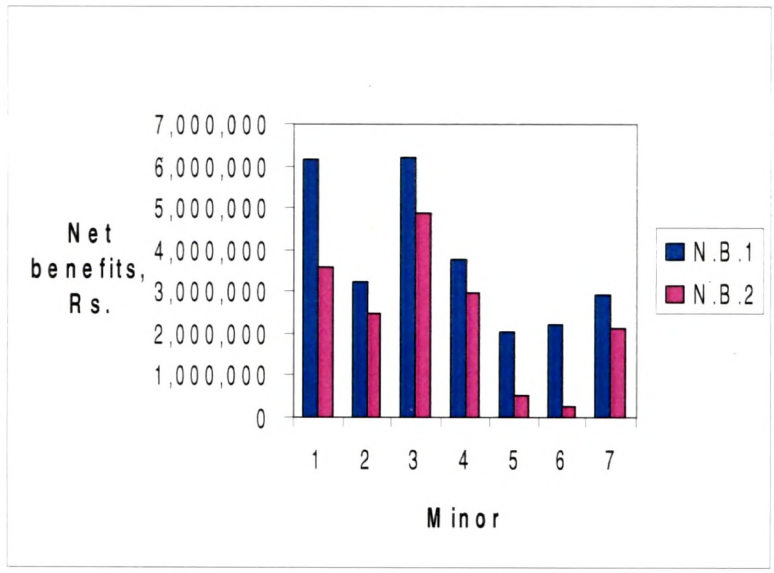
The results of sensitivity analysis for Amalsad branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for general strategy are illustrated in Fig.7.31, enclosed in C.D.

The results of sensitivity analysis for Valsad branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for general strategy are illustrated in Fig.7.32, enclosed in C.D.

Fig. 7.30: Sensitivity Analysis: Net Benefits using 10 years average Evapotranspiration rate for Navsari branch canal, for general strategy

N.B.: N.B.1 = Net benefits obtained using the actual water requirement of the crops during the year 1999-2000

N.B.2 = Net benefits obtained using the actual water requirement of the crops during the last 10 years, i.e. year 1990-1991 to1999-2000

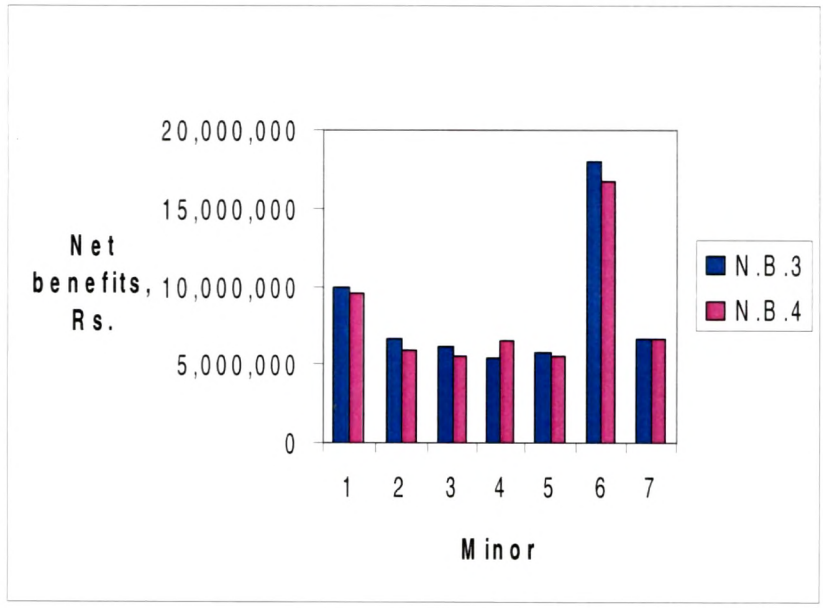


The results of sensitivity analysis using the originally practiced cropping pattern in Umbhrat branch canal, for general strategy are illustrated in Fig.7.33.

Fig. 7.33: Sensitivity Analysis: Net Benefits using surface water restriction method in Chalthan branch canal, for general strategy

N.B.: N.B.3 = Net benefits obtained in Chalthan branch canal using both surface and ground water.

N.B.4 = Net benefits obtained in Chalthan using surface water restriction method.

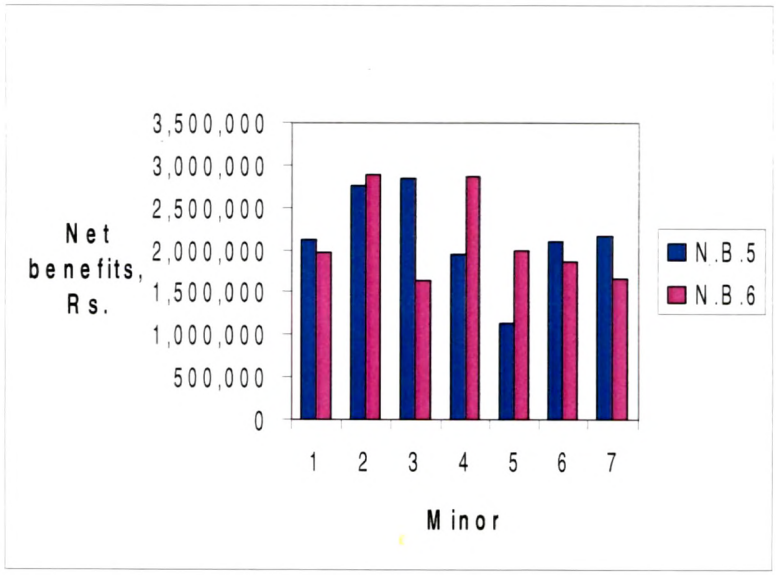


The results of sensitivity analysis Using Original Cropping Pattern in Umbhrat Branch Canal, for general strategy are illustrated in Fig.7.34.

Fig. 7.34: Sensitivity Analysis: Net Benefits Using Original Cropping Pattern in Umbhrat Branch Canal, for General Strategy

N.B.: N.B.5 = Net benefits obtained in Umbhrat branch canal using prevailing cropping pattern.

N.B.6 = Net benefits obtained in Umbhrat branch canal using originally practiced cropping pattern.



Fuzzy linear programming (FLP) model

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 17 of Surat branch canal, for general strategy are given in Tables 7.75 to 7.91, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Bardoli branch canal, for general strategy are given in Tables 7.92 to 7.98, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Chalthan branch canal, for general strategy are given in Tables 7.99 to 7.105, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 4 of Umbhrat branch canal upto 58 R.D., for general strategy are given in Tables 7.106 to 7.109, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Umbhrat branch canal beyond 58 R.D., for general strategy are given in Tables 7.110 to 7.116, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Navsari branch canal, for general strategy are given in Tables 7.117 to 7.123.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Amalsad branch canal, for general strategy are given in Tables 7.124 to 7.130, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 10 of Valsad branch canal, for general strategy are given in Tables 7.131 to 7.140, enclosed in C.D.

Table 7.117: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Dandeswar Minor of Navsari Branch Canal for General Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	6.8658	0.3406	8.5480
A_2	0.0000	0.0000	0.0000
A_3	0.0336	0.0000	13.4293
A_4	0.0000	0.0000	0.0000
A_5	213.7914	353.5248	99.9997
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	40.3535	54.3249	99.9938
Total	**261.0443**	**408.1903**	**221.9708**
Surface Water Releases, ha.m			
SW_1	37.3922	49.3957	84.7596
SW_2	38.8719	49.4691	84.7624
SW_3	0.1448	0.0000	63.3221
SW_4	1.6245	0.0000	63.9604
SW_5	1.9260	0.0000	64.0911
SW_6	32.2945	48.9479	76.4399
SW_7	0.0000	0.0000	62.6150
SW_8	0.0000	0.0000	62.6150
SW_9	0.0000	0.0000	62.6150
SW_{10}	44.6001	70.0875	82.6746
SW_{11}	40.8260	28.6875	84.5740
SW_{12}	38.7075	49.4609	84.7534
Total	**236.3875**	**296.0486**	**877.1825**
Ground Water Releases, ha.m			
GW_1	1.0395	1.2994	23.4812
GW_2	1.0395	1.2994	23.6613
GW_3	1.0395	0.0535	0.1641
GW_4	1.0395	0.0731	0.1742
GW_5	1.0395	0.0771	0.1760
GW_6	1.0395	1.2994	0.3484
GW_7	0.0000	0.0000	0.1119
GW_8	0.0000	0.0000	0.1119
GW_9	0.0000	0.0000	0.1119
GW_{10}	1.0395	1.2994	0.3421
GW_{11}	1.0395	1.2994	11.4751
GW_{12}	1.0395	1.2994	23.6436
Total	**9.3555**	**8.0001**	**83.8017**
Optimal Benefits, Rs./ha.m	**61,50,800**	**93,64,900**	**70,88,378**
% Change in Net Benefits Due to FLP to that of LP			**15.24**

N.B.: Flp1= Optimal results of general linear programming Model

Flp2= Optimal results of general linear programming Model with fuzzified constraints

Flp3= Optimal results of fuzzy linear programming Model with aspiration level, λ of 100%

Table 7.118: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Dandi Minor of Navsari Branch Canal for General Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	38.8945	38.3242	0.1515
A_2	0.0000	0.0000	0.0000
A_3	0.2974	6.7854	0.0310
A_4	0.0000	0.0000	0.0000
A_5	120.1737	97.8624	99.9973
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	65.0393	28.3354	65.9130
Total	**224.4049**	**171.3074**	**166.0928**
Surface Water Releases, ha.m			
SW_1	5.4261	0.1487	14.0189
SW_2	11.5294	6.6823	13.7717
SW_3	0.0000	0.0003	0.0050
SW_4	0.0032	2.6748	0.0028
SW_5	0.0821	4.0302	0.0026
SW_6	0.0000	0.0000	0.0050
SW_7	0.0000	0.0000	0.0059
SW_8	0.0000	0.0000	0.0059
SW_9	0.0000	0.0000	0.0059
SW_{10}	1.2428	5.8404	0.1576
SW_{11}	16.7601	4.1330	0.2224
SW_{12}	10.8513	5.9563	14.0126
Total	**45.8950**	**29.4660**	**42.2163**
Ground Water Releases, ha.m			
GW_1	20.8951	15.8242	16.1365
GW_2	20.8951	15.8242	16.1368
GW_3	17.6919	15.8237	3.3545
GW_4	19.3249	15.8242	3.2892
GW_5	19.7469	15.8176	3.2758
GW_6	13.2443	10.0301	3.5338
GW_7	13.2443	10.0301	3.5869
GW_8	13.2443	10.0301	3.5869
GW_9	13.2443	10.0301	3.5869
GW_{10}	20.8949	15.8076	7.721
GW_{11}	20.8951	15.8242	13.6831
GW_{12}	20.8951	15.8242	16.0797
Total	**214.2162**	**166.6903**	**93.9711**
Optimal Benefits, Rs./ha.m	**32,48,900**	**18,40,500**	**41,69,838**
% Change in Net Benefits Due to FLP to that of LP			**28.35**

Table 7.119: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Dandeswar Minor of Navsari Branch Canal for General Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	5.1313	0.0000	3.3844
A_2	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000
A_5	76.8000	96.0000	107.0232
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	83.2664	107.0833	137.7861
Total	**165.1977**	**203.0833**	**248.1937**
Surface Water Releases, ha.m			
SW_1	78.5990	100.3720	0.0331
SW_2	79.7048	100.3720	0.1255
SW_3	0.0000	0.0000	0.0003
SW_4	0.0000	0.0000	0.0009
SW_5	0.0000	0.0000	0.0009
SW_6	0.0000	0.0000	0.0007
SW_7	0.0000	0.0000	0.0006
SW_8	0.0000	0.0000	0.0006
SW_9	0.0000	0.0000	0.0006
SW_{10}	9.5398	9.2368	0.0006
SW_{11}	46.9642	57.6344	0.0065
SW_{12}	79.5820	100.3720	0.0334
Total	**294.3898**	**367.9872**	**0.2037**
Ground Water Releases, ha.m			
GW_1	1.3860	1.7325	37.6077
GW_2	1.3860	1.7325	37.7623
GW_3	0.8059	0.0000	1.2776
GW_4	1.1019	0.0000	1.4568
GW_5	1.1622	0.0000	1.4934
GW_6	0.0000	0.0000	0.7892
GW_7	0.0000	0.0000	0.8012
GW_8	0.0000	0.0000	0.8012
GW_9	0.0000	0.0000	0.8012
GW_{10}	1.3860	1.7325	5.8211
GW_{11}	1.3860	1.7325	23.1907
GW_{12}	1.3860	1.7325	37.7671
Total	**10.0000**	**8.6625**	**149.5695**
Optimal Benefits, Rs./ha.m	**62,01,600**	**78,70,300**	**77,56,871**
% Change in Net Benefits Due to FLP to that of LP			**25.08**

Table 7.120: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Onjal Minor of Navsari Branch Canal for General Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	33.4220	31.4437	1.8868
A_2	0.0000	0.0000	0.0000
A_3	2.7014	4.4421	0.0000
A_4	0.0000	0.0000	0.0000
A_5	119.9945	115.3723	100.0000
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	73.6635	48.2738	62.9418
Total	**229.7814**	**199.5319**	**164.8286**
Surface Water Releases, ha.m			
SW_1	18.4990	12.8818	7.8637
SW_2	23.4032	17.9103	8.2161
SW_3	0.0000	0.0000	0.0958
SW_4	0.0000	0.0002	0.0089
SW_5	0.0000	0.0008	0.0113
SW_6	0.0000	0.0000	0.2932
SW_7	0.0000	0.0000	0.0355
SW_8	0.7078	6.9829	0.0069
SW_9	0.0000	0.0000	0.0355
SW_{10}	0.0000	0.0000	0.0499
SW_{11}	8.9738	2.2334	0.4389
SW_{12}	22.8586	17.3517	8.1792
Total	**74.4424**	**57.3611**	**25.2349**
Ground Water Releases, ha.m			
GW_1	21.0693	16.0206	15.2125
GW_2	21.0693	16.0206	15.2123
GW_3	16.9285	13.8192	0.9134
GW_4	18.2414	15.165	1.0309
GW_5	18.5088	15.4392	1.0494
GW_6	13.3547	10.1546	0.6041
GW_7	13.3546	10.1546	0.6834
GW_8	20.998	16.02	6.8443
GW_9	13.3546	10.1546	0.6834
GW_{10}	15.7976	12.6178	1.6396
GW_{11}	21.0693	16.0092	10.61
GW_{12}	21.0693	16.0206	15.2117
Total	**214.8154**	**167.5960**	**69.6950**
Optimal Benefits, Rs./ha.m	**37,87,500**	**30,45,200**	**44,37,843**
% Change in Net Benefits Due to FLP to that of LP			**17.17**

Table 7.121: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Sadlav Minor of Navsari Branch Canal for General Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	8.0086	0.1699	17.2447
A_2	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000
A_5	193.7818	243.0473	92.3644
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	58.5073	75.4364	0.1121
Total	**260.2977**	**318.6536**	**109.7212**
Surface Water Releases, ha.m			
SW_1	23.9869	42.0319	0.7179
SW_2	22.8951	40.2409	0.6747
SW_3	25.8904	42.8697	0.8649
SW_4	23.3677	40.0306	0.7076
SW_5	22.8686	39.4682	0.5852
SW_6	20.6888	40.3559	1.2253
SW_7	33.3102	51.2721	1.0516
SW_8	33.3102	51.2721	1.0516
SW_9	33.3102	51.2721	1.0516
SW_{10}	21.1548	41.2829	1.0375
SW_{11}	7.0083	19.9654	4.9429
SW_{12}	23.0163	40.4379	0.6831
Total	**290.8075**	**500.4997**	**14.5939**
Ground Water Releases, ha.m			
GW_1	51.4599	69.2039	3.7009
GW_2	49.6757	65.9620	4.6431
GW_3	42.6062	57.7672	5.7246
GW_4	41.2050	54.8058	6.6973
GW_5	40.9156	54.1983	6.9196
GW_6	49.4780	64.8606	9.1578
GW_7	46.2727	65.6483	3.1930
GW_8	46.2727	65.6483	3.1930
GW_9	46.2727	65.6483	3.1930
GW_{10}	52.0565	68.1153	10.4108
GW_{11}	26.8725	24.3982	14.9657
GW_{12}	49.8739	66.3227	4.5374
Total	**542.9614**	**722.5789**	**76.3362**
Optimal Benefits, Rs./ha.m	**20,33,600**	**33,61,900**	**7,20,359**
% Change in Net Benefits Due to FLP to that of LP			**-64.58**

Table 7.122: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Vachharwad Minor of Navsari Branch Canal for General Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	29.2556	31.2537	7.7004
A_2	0.0000	0.0000	0.0000
A_3	23.3879	54.3374	8.6088
A_4	0.0000	0.0000	0.0000
A_5	162.6687	200.2852	100.0000
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	85.0342	68.7475	32.5240
Total	**300.3464**	**354.6238**	**148.8332**
Surface Water Releases, ha.m			
SW_1	8.4295	33.9124	15.4541
SW_2	8.2609	32.3892	16.0306
SW_3	25.6211	43.6406	6.6351
SW_4	23.7165	41.9397	7.2028
SW_5	23.3156	41.5954	7.2883
SW_6	11.7031	39.0460	8.0807
SW_7	30.2555	48.4336	4.7405
SW_8	30.2555	48.4336	4.7405
SW_9	30.2555	48.4336	4.7405
SW_{10}	9.3048	38.9931	8.7221
SW_{11}	1.8623	26.3180	10.2555
SW_{12}	8.2781	32.5568	15.9619
Total	**211.2584**	**475.6920**	**109.8526**
Ground Water Releases, ha.m			
GW_1	46.8738	61.3750	12.1879
GW_2	46.1342	59.8098	12.4234
GW_3	33.0298	48.1754	2.1859
GW_4	32.7550	46.6577	2.4237
GW_5	32.7024	46.3480	2.4802
GW_6	41.9258	55.4473	5.7281
GW_7	33.9253	52.2632	1.6758
GW_8	33.9253	52.2632	1.6758
GW_9	33.9253	52.2632	1.6758
GW_{10}	44.8129	58.3598	7.0498
GW_{11}	39.1697	33.9049	10.5989
GW_{12}	46.2168	59.9841	12.3985
Total	**465.3963**	**626.8516**	**72.5038**
Optimal Benefits, Rs./ha.m	**22,10,100**	**10,94,700**	**31,85,229**
% Change in Net Benefits Due to FLP to that of LP			**44.12**

Table 7.123: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Veraval Minor of Navsari Branch Canal for General Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	57.8267	30.9168	22.5709
A_2	0.0000	0.0000	0.0000
A_3	10.8219	29.3835	8.7910
A_4	0.0000	0.0000	0.0000
A_5	111.2755	133.1805	100.0000
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	33.5094	38.7773	20.4124
Total	**213.4335**	**232.2581**	**151.7743**
Surface Water Releases, ha.m			
SW_1	7.7969	23.9752	7.0573
SW_2	18.2862	11.5432	8.0057
SW_3	5.1434	11.4124	4.3464
SW_4	16.9562	9.9846	4.7270
SW_5	11.5524	9.7687	4.7991
SW_6	9.5070	10.9567	4.5042
SW_7	0.3534	16.2249	2.5840
SW_8	0.3534	16.2249	2.5840
SW_9	0.3534	16.2249	2.5840
SW_{10}	8.4054	11.5247	4.7955
SW_{11}	5.4726	6.9579	5.5237
SW_{12}	16.9679	14.3524	7.8125
Total	**101.1482**	**159.1505**	**59.3234**
Ground Water Releases, ha.m			
GW_1	18.5927	29.8251	10.8682
GW_2	18.3685	33.3228	11.9038
GW_3	16.8176	21.8867	3.6582
GW_4	16.2391	22.4386	4.8319
GW_5	18.212	22.5309	5.0724
GW_6	16.2198	24.2585	4.9587
GW_7	11.0665	20.1365	0.678
GW_8	11.0665	20.1365	0.678
GW_9	11.0665	20.1365	0.678
GW_{10}	18.1376	26.4254	6.7635
GW_{11}	18.5835	26.0605	5.4889
GW_{12}	18.4343	32.5519	11.8116
Total	**192.8046**	**299.7099**	**67.3912**
Optimal Benefits, Rs./ha.m	**25,69,500**	**20,98,500**	**28,65,548**
% Change in Net Benefits Due to FLP to that of LP			**11.52**

Space Integration Strategy

Linear programming (LP) model

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 17 of Surat branch canal, for space integration strategy are given in Tables 7.141 to 7.157, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Bardoli branch canal, for space integration strategy are given in Tables 7.158 to 7.164, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Chalthan branch canal, for space integration strategy are given in Tables 7.165 to 7.171, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 4 of Umbhrat branch canal upto 58 R.D., for space integration strategy are given in Tables 7.172 to 7.175, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Umbhrat branch canal beyond 58 R.D., for space integration strategy are given in Tables 7.176 to 7.182, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Navsari branch canal, for space integration strategy are given in Tables 7.183 to 7.189.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Amalsad branch canal, for space integration strategy are given in Tables 7.190 to 7.196, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 10 of Valsad branch canal, for space integration strategy are given in Tables 7.197 to 7.206, enclosed in C.D.

Table 7.183: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Dandeswar Minor of Navsari Branch Canal for Space Integration Strategy

Irrigation Intensity,%	200	210	220	230	240	250	260	270
Area Irrigated, ha								
A_1	16.0018	15.8728	15.7350	15.6190	15.5032	15.3811	15.2680	15.1589
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	25.3821	26.3471	27.2556	27.8557	28.3989	28.9465	29.4955	30.0428
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	117.8563	117.8283	117.7995	118.0374	118.3395	118.6440	118.9514	119.2616
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	60.7600	61.0302	61.3066	61.4316	61.5366	61.6577	61.7238	61.7598
Total	**220.0002**	**221.0784**	**222.0967**	**222.9437**	**223.7782**	**224.6293**	**225.4387**	**226.2231**
Surface Water Releases, ha.m								
SW_1	27.0583	27.1904	27.3088	27.3757	27.4339	27.4929	27.5164	27.5176
SW_2	27.5243	27.5345	27.5380	27.5338	27.5290	27.5244	27.4859	27.4266
SW_3	11.7641	11.7372	11.7108	11.6817	11.6518	11.6218	11.5917	11.5616
SW_4	11.7651	11.7375	11.7104	11.6809	11.6505	11.6200	11.5895	11.5589
SW_5	11.7651	11.7375	11.7103	11.6806	11.6502	11.6196	11.5890	11.5584
SW_6	11.7638	11.7370	11.7107	11.6818	11.6520	11.6221	11.5921	11.5620
SW_7	11.7578	11.7331	11.7091	11.6817	11.6533	11.6250	11.5964	11.5676
SW_8	11.7578	11.7331	11.7091	11.6817	11.6533	11.6250	11.5964	11.5676
SW_9	11.7578	11.7331	11.7091	11.6817	11.6533	11.6250	11.5964	11.5676
SW_{10}	11.7632	11.7367	11.7107	11.6819	11.6523	11.6226	11.5928	11.5628
SW_{11}	14.5564	14.5225	14.4809	14.4441	14.4062	14.3647	14.3210	14.2749
SW_{12}	27.5027	27.5250	27.5399	27.5427	27.5441	27.5458	27.5133	27.4597
Total	**190.7364**	**190.6576**	**190.5478**	**190.3483**	**190.1299**	**189.9089**	**189.5809**	**189.1853**
Ground Water Releases, ha.m								
GW_1	19.3365	19.3731	19.4092	19.4314	19.4521	19.4747	19.4986	19.5240
GW_2	19.3365	19.3731	19.4092	19.4314	19.4521	19.4747	19.4986	19.5240
GW_3	18.7004	18.6850	18.6688	18.6558	18.6427	18.6286	18.6143	18.5995
GW_4	18.7004	18.6850	18.6688	18.6558	18.6427	18.6286	18.6143	18.5995
GW_5	18.7004	18.6850	18.6688	18.6558	18.6427	18.6286	18.6143	18.5995
GW_6	18.8448	18.8285	18.8116	18.7983	18.7851	18.7709	18.7563	18.7411
GW_7	18.8162	18.7998	18.7827	18.7692	18.7558	18.7414	18.7266	18.7112
GW_8	18.8162	18.7998	18.7827	18.7692	18.7558	18.7414	18.7266	18.7112
GW_9	18.8162	18.7998	18.7827	18.7692	18.7558	18.7414	18.7266	18.7112
GW_{10}	19.0343	19.0172	18.9999	18.9863	18.9730	18.9589	18.9441	18.9285
GW_{11}	18.7628	18.7468	18.7301	18.7168	18.7036	18.6893	18.6747	18.6595
GW_{12}	19.3365	19.3731	19.4092	19.4314	19.4521	19.4747	19.4986	19.5240
Total	**227.2012**	**227.1662**	**227.1237**	**227.0706**	**227.0135**	**226.9532**	**226.8936**	**226.8332**
Optimal Benefits, Rs./ha.m	**37,97,600**	**38,71,700**	**39,42,600**	**39,90,500**	**40,34,900**	**40,80,500**	**41,23,200**	**41,64,100**

Table 7.184: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Dandi Minor of Navsari Branch Canal for Space Integration Strategy

Irrigation Intensity,%	10	20	30	40	50	60	70	80
Area Irrigated, ha								
A_1	23.1501	15.5198	36.2830	33.7612	30.6315	23.7277	25.8555	6.5022
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	14.6429	15.5965	17.7610	20.8830	14.8777	22.5704	23.5605	1.4647
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	88.6452	88.9745	88.2637	90.7495	90.0084	93.9858	93.8217	82.5786
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	9.5213	1.6557	1.6124	8.6825	7.7959	17.5056	16.1402	2.0805
Total	**135.9595**	**121.7465**	**143.9201**	**154.0762**	**143.3135**	**157.7895**	**159.3779**	**92.6260**
Surface Water Releases, ha.m								
SW_1	9.2227	18.0840	4.9172	7.3430	6.9253	9.8704	9.9212	10.2210
SW_2	13.3819	14.8909	13.2359	14.2581	14.4875	16.5596	16.2350	8.8517
SW_3	10.2000	12.0835	16.7455	17.3954	17.0843	15.0240	14.8222	11.3490
SW_4	10.7966	12.5993	18.9585	19.2803	18.6704	16.0354	15.7627	11.3169
SW_5	10.9438	12.7343	19.5354	19.7609	19.0722	16.2850	15.9901	11.3131
SW_6	9.4062	11.5446	14.2824	15.1095	15.1071	13.6016	13.4131	11.4750
SW_7	9.4062	11.5446	14.2824	15.1095	15.1071	13.6016	13.4131	11.4750
SW_8	9.4062	11.5446	14.2824	15.1095	15.1071	13.6016	13.4131	11.4750
SW_9	9.4062	11.5446	14.2824	15.1095	15.1071	13.6016	13.4131	11.4750
SW_{10}	9.8644	11.8226	15.6047	16.3850	16.2242	14.4489	14.2708	11.3827
SW_{11}	8.8309	15.6007	14.9151	16.3634	19.7630	19.7251	19.6978	10.6863
SW_{12}	12.5308	8.2395	10.4397	9.0436	9.3534	12.1350	13.5254	8.5157
Total	**123.3959**	**152.2332**	**171.4816**	**180.2677**	**182.0087**	**174.4898**	**173.8776**	**129.5364**
Ground Water Releases, ha.m								
GW_1	15.2742	15.2979	15.2880	15.2892	15.2992	15.2995	15.2853	15.3024
GW_2	15.2742	15.2979	15.2880	15.2892	15.2992	15.2995	15.2853	15.3024
GW_3	15.2747	15.2979	15.2891	15.2906	15.2984	15.2974	15.2825	15.3017
GW_4	15.2747	15.2979	15.2891	15.2906	15.2984	15.2974	15.2825	15.3017
GW_5	15.2747	15.2979	15.2891	15.2906	15.2984	15.2974	15.2825	15.3017
GW_6	15.2747	15.2979	15.2891	15.2906	15.2984	15.2974	15.2825	15.3017
GW_7	15.2745	15.2979	15.2890	15.2905	15.2984	15.2973	15.2826	15.3021
GW_8	15.2745	15.2979	15.2890	15.2905	15.2984	15.2973	15.2826	15.3021
GW_9	15.2745	15.2979	15.2890	15.2905	15.2984	15.2973	15.2826	15.3021
GW_{10}	15.2744	15.2979	15.2889	15.2904	15.2985	15.2974	15.2829	15.3025
GW_{11}	15.2746	15.2979	15.2890	15.2905	15.2984	15.2973	15.2825	15.3019
GW_{12}	15.2742	15.2979	15.2880	15.2892	15.2992	15.2995	15.2853	15.3024
Total	**183.2939**	**183.5748**	**183.4653**	**183.4824**	**183.5833**	**183.5747**	**183.3991**	**183.6247**
Optimal Benefits, Rs./ha.m	**4,29,660**	**1,44,940**	**3,86,780**	**9,96,820**	**4,89,490**	**14,89,000**	**15,11,900**	**12,91,900**

Table 7.185: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Machhad Minor of Navsari Branch Canal for Space Integration Strategy

Irrigation Intensity,%	50	60	70	80	90	100	110	120
Area Irrigated, ha								
A_1	27.4973	0.1855	0.1685	0.1414	0.1084	0.0179	38.1930	57.4783
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	39.3582	57.2369	58.7454	57.2038	55.2359	57.7535	50.6738	47.5170
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	0.0335	64.4639	58.8572	57.7176	53.1215	83.0624	12.7322	0.2451
Total	**66.8890**	**121.8863**	**117.7711**	**115.0628**	**108.4658**	**140.8338**	**101.5990**	**105.2404**
Surface Water Releases, ha.m								
SW_1	28.6877	31.2760	35.8341	34.2258	31.6866	29.2126	21.0553	22.0954
SW_2	23.8796	33.1862	31.7501	29.3944	27.8786	27.8509	31.1269	36.6887
SW_3	37.0686	22.7238	31.1487	31.5786	29.1335	28.6039	2.9753	8.3243
SW_4	37.2694	23.0833	32.0677	32.4472	29.7046	28.1640	5.6177	11.7304
SW_5	37.2348	23.2368	32.3067	32.6200	29.7883	28.0953	6.3817	12.7039
SW_6	36.2151	22.9000	30.1878	30.1817	27.8918	29.7912	0.1637	5.0724
SW_7	36.2151	22.9000	30.1878	30.1817	27.8918	29.7912	0.1637	5.0724
SW_8	36.2151	22.9000	30.1878	30.1817	27.8918	29.7912	0.1637	5.0724
SW_9	36.2151	22.9000	30.1878	30.1817	27.8918	29.7912	0.1637	5.0724
SW_{10}	36.7720	22.7001	30.7044	31.0248	28.6831	28.9830	1.7475	6.7775
SW_{11}	33.7811	27.5362	36.4899	35.7599	32.2692	27.6540	15.0269	20.5870
SW_{12}	25.1719	30.9199	30.6950	29.2232	27.9557	28.3675	29.4594	34.3073
Total	**404.7255**	**306.2623**	**381.7478**	**377.0007**	**348.6668**	**346.0960**	**114.0455**	**173.5041**
Ground Water Releases, ha.m								
GW_1	33.4708	34.5212	34.2033	34.1041	34.0256	33.8149	34.1947	34.5490
GW_2	33.4708	34.5212	34.2033	34.1041	34.0256	33.8149	34.1947	34.5490
GW_3	33.4463	34.5273	34.1928	34.1041	34.0298	33.8193	34.0468	34.4084
GW_4	33.4463	34.5273	34.1928	34.1041	34.0298	33.8193	34.0468	34.4084
GW_5	33.4463	34.5273	34.1928	34.1041	34.0298	33.8193	34.0468	34.4084
GW_6	33.4463	34.5273	34.1928	34.1041	34.0298	33.8193	34.0468	34.4084
GW_7	33.4934	34.5154	34.2106	34.1011	34.0201	33.8096	34.3537	34.7019
GW_8	33.4934	34.5154	34.2106	34.1011	34.0201	33.8096	34.3537	34.7019
GW_9	33.4934	34.5154	34.2106	34.1011	34.0201	33.8096	34.3537	34.7019
GW_{10}	33.5638	34.7277	34.4461	34.3431	34.2355	34.0554	34.0576	34.3855
GW_{11}	33.4708	34.5212	34.2033	34.1041	34.0256	33.8149	34.1947	34.5490
GW_{12}	33.4708	34.5212	34.2033	34.1041	34.0256	33.8149	34.1947	34.5490
Total	**401.7124**	**414.4679**	**410.6623**	**409.4792**	**408.5174**	**406.0210**	**410.0847**	**414.3208**
Optimal Benefits, Rs./ha.m	**56,08,500**	**21,48,400**	**24,21,500**	**24,96,600**	**27,82,000**	**8,99,550**	**44,64,000**	**49,75,100**

Table 7.186: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Onjal Minor of Navsari Branch Canal for Space Integration Strategy

Irrigation Intensity,%	20	30	40	50	60	70	80	90
Area Irrigated, ha								
A_1	6.0456	12.0347	12.5592	12.0988	12.0324	9.8330	3.4554	1.4377
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	21.4332	25.3324	27.9229	25.8320	30.2723	31.4302	3.2667	7.6608
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	98.7398	99.0401	99.0902	99.0139	98.8592	98.1537	84.0137	84.2627
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	42.8255	32.9266	30.6944	28.7591	30.0969	24.1197	10.1882	9.9805
Total	**169.0441**	**169.3338**	**170.2667**	**165.7038**	**171.2608**	**163.5366**	**100.9240**	**103.3417**
Surface Water Releases, ha.m								
SW_1	15.1453	6.4745	7.1474	8.1059	7.7487	9.7467	10.4381	8.7218
SW_2	14.0080	5.3598	3.3173	3.7954	2.5477	18.9259	11.9409	11.1768
SW_3	11.2349	10.9645	10.7936	10.1773	10.7660	10.7940	11.6925	10.7881
SW_4	11.3014	11.0880	10.9061	10.2636	10.7830	10.7466	11.7973	11.3352
SW_5	11.3173	11.1160	10.9312	10.2818	10.7832	10.7312	11.8333	11.4920
SW_6	11.1210	10.7159	10.5586	9.9771	10.6524	10.7877	11.7411	10.4011
SW_7	11.1210	10.7159	10.5586	9.9771	10.6524	10.7877	11.7411	10.4011
SW_8	11.1501	10.7855	10.6253	10.0362	10.6937	10.8020	11.6976	10.4234
SW_9	11.1210	10.7159	10.5586	9.9771	10.6524	10.7877	11.7411	10.4011
SW_{10}	11.1598	10.8077	10.6465	10.0547	10.7055	10.8047	11.6879	10.4431
SW_{11}	12.6562	11.4630	11.1546	10.5831	11.1198	10.9969	11.7586	10.7947
SW_{12}	15.7054	4.9573	3.6397	4.6705	4.5019	14.9648	11.3236	9.9561
Total	**147.0414**	**115.1640**	**110.8375**	**107.8998**	**111.6067**	**140.8759**	**139.3931**	**126.3345**
Ground Water Releases, ha.m								
GW_1	15.2680	15.2818	15.2786	13.9444	15.2729	15.2623	15.2606	15.2594
GW_2	15.2680	15.2818	15.2786	15.0305	15.2728	15.2608	15.2606	15.2594
GW_3	15.2680	15.2715	15.2693	8.0803	15.2652	15.2612	15.2612	15.2584
GW_4	15.2680	15.2715	15.2693	8.0803	15.2652	15.2612	15.2612	15.2584
GW_5	15.2680	15.2715	15.2693	8.0803	15.2652	15.2612	15.2612	15.2584
GW_6	15.2680	15.2715	15.2693	8.0803	15.2652	15.2612	15.2612	15.2584
GW_7	15.2680	15.2718	15.2692	8.2179	15.2650	15.2621	15.2613	15.2587
GW_8	15.2680	15.2739	15.2699	14.0790	15.2661	15.2614	15.2625	15.2595
GW_9	15.2680	15.2718	15.2692	8.2179	15.2650	15.2621	15.2613	15.2587
GW_{10}	15.2680	15.2719	15.2691	12.1941	15.2653	15.2608	15.2614	15.2587
GW_{11}	15.2679	15.2716	15.2692	9.2883	15.2652	15.2621	15.2612	15.2585
GW_{12}	15.2680	15.2818	15.2786	13.9450	15.2723	15.2618	15.2606	15.2594
Total	**183.2159**	**183.2924**	**183.2596**	**127.2383**	**183.2054**	**183.1382**	**183.1343**	**183.1059**
Optimal Benefits, Rs./ha.m	**26,83,200**	**24,69,000**	**25,10,700**	**31,99,500**	**26,07,700**	**22,55,300**	**7,23,480**	**4,91,880**

Table 7.187: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Sadlav Minor of Navsari Branch Canal for Space Integration Strategy

Irrigation Intensity,%	250	260	270	280	290	300	310	320
Area Irrigated, ha								
A_1	15.9521	17.3362	10.8000	10.7936	17.3611	10.5934	17.7766	18.0115
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	170.8734	183.1339	182.5125	183.9410	187.4821	186.8702	190.4691	191.9893
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	90.6031	83.6976	0.5965	0.5844	83.5001	0.6593	83.3833	83.3215
Total	**277.4286**	**284.1677**	**193.9090**	**195.3190**	**288.3433**	**198.1229**	**291.6290**	**293.3223**
Surface Water Releases, ha.m								
SW_1	39.1873	40.3410	39.4924	39.4620	40.2171	39.4123	40.1476	40.1120
SW_2	37.3493	36.9931	42.3426	42.3018	36.8907	42.2253	36.8448	36.8213
SW_3	38.3934	44.1929	38.8349	38.8108	44.0291	38.7681	43.9233	43.8705
SW_4	38.0521	43.6356	38.9338	38.9110	43.4697	38.8685	43.3687	43.3191
SW_5	37.9792	43.5134	38.9667	38.9443	43.3469	38.9018	43.2468	43.1978
SW_6	38.4538	44.2885	38.8280	38.8036	44.1250	38.7609	44.0182	43.9648
SW_7	39.2094	45.3853	39.0882	39.0606	45.2201	39.0170	45.0994	45.0378
SW_8	39.2094	45.3853	39.0882	39.0606	45.2201	39.0170	45.0994	45.0378
SW_9	39.2094	45.3853	39.0882	39.0606	45.2201	39.0170	45.0994	45.0378
SW_{10}	38.5604	44.4551	38.8244	38.7996	44.2918	38.7569	44.1833	44.1288
SW_{11}	0.0455	2.6373	90.8491	90.7665	2.6346	90.6215	2.6386	2.6411
SW_{12}	37.5638	37.3767	41.9918	41.9524	37.2718	41.8791	37.2234	37.1986
Total	**423.2130**	**473.5895**	**526.3283**	**525.9338**	**471.9370**	**525.2454**	**470.8929**	**470.3674**
Ground Water Releases, ha.m								
GW_1	46.2959	51.7349	51.5126	51.4643	51.5780	51.3772	51.4751	51.4236
GW_2	46.2959	51.7349	51.5126	51.4643	51.5780	51.3772	51.4751	51.4236
GW_3	46.3250	51.8106	51.4501	51.4012	51.6564	51.3130	51.5550	51.5041
GW_4	46.3250	51.8106	51.4501	51.4012	51.6564	51.3130	51.5550	51.5041
GW_5	46.3250	51.8106	51.4501	51.4012	51.6564	51.3130	51.5550	51.5041
GW_6	47.4191	53.2567	52.1161	52.0632	53.1106	51.9674	53.0144	52.9662
GW_7	46.2637	51.6517	51.5811	51.5335	51.4921	51.4476	51.3877	51.3355
GW_8	46.2637	51.6517	51.5811	51.5335	51.4921	51.4476	51.3877	51.3355
GW_9	46.2637	51.6517	51.5811	51.5335	51.4921	51.4476	51.3877	51.3355
GW_{10}	47.8296	53.7082	52.5247	52.4715	53.5597	52.3750	53.4627	53.4142
GW_{11}	46.2959	51.7349	51.5126	51.4643	51.5780	51.3772	51.4751	51.4236
GW_{12}	46.2959	51.7349	51.5126	51.4643	51.5780	51.3772	51.4751	51.4236
Total	**558.1984**	**624.2914**	**619.7848**	**619.1960**	**622.4278**	**618.1330**	**621.2056**	**620.5936**
Optimal Benefits, Rs./ha.m	**6,73,420**	**19,64,500**	**70,35,900**	**70,01,100**	**18,66,100**	**69,30,100**	**17,90,400**	**17,51,700**

Table 7.188: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Vachharvad Minor of Navsari Branch Canal for Space Integration Strategy

Irrigation Intensity,%	240	250	260	270	280	290	300	310
Area Irrigated, ha								
A_1	8.3320	7.6468	6.6289	5.7759	5.3547	4.8704	4.3293	3.7318
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	4.2943	4.3027	4.3074	4.7043	5.7449	6.5741	7.1862	7.5833
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	159.3713	159.3533	159.3355	159.3178	159.3001	159.2824	159.2647	159.2470
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	49.5267	50.6060	50.9724	51.2110	51.6135	51.7432	51.6302	51.2885
Total	**221.5243**	**221.9088**	**221.2442**	**221.0090**	**222.0132**	**222.4701**	**222.4104**	**221.8506**
Surface Water Releases, ha.m								
SW_1	23.5192	23.7698	23.8511	23.9091	24.0215	24.0530	24.0108	23.8984
SW_2	20.3962	20.6090	20.6345	20.6505	20.7521	20.7684	20.7069	20.5714
SW_3	40.5070	40.6504	40.7987	40.9034	40.9318	40.9699	41.0182	41.0771
SW_4	40.0525	40.1853	40.3202	40.4144	40.4386	40.4720	40.5155	40.5693
SW_5	39.9550	40.0854	40.2173	40.3093	40.3325	40.3650	40.4075	40.4603
SW_6	40.5869	40.7320	40.8826	40.9890	41.0183	41.0572	41.1064	41.1662
SW_7	41.5530	41.7159	41.8915	42.0182	42.0562	42.1054	42.1663	42.2391
SW_8	41.5530	41.7159	41.8915	42.0182	42.0562	42.1054	42.1663	42.2391
SW_9	41.5530	41.7159	41.8915	42.0182	42.0562	42.1054	42.1663	42.2391
SW_{10}	40.7273	40.8755	41.0299	41.1395	41.1700	41.2104	41.2612	41.3228
SW_{11}	3.7700	3.1766	2.5301	2.1189	2.1132	2.1072	2.1011	2.0948
SW_{12}	20.7474	20.9645	20.9963	21.0170	21.1199	21.1379	21.0785	20.9454
Total	**394.9205**	**396.1962**	**396.9352**	**397.5057**	**398.0665**	**398.4572**	**398.7050**	**398.8230**
Ground Water Releases, ha.m								
GW_1	22.9672	22.5537	22.3270	22.3174	22.5656	22.7968	22.9981	23.1639
GW_2	22.9672	22.5537	22.3270	22.3174	22.5656	22.7968	22.9981	23.1639
GW_3	47.9718	48.1336	48.2450	48.2801	48.2160	48.1578	48.1091	48.0715
GW_4	47.9718	48.1336	48.2450	48.2801	48.2160	48.1578	48.1091	48.0715
GW_5	47.9718	48.1336	48.2450	48.2801	48.2160	48.1578	48.1091	48.0715
GW_6	49.3681	49.5590	49.7020	49.7626	49.7128	49.6684	49.6333	49.6091
GW_7	47.6676	47.8493	47.9682	48.0066	47.9459	47.8865	47.8327	47.7866
GW_8	47.6676	47.8493	47.9682	48.0066	47.9459	47.8865	47.8327	47.7866
GW_9	47.6676	47.8493	47.9682	48.0066	47.9459	47.8865	47.8327	47.7866
GW_{10}	49.5057	49.7293	49.8936	49.9695	49.9318	49.8939	49.8604	49.8337
GW_{11}	47.8227	47.9954	48.1111	48.1481	48.0858	48.0270	47.9757	47.9337
GW_{12}	22.9672	22.5537	22.3270	22.3174	22.5656	22.7968	22.9981	23.1639
Total	**502.5163**	**502.8935**	**503.3273**	**503.6925**	**503.9129**	**504.1126**	**504.2891**	**504.4425**
Optimal Benefits, Rs./ha.m	**22,89,300**	**22,44,800**	**22,50,800**	**22,35,400**	**21,58,800**	**21,12,600**	**20,95,300**	**21,05,900**

Table 7.189: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Veraval Minor of Navsari Branch Canal for Space Integration Strategy

Irrigation Intensity,%	240	250	260	270	280	290	300	310
Area Irrigated, ha								
A_1	3.6485	0.2510	0.2282	0.1591	1.9481	6.7572	12.7955	17.9871
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0268	11.3972	18.0344	21.8764	24.6738	26.3571	27.1741	27.0294
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	115.8172	110.3957	110.5914	110.7870	110.9830	111.1784	111.3262	111.4017
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	4.7295	23.0619	21.6306	20.1197	18.9047	18.6410	19.1823	20.3931
Total	**124.2220**	**145.1058**	**150.4846**	**152.9422**	**156.5096**	**162.9337**	**170.4781**	**176.8113**
Surface Water Releases, ha.m								
SW_1	23.5000	10.4571	9.0335	7.6865	6.6308	6.3105	6.6156	7.3771
SW_2	19.0107	2.6244	2.1329	1.6375	1.6191	2.6749	4.3548	6.2171
SW_3	23.8821	9.2246	9.1218	9.0673	9.0530	9.1171	9.2492	9.4386
SW_4	22.5937	8.7372	8.5147	8.3279	8.2590	8.4497	8.8283	9.2748
SW_5	22.2264	8.5836	8.3237	8.0954	8.0083	8.2358	8.6876	9.2102
SW_6	24.3766	9.3859	9.3203	9.3062	9.3044	9.3190	9.3616	9.4584
SW_7	25.2027	9.6080	9.5863	9.6145	9.6093	9.5320	9.4278	9.3713
SW_8	25.2027	9.6080	9.5863	9.6145	9.6093	9.5320	9.4278	9.3713
SW_9	25.2027	9.6080	9.5863	9.6145	9.6093	9.5320	9.4278	9.3713
SW_{10}	24.5069	9.4254	9.3684	9.3636	9.3637	9.3649	9.3843	9.4573
SW_{11}	21.5404	10.7003	9.7746	8.8433	8.0765	7.8340	8.0793	8.6117
SW_{12}	20.1970	3.4798	2.8571	2.2441	2.1082	3.0230	4.5631	6.3157
Total	**277.4419**	**101.4423**	**97.2059**	**93.4153**	**91.2509**	**92.9249**	**97.4072**	**103.4748**
Ground Water Releases, ha.m								
GW_1	28.1420	14.0444	14.1784	14.2426	14.2485	14.2180	14.1978	14.2213
GW_2	28.1420	14.0444	14.1784	14.2426	14.2485	14.2180	14.1978	14.2213
GW_3	29.1285	14.0083	13.9578	13.9103	13.8601	13.8794	13.8910	13.8623
GW_4	29.1285	14.0083	13.9578	13.9103	13.8601	13.8794	13.8910	13.8623
GW_5	29.1285	14.0083	13.9578	13.9103	13.8601	13.8794	13.8910	13.8623
GW_6	29.4510	14.0346	13.9808	13.9340	13.8999	13.9162	13.9347	13.9312
GW_7	29.0716	14.0585	14.0097	13.9728	13.9720	13.9809	14.0066	14.0546
GW_8	29.0716	14.0585	14.0097	13.9728	13.9720	13.9809	14.0066	14.0546
GW_9	29.0716	14.0585	14.0097	13.9728	13.9720	13.9809	14.0066	14.0546
GW_{10}	29.7271	14.1237	14.0872	14.0863	14.1500	14.1238	14.1327	14.2222
GW_{11}	29.1013	14.0345	13.9817	13.9346	13.9059	13.9216	13.9437	13.9558
GW_{12}	28.1420	14.0444	14.1784	14.2426	14.2485	14.2180	14.1978	14.2213
Total	**347.3057**	**168.5264**	**168.4874**	**168.3320**	**168.1976**	**168.1965**	**168.2973**	**168.5238**
Optimal Benefits, Rs./ha.m	**34,76,700**	**12,24,600**	**15,59,300**	**17,15,100**	**18,59,900**	**20,48,700**	**22,52,900**	**24,16,300**

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Surat branch canal, for space integration strategy are given in Table 7.207.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Bardoli branch canal, for space integration strategy are given in Table 7.208.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Chalthan branch canal, for space integration strategy are given in Table 7.209.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Umbhrat branch canal upto 58 R.D, for space integration strategy are given in Table 7.210.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Umbhrat branch canal beyond 58 R.D., for space integration strategy are given in Table 7.211.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Navsari branch canal, for space integration strategy are given in Table 7.212.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Amalsad branch canal, for space integration strategy are given in Table 7.213.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Valsad branch canal, for space integration strategy are given in Table 7.214.

Table 7.207: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Surat Branch Canal for Space Integration Strategy

Name of Minor	Bhairav	Dumas distributary	Kalsad	Katargam distributary	Khajod
Optimal Irrigation Intensity,%	**60**	**390**	**260**	**200**	**280**
Area Irrigated, ha					
A_1	44.0238	5.1443	1.2606	0.0400	3.0715
A_2	0.0000	3.2330	0.0000	2.2182	43.2058
A_3	2.8235	27.1697	0.0000	0.0000	10.6241
A_4	4.1683	8.9136	0.0000	17.1482	38.1601
A_5	6.4249	101.9501	112.9583	99.7536	20.4655
A_6	0.0000	11.7466	0.0000	0.0000	0.0000
A_7	0.0853	25.4636	0.0000	19.0670	14.0936
A_8	0.0000	9.1153	0.0000	0.0000	0.0000
A_9	0.0000	20.2222	0.0000	4.9768	0.0000
A_{10}	36.2850	16.1685	36.5441	2.2127	4.6545
Total	**93.8108**	**229.1269**	**150.7630**	**145.4165**	**134.2751**
Surface water releases, ha.m					
SW_1	0.1979	15.0554	14.9407	4.1231	9.5357
SW_2	4.7081	24.4996	8.0628	4.8847	15.1961
SW_3	0.1296	11.9593	14.4901	4.9563	13.2164
SW_4	0.1338	11.8483	13.2801	4.9714	15.8259
SW_5	0.1345	11.8084	12.9214	4.5158	11.0705
SW_6	0.1225	11.8956	15.2883	3.1027	8.7169
SW_7	0.0737	12.1672	15.9780	3.0454	8.4061
SW_8	0.1195	12.1672	15.9780	3.1025	8.4061
SW_9	0.1209	12.1310	15.9780	3.1700	8.3705
SW_{10}	0.1270	11.8869	15.5415	3.2418	8.5441
SW_{11}	0.1466	12.4871	9.4829	3.6630	8.8753
SW_{12}	2.9394	15.3111	12.1459	4.0124	9.3000
Total	**8.9535**	**163.2171**	**164.0877**	**46.7891**	**125.4636**
Ground Water Releases, ha.m					
GW_1	13.6236	18.9023	15.1160	9.1117	13.6077
GW_2	15.0073	16.6532	15.1160	9.0703	13.6077
GW_3	6.8993	17.3101	18.7689	4.9584	13.5931
GW_4	9.4344	17.1732	18.7689	4.6206	13.5925
GW_5	9.9514	17.1732	18.7689	4.6206	13.5925
GW_6	3.8424	17.5115	18.7689	4.6206	13.5931
GW_7	0.0000	17.1786	12.4805	10.3573	13.5953
GW_8	3.5506	17.1786	12.4805	10.7680	13.5953
GW_9	4.3377	17.5677	12.4805	14.2209	13.5959
GW_{10}	7.3237	18.2511	12.5525	12.2145	13.5968
GW_{11}	11.2597	17.2196	15.1160	7.6464	13.5970
GW_{12}	14.9751	22.4419	15.1160	8.3819	13.6061
Total	**100.2052**	**214.5610**	**185.5336**	**100.5912**	**163.1730**
Optimal Benefits, Rs./ha.m	**22,41,700**	**32,87,600**	**10,61,600**	**32,15,300**	**1,16,72,000**

Table 7.207: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Surat Branch Canal for Space Integration Strategy (Contd.)

Name of Minor	Kholwad	Nagod distributary	Palsod	Pasodra	Puna subminor
Optimal Irrigation Intensity,%	**140**	**100**	**200**	**150**	**180**
Area Irrigated, ha					
A_1	0.0269	0.0000	4.8052	0.4538	0.0003
A_2	3.9290	0.0000	0.0000	0.0000	5.3759
A_3	0.0000	14.5933	0.0000	0.0000	0.0000
A_4	0.7066	18.4824	8.9822	0.7831	52.0361
A_5	59.8882	99.5649	114.6856	14.2556	4.9069
A_6	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	3.4825	1.6339	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	9.9831	0.0000	0.0000	0.0000
A_{10}	2.9449	3.3820	31.5738	4.8373	1.5903
Total	**70.9781**	**147.6396**	**160.0468**	**20.3298**	**63.9095**
Surface water releases, ha.m					
SW_1	4.7732	5.0949	13.5399	4.9366	4.2749
SW_2	5.1151	5.2029	7.7254	4.9925	4.9992
SW_3	3.8635	5.2921	13.8883	1.1235	4.7913
SW_4	4.1181	5.1010	17.7300	1.2573	4.9997
SW_5	3.8999	5.2916	18.9428	1.9189	4.7773
SW_6	3.1166	3.8782	12.0507	0.9093	1.8569
SW_7	2.9482	3.8983	11.7470	0.7627	0.0937
SW_8	3.0155	3.8821	11.7470	0.7980	0.0937
SW_9	3.0144	3.8787	11.7470	1.0456	0.0927
SW_{10}	3.2593	3.8698	11.7758	1.1180	1.3090
SW_{11}	4.1706	4.1699	11.0660	3.9313	3.1469
SW_{12}	4.6565	3.7382	10.4769	4.9881	3.8021
Total	**45.9509**	**53.2977**	**152.4368**	**27.7818**	**34.2374**
Ground Water Releases, ha.m					
GW_1	8.1937	12.8409	16.1800	8.4147	9.6612
GW_2	8.1786	12.9396	16.1919	8.4146	9.6424
GW_3	6.4337	4.5375	19.2688	8.0614	5.6830
GW_4	6.3873	4.5121	19.2688	8.0614	5.6830
GW_5	6.3873	4.5121	19.2688	8.0614	5.6830
GW_6	6.3873	4.5121	19.2688	8.0614	5.7255
GW_7	9.7196	6.1463	13.7167	8.5256	9.6594
GW_8	10.8584	10.4952	13.7167	8.5257	9.6594
GW_9	11.1192	11.3240	13.7167	8.5258	9.6594
GW_{10}	10.9003	10.6319	13.7854	8.5258	9.6594
GW_{11}	8.0865	6.9856	16.1600	8.4153	9.6374
GW_{12}	8.1436	12.4455	16.1584	8.4150	9.6492
Total	**100.7955**	**101.8828**	**196.7010**	**100.0081**	**100.0023**
Optimal Benefits, Rs./ha.m	**3,80,500**	**54,87,800**	**19,31,200**	**10,18,700**	**66,85,100**

Table 7.207: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Surat Branch Canal for Space Integration Strategy (contd.)

Name of Minor	Sania	Saroli subminor	Segwa	Simada	Surat branch	Umbhel	vihan
Optimal Irrigation Intensity,%	**200**	**200**	**290**	**210**	**150**	**330**	**180**
Area Irrigated, ha							
A_1	0.0007	0.0008	0.0259	0.5194	0.0929	2.2609	0.9279
A_2	5.3744	5.3740	0.0000	3.7014	11.3693	0.0000	0.0000
A_3	5.9986	6.3930	0.0000	0.6139	2.8848	0.0000	0.0000
A_4	14.7009	73.3931	8.8163	11.4304	95.7188	14.2060	4.6107
A_5	67.8757	0.0000	99.9985	16.9744	30.9950	72.3342	92.2280
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	2.1972	0.0000	0.0000	0.9417	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	18.2676	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	**1.5879**	1.5917	5.0003	2.4904	1.1555	4.2142	4.6841
Total	**95.5382**	**86.7526**	**116.0382**	**35.7299**	**160.4839**	**93.9570**	**102.4507**
Surface water releases, ha.m							
SW_1	4.1870	4.4658	4.9962	4.4590	4.8324	4.8117	4.8949
SW_2	4.9969	4.9986	4.9991	5.0030	6.0112	5.0000	5.0000
SW_3	4.8085	4.8739	0.0153	4.0286	5.8556	2.5562	2.6956
SW_4	4.9990	4.9990	0.0560	4.4867	6.1450	3.0036	2.7879
SW_5	4.7480	4.7703	0.0736	4.3703	5.5299	3.0978	2.8100
SW_6	2.3389	2.5802	0.0418	2.3206	3.9001	2.0716	2.6108
SW_7	1.8960	1.9791	0.0816	1.7297	3.7026	1.5779	2.5308
SW_8	1.9006	1.9791	0.0519	1.7297	3.7026	1.5779	2.5921
SW_9	2.4704	1.9791	0.0430	1.7297	3.7026	1.5779	2.6085
SW_{10}	3.0712	2.0243	0.0153	1.8485	4.0861	1.8862	2.6926
SW_{11}	3.8270	3.4502	3.0804	3.5720	6.3077	4.0386	4.0331
SW_{12}	4.0279	4.1189	4.9988	4.3043	4.6864	4.9869	4.9890
Total	**43.2714**	**42.2185**	**18.4530**	**39.5821**	**58.4622**	**36.1863**	**40.2453**
Ground Water Releases, ha.m							
GW_1	10.2696	14.5563	9.9940	9.4616	15.1085	9.8642	8.5313
GW_2	10.3560	14.9987	10.0018	9.4888	15.8172	9.8973	8.5431
GW_3	0.3328	0.0796	0.1170	0.6336	6.2430	0.4993	2.3007
GW_4	0.3328	0.0796	0.0680	0.6336	6.2430	0.4820	2.3007
GW_5	0.3328	0.0796	0.0680	0.6336	6.2430	0.4820	2.3007
GW_6	0.3328	0.0796	0.0680	0.6336	6.2430	0.4820	2.3007
GW_7	14.8732	13.6069	14.9594	15.0041	7.6855	14.7498	14.9501
GW_8	14.8626	13.6069	14.9657	15.0041	7.6855	14.7498	13.9694
GW_9	14.9991	13.6069	14.9636	15.0041	7.6855	14.7498	13.9245
GW_{10}	14.9617	13.6069	14.9655	15.0046	7.6947	14.7506	13.9573
GW_{11}	8.3502	3.5789	9.8876	9.1620	9.0730	9.6049	8.4483
GW_{12}	10.0019	12.1270	9.9429	9.3783	12.7554	9.7415	8.4934
Total	**100.0055**	**100.0069**	**100.0015**	**100.0420**	**108.4773**	**100.0532**	**100.0202**
Optimal Benefits, Rs./ha.m	**30,35,600**	**99,84,500**	**16,94,300**	**10,99,300**	**1,43,79,000**	**33,39,200**	**9,38,550**

Table 7.208: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Bardoli Branch Canal for Space Integration Strategy

Name of Minor	Baleswar	Ena distributary	Gangadhara	Kareli	Kharwasa	Palsana	Tundi
Optimal Irrigation Intensity,%	**220**	**130**	**110**	**160**	**170**	**150**	**140**
Area Irrigated, ha							
A_1	1.7336	0.0808	0.0216	17.3945	12.4948	12.6555	0.0494
A_2	0.0000	9.0883	0.0000	0.0000	0.0000	10.4487	4.4249
A_3	0.0000	1.5729	0.0000	0.0000	0.0000	12.4447	0.0000
A_4	8.6242	4.6943	24.1130	0.0268	5.9950	71.6277	42.9283
A_5	89.4613	99.7277	15.7175	95.4393	79.2034	98.2876	40.4932
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	5.2714	0.1496
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	4.3942	1.8854	5.0026	42.1653	0.0188	7.2863	1.8535
Total	**104.2133**	**117.0494**	**44.8547**	**155.0259**	**97.7120**	**218.0219**	**89.8989**
Surface Water Releases, ha.m							
SW_1	4.7999	4.8759	4.9971	33.6386	14.3411	5.7100	4.4367
SW_2	4.9929	5.5718	4.9995	30.9677	12.4658	6.7057	4.8706
SW_3	2.9420	5.4652	0.0405	29.0101	11.5692	6.4723	4.4263
SW_4	3.0845	5.9136	0.0174	21.3139	11.4461	6.5373	4.9345
SW_5	3.1171	5.3008	0.0307	16.7744	11.4242	6.4484	4.3978
SW_6	2.7716	3.6086	0.0483	32.4032	11.7618	6.1546	3.2175
SW_7	2.6670	3.4051	0.0404	35.3069	12.1190	6.0792	2.9950
SW_8	2.6921	3.4051	0.0404	35.3069	12.1190	6.0792	2.9950
SW_9	2.7172	3.4051	0.0404	35.3069	12.1190	6.0792	2.9950
SW_{10}	2.7403	3.3788	0.0453	33.5886	11.8657	6.0822	3.0071
SW_{11}	4.0968	4.1382	3.1317	31.1993	11.2070	6.6339	3.7624
SW_{12}	4.9799	4.5442	4.9992	31.3409	13.4077	6.1594	4.2095
Total	**41.6013**	**53.0124**	**18.4309**	**366.1574**	**145.8456**	**75.1414**	**46.2474**
Ground Water Releases, ha.m							
GW_1	8.7637	8.9046	10.0969	47.8194	19.2517	18.1741	9.9127
GW_2	8.7796	8.9118	10.1587	47.6725	19.2437	18.6321	10.1898
GW_3	4.2172	6.1602	0.0443	49.2241	19.3324	8.5771	5.1655
GW_4	4.2172	6.1602	0.0443	49.2241	19.3324	8.5592	5.1618
GW_5	4.2172	6.1602	0.0443	49.2241	19.3324	8.5592	5.1618
GW_6	4.2172	6.1602	0.0443	49.2241	19.3324	8.5592	5.1618
GW_7	12.0900	11.2493	14.9750	49.2029	19.3403	8.9233	10.4800
GW_8	12.0441	11.2493	14.9750	49.2029	19.3403	8.9233	10.4800
GW_9	12.0293	11.2493	14.9750	49.2029	19.3403	8.9233	10.4800
GW_{10}	12.0900	11.2564	14.9750	49.2172	19.3552	8.9508	10.4849
GW_{11}	8.6526	8.7053	9.7474	48.7522	19.3064	9.8866	8.3355
GW_{12}	8.7128	8.8796	9.9206	48.2665	19.2770	16.4732	9.0971
Total	**100.0309**	**105.0464**	**100.0008**	**586.2329**	**231.7845**	**133.1414**	**100.1109**
Optimal Benefits, Rs./ha.m	**14,32,500**	**25,06,400**	**22,90,500**	**53,48,500**	**14,27,500**	**1,28,12,000**	**59,05,800**

Table 7.209: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Chalthan Branch Canal for Space Integration Strategy

Name of Minor	Bhesthan	Chalthan branch	Devdha	Lajpur distributary	Talangpur	Udhna distributary	vanj
Optimal Irrigation Intensity,%	**150**	**230**	**220**	**90**	**120**	**130**	**210**
Area Irrigated, ha							
A_1	2.4674	2.1056	1.6752	165.1571	1.2206	0.0000	0.8645
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	5.3768	0.0000
A_3	15.7498	0.0000	0.0000	0.0000	21.7027	0.2333	15.8685
A_4	33.4932	13.5709	5.2340	0.0000	5.0715	100.0000	12.0695
A_5	99.8111	99.9966	99.9721	82.1621	99.7897	100.0000	99.6246
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	2.4942	0.0000	0.0000	18.2967	1.7077	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.5732
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	4.1997	4.3823	4.4159	47.5355	4.3151	1.5915	4.0779
Total	**158.2154**	**120.0554**	**111.2972**	**313.1514**	**133.8073**	**207.2016**	**136.0782**
Surface Water Releases, ha.m							
SW_1	4.6747	4.8494	4.8403	22.6466	4.7581	3.8197	4.9657
SW_2	4.9787	5.0302	5.0000	28.7908	4.8762	5.0000	5.1958
SW_3	3.4953	2.5891	3.0247	28.1887	3.0676	4.3562	3.1137
SW_4	3.6866	2.6308	3.1512	36.4713	3.1500	5.0000	3.0753
SW_5	3.7362	2.6424	3.1784	38.1388	3.1679	4.2704	3.0515
SW_6	3.4174	2.5677	2.9602	18.4143	2.9329	1.7597	3.0184
SW_7	3.2185	2.5900	2.7556	18.4143	2.9329	0.0000	3.0184
SW_8	3.2185	2.5799	2.7556	18.4143	2.9329	0.0000	3.0184
SW_9	3.2416	2.5733	2.7815	20.5315	3.5511	0.0000	3.2608
SW_{10}	3.4366	2.5697	2.9770	27.8639	2.0907	1.3090	2.8360
SW_{11}	4.2652	4.0014	4.2621	29.7533	4.0782	2.7768	4.6448
SW_{12}	4.9494	5.0063	4.9787	27.8503	4.8621	3.3476	5.2601
Total	**46.3187**	**39.6302**	**42.6653**	**315.4781**	**42.4006**	**31.6394**	**44.4589**
Ground Water Releases, ha.m							
GW_1	14.8848	8.7278	8.4188	27.1601	14.9307	13.7179	13.1689
GW_2	15.2411	8.7795	8.4304	27.1499	14.9060	15.0000	13.2638
GW_3	7.1287	5.7064	5.5670	26.2334	4.4954	0.0000	6.4779
GW_4	7.0977	5.7064	5.5670	26.2148	4.4564	0.0000	6.4779
GW_5	7.0977	5.7064	5.5670	26.2148	4.4564	0.0000	6.4779
GW_6	7.9152	5.7064	6.4973	35.6780	8.8649	2.3504	10.3876
GW_7	8.6531	10.6025	10.5757	19.7017	5.4588	13.5271	5.1414
GW_8	8.6531	10.9375	10.5757	19.7017	5.4588	13.5271	5.1414
GW_9	9.3801	11.1451	10.8377	34.6180	12.7232	13.6349	12.6504
GW_{10}	10.6961	10.6025	11.4065	19.7017	5.4588	13.7768	5.1414
GW_{11}	8.4082	8.4023	8.3324	27.1126	6.4809	4.8077	7.6410
GW_{12}	13.9885	8.5710	8.3802	27.1353	14.7612	9.6581	12.8698
Total	**119.1443**	**100.5938**	**100.1557**	**316.6220**	**102.4515**	**100.0000**	**104.8394**
Optimal Benefits, Rs./ha.m	**74,19,500**	**37,18,800**	**25,54,800**	**68,11,600**	**38,68,700**	**164,99,000**	**44,44,900**

Table 7.210: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Umbhrat Branch Canal upto 58 R.D. for Space Integration Strategy

Name of Minor	Mahuwa	Malekpur	Nizar	Pera distributary
Optimal Irrigation Intensity,%	**200**	**250**	**270**	**160**
Area Irrigated, ha				
A_1	2.2726	27.9144	1.1654	60.9001
A_2	0.0000	0.0000	0.0000	63.7318
A_3	0.0000	0.0000	0.0000	53.8203
A_4	7.6428	0.0000	6.7150	62.6439
A_5	99.9835	98.7893	99.9819	155.8066
A_6	0.0000	0.0000	0.2540	0.0000
A_7	0.6110	0.0000	0.2274	0.0000
A_8	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000
A_{10}	4.2044	8.5135	4.5714	88.6498
Total	**114.7143**	**135.2172**	**112.9151**	**485.5525**
Surface Water Releases, ha.m				
SW_1	4.7404	1.4735	4.7991	37.7089
SW_2	4.9924	5.8278	4.9867	37.7212
SW_3	2.7324	5.6941	2.4143	33.0661
SW_4	3.0116	5.8978	2.3866	33.0423
SW_5	3.0752	5.9385	2.3766	32.888
SW_6	2.4655	5.4313	2.4027	32.6384
SW_7	2.2218	5.0985	2.3286	32.7942
SW_8	2.2218	5.0985	2.3286	32.7942
SW_9	2.2218	5.0985	2.3286	32.7942
SW_{10}	2.5518	5.5268	2.4121	32.5532
SW_{11}	3.8909	5.6513	3.7201	34.2536
SW_{12}	4.9789	5.7532	4.9709	36.6183
Total	**39.1045**	**62.4898**	**37.4549**	**408.8726**
Ground Water Releases, ha.m				
GW_1	9.0449	11.022	11.222	48.882
GW_2	9.0427	11.022	11.2193	49.0433
GW_3	5.8778	9.8517	0.0678	42.6311
GW_4	5.871	9.8517	0.0581	42.6311
GW_5	5.871	9.8517	0.0581	42.6311
GW_6	5.871	9.8517	0.0581	42.6311
GW_7	10.027	15.2857	13.5883	42.1985
GW_8	10.2002	8.7347	13.8606	32.7512
GW_9	10.2002	8.7347	13.8606	32.7512
GW_{10}	9.9966	13.0865	13.6728	44.3776
GW_{11}	9.0773	11.022	11.2305	43.2812
GW_{12}	9.0595	11.022	11.223	48.3813
Total	**100.1392**	**129.3364**	**100.1192**	**512.1907**
Optimal Benefits, Rs./ha.m	**28,91,900**	**24,86,900**	**27,88,600**	**3,12,32,000**

Table 7.211: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Umbhrat Branch Canal beyond 58 R.D. for Space Integration Strategy

Name of Minor	Bhinar	Borsi	Kalkachha	Kasba	Maroli	Nagod	Umrath
Optimal Irrigation Intensity,%	**130**	**10**	**160**	**230**	**80**	**100**	**120**
Area Irrigated, ha							
A_1	0.1535	0.0000	0.0000	0.1532	17.0488	0.0616	17.3182
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	145.4135	66.7380	38.7131	130.0070	90.6715	72.1309	100.9602
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	35.4443	0.0000	66.5721	61.7653	32.3415	30.6806	33.1591
Total	**181.0113**	**66.7380**	**105.2852**	**191.9255**	**140.0618**	**102.8731**	**151.4375**
Surface Water Releases, ha.m							
SW_1	66.3267	0.0083	21.1937	63.262	12.0001	20.4756	11.9577
SW_2	65.4014	0.0083	18.0793	61.9892	12.1588	25.5674	13.5596
SW_3	63.2087	0.0083	21.1864	59.4771	8.6486	8.1295	8.0839
SW_4	59.6211	0.0083	21.1368	56.7517	8.7777	9.5825	7.9726
SW_5	58.6664	0.0083	21.1249	56.0689	8.8074	9.9975	7.9281
SW_6	66.4442	0.0083	20.4333	60.819	8.4058	6.9406	8.0324
SW_7	67.9822	0.0083	20.4333	64.561	8.4058	6.4904	7.9028
SW_8	67.9822	0.0083	20.4333	64.561	8.4058	6.4904	7.9028
SW_9	67.9822	0.0083	21.1078	64.561	8.5092	6.4904	7.9028
SW_{10}	66.1437	0.0083	21.1874	61.2288	8.6443	7.0413	8.0476
SW_{11}	66.1097	0.0083	18.1866	61.486	10.0241	13.2071	9.1387
SW_{12}	65.5188	0.0083	18.4534	62.1334	12.1396	24.5627	12.578
Total	**781.3873**	**0.0996**	**242.9562**	**736.8991**	**114.9272**	**144.9754**	**111.0070**
Ground Water Releases, ha.m							
GW_1	81.4463	15.2853	15.942	73.5654	13.8711	35.1468	14.1546
GW_2	79.2842	15.2853	15.942	73.5654	13.8711	35.1468	14.1546
GW_3	79.2843	15.2801	15.9159	73.5658	13.8727	35.0936	14.2249
GW_4	79.2843	15.2801	15.9159	73.5658	13.8727	35.0936	14.2249
GW_5	79.2843	15.2801	15.9159	73.5658	13.8727	35.0936	14.2249
GW_6	79.2843	15.2801	17.1119	73.8398	13.8519	35.0936	14.2249
GW_7	79.2842	15.2843	15.324	73.565	13.8835	35.2085	14.0844
GW_8	79.2842	15.2843	15.324	73.565	13.8835	35.2085	14.0844
GW_9	79.2842	15.2843	15.9727	73.565	13.8747	35.2085	14.0844
GW_{10}	79.536	15.2844	15.9724	74.118	13.8744	35.2439	14.0425
GW_{11}	79.2842	15.2853	15.942	73.5654	13.8711	35.1468	14.1546
GW_{12}	79.2842	15.2854	15.942	73.5654	13.8711	35.1468	14.1546
Total	**953.8247**	**183.3990**	**191.2207**	**883.6118**	**166.4705**	**421.8310**	**169.8137**
Optimal Benefits, Rs./ha.m	**1,15,06,000**	**18,72,500**	**13,99,300**	**90,12,200**	**10,81,300**	**39,75,800**	**12,65,200**

Table 7.212: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Navsari Branch Canal for Space Integration Strategy

Name of Minor	Dandeswar	Dandi	Machhad	Onjal	Sadlav	Vachharvad	Veraval
Optimal Irrigation Intensity,%	**270**	**70**	**50**	**50**	**270**	**240**	**240**
Area Irrigated, ha							
A_1	15.1589	25.8555	27.4973	12.0988	10.8000	8.3320	3.6485
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	30.0428	23.5605	0.0000	25.8320	0.0000	4.2943	0.0268
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	119.2616	93.8217	39.3582	99.0139	182.5125	159.3713	115.8172
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	61.7598	16.1402	0.0335	28.7591	0.5965	49.5267	4.7295
Total	**226.2231**	**159.3779**	**66.8890**	**165.7038**	**193.9090**	**221.5243**	**124.2220**
Surface Water Releases, ha.m							
SW_1	27.5176	9.9212	28.6877	8.1059	39.4924	23.5192	23.5000
SW_2	27.4266	16.2350	23.8796	3.7954	42.3426	20.3962	19.0107
SW_3	11.5616	14.8222	37.0686	10.1773	38.8349	40.5070	23.8821
SW_4	11.5589	15.7627	37.2694	10.2636	38.9338	40.0525	22.5937
SW_5	11.5584	15.9901	37.2348	10.2818	38.9667	39.9550	22.2264
SW_6	11.5620	13.4131	36.2151	9.9771	38.8280	40.5869	24.3766
SW_7	11.5676	13.4131	36.2151	9.9771	39.0882	41.5530	25.2027
SW_8	11.5676	13.4131	36.2151	10.0362	39.0882	41.5530	25.2027
SW_9	11.5676	13.4131	36.2151	9.9771	39.0882	41.5530	25.2027
SW_{10}	11.5628	14.2708	36.7720	10.0547	38.8244	40.7273	24.5069
SW_{11}	14.2749	19.6978	33.7811	10.5831	90.8491	3.7700	21.5404
SW_{12}	27.4597	13.5254	25.1719	4.6705	41.9918	20.7474	20.1970
Total	**189.1853**	**173.8776**	**404.7255**	**107.8998**	**526.3283**	**394.9205**	**277.4419**
Ground Water Releases, ha.m							
GW_1	19.5240	15.2853	33.4708	13.9444	51.5126	22.9672	28.1420
GW_2	19.5240	15.2853	33.4708	15.0305	51.5126	22.9672	28.1420
GW_3	18.5995	15.2825	33.4463	8.0803	51.4501	47.9718	29.1285
GW_4	18.5995	15.2825	33.4463	8.0803	51.4501	47.9718	29.1285
GW_5	18.5995	15.2825	33.4463	8.0803	51.4501	47.9718	29.1285
GW_6	18.7411	15.2825	33.4463	8.0803	52.1161	49.3681	29.4510
GW_7	18.7112	15.2826	33.4934	8.2179	51.5811	47.6676	29.0716
GW_8	18.7112	15.2826	33.4934	14.0790	51.5811	47.6676	29.0716
GW_9	18.7112	15.2826	33.4934	8.2179	51.5811	47.6676	29.0716
GW_{10}	18.9285	15.2829	33.5638	12.1941	52.5247	49.5057	29.7271
GW_{11}	18.6595	15.2825	33.4708	9.2883	51.5126	47.8227	29.1013
GW_{12}	19.5240	15.2853	33.4708	13.9450	51.5126	22.9672	28.1420
Total	**226.8332**	**183.3991**	**401.7124**	**127.2383**	**619.7848**	**502.5163**	**347.3057**
Optimal Benefits, Rs./ha.m	**41,64,100**	**15,11,900**	**56,08,500**	**31,99,500**	**70,35,900**	**22,89,300**	**34,76,700**

Table 7.213: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Amalsad Branch Canal for Space Integration Strategy

Name of Minor	Abrama	Arda	Chijgam	Devdha	Mandher	Masa	Panar
Optimal Irrigation Intensity	110	220	190	240	70	170	150
Area Irrigated, ha							
A_1	1.1590	0.3629	5.9421	2.5579	3.0514	12.0919	7.6169
A_2	18.0587	0.0000	13.8089	4.7857	0.0000	0.0000	1.7084
A_3	19.8877	102.9741	15.2131	18.4003	23.8047	24.6725	17.2676
A_4	23.1240	0.0000	48.4983	26.6313	0.9695	4.2740	20.2454
A_5	95.3604	308.8309	91.3815	85.8969	98.4391	93.3396	91.8099
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	30.3373	127.3129	22.7411	36.9890	30.9038	28.6793	31.5757
Total	**187.9271**	**539.4808**	**197.5850**	**175.2611**	**157.1685**	**163.0573**	**170.2239**
Surface Water Releases, ha.m							
SW_1	15.2422	91.5411	15.4574	13.3918	15.1709	11.8389	12.8663
SW_2	15.6079	89.048	17.2946	14.1866	14.9098	12.6045	12.5683
SW_3	10.3858	89.4372	9.2229	7.6471	8.1925	9.3623	9.0781
SW_4	10.402	87.9196	9.3154	7.624	8.1625	9.4603	9.0557
SW_5	10.301	87.5948	9.2562	7.6276	8.1564	9.4823	9.1073
SW_6	10.1085	90.3039	8.9509	7.6693	8.1979	9.2631	9.2356
SW_7	10.094	92.9714	8.8734	7.7399	8.2709	9.1604	9.2613
SW_8	10.094	92.9714	8.8734	7.7399	8.2709	9.1604	9.2613
SW_9	10.0564	92.9714	8.9336	7.7399	8.2709	9.3021	9.2624
SW_{10}	10.1085	90.5829	9.0127	7.6825	8.2077	9.359	9.2262
SW_{11}	11.7299	89.6329	10.1306	9.482	8.8127	10.6372	10.4666
SW_{12}	14.6575	89.335	16.3248	14.3716	14.9402	12.507	13.5767
Total	**138.7877**	**1084.3096**	**131.6459**	**112.9022**	**119.5633**	**122.1375**	**122.9658**
Ground Water Releases, ha.m							
GW_1	14.5519	106.6956	14.7096	13.4344	13.8969	14.4375	14.0854
GW_2	14.5599	106.6956	14.5352	13.4447	13.8853	14.438	14.086
GW_3	14.6232	112.4301	15.0728	13.4435	13.8944	14.2157	14.0808
GW_4	14.6232	112.4301	15.0728	13.4435	13.8944	14.2157	14.0808
GW_5	14.6232	112.4301	15.0728	13.4435	13.8944	14.2157	14.0808
GW_6	14.6232	113.1144	15.0728	13.364	13.4963	14.2157	14.0808
GW_7	14.3309	112.6547	14.9342	13.3713	13.6674	14.2435	13.9849
GW_8	14.3309	112.6547	14.9342	13.3713	13.6674	14.2435	13.9849
GW_9	14.6668	112.6547	14.4795	13.3713	13.6674	14.4327	14.0029
GW_{10}	13.9288	114.0647	14.4467	13.323	13.2794	14.3388	13.9157
GW_{11}	14.413	112.5493	14.7847	13.3835	13.8125	14.2297	14.0015
GW_{12}	14.666	106.6956	15.111	13.444	13.9225	14.4401	14.0647
Total	**173.9410**	**1335.0696**	**178.2263**	**160.8380**	**164.9783**	**171.6666**	**168.4492**
Optimal Benefits, Rs./ha.m	**82,56,000**	**31,06,200**	**1,02,28,000**	**67,75,800**	**24,99,800**	**28,57,200**	**50,23,300**

Table 7.214: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Valsad Branch Canal for Space Integration Strategy

Name of Minor	Minkachh	Matvad	Khapariya	Gadat	Pati
Optimal Irrigation Intensity,%	**200**	**200**	**140**	**160**	**130**
Area Irrigated, ha					
A_1	941.2300	646.9741	253.3300	510.0000	625.5400
A_2	0.0000	6.7881	0.0000	5.8000	0.0000
A_3	389.7400	350.7185	224.1000	1092.0000	288.4100
A_4	0.0000	2.2627	0.0000	35.1000	0.0057
A_5	17.5400	33.9405	38.9700	380.0000	144.2100
A_6	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	327.0374	230.7954	10.2036	613.0000	307.9000
TOTAL	**1675.5474**	**1271.4793**	**526.6036**	**2885.0000**	**1366.0657**
Surface Water Releases, ha.m					
SW_1	186.6955	206.3597	77.5191	0.0000	46.1469
SW_2	188.5458	209.2744	75.8862	0.0000	58.0256
SW_3	0.0000	0.0000	0.0000	0.0000	0.0000
SW_4	0.0000	0.0000	0.0000	0.0000	0.0000
SW_5	0.0000	0.0000	0.0000	0.0000	0.0000
SW_6	0.0000	0.0000	0.0000	0.0000	0.0000
SW_7	0.0000	0.0000	0.0000	0.0000	0.0000
SW_8	0.0000	0.0000	0.0000	0.0000	0.0000
SW_9	232.5400	298.1100	21.1580	380.0000	213.4700
SW_{10}	186.0300	270.0600	56.0470	326.2000	193.0300
SW_{11}	99.8099	216.0981	25.8180	272.8000	128.2004
SW_{12}	139.9784	240.9278	39.8999	297.4000	158.4008
Total	**1033.6164**	**1440.8449**	**296.3291**	**1275.9000**	**797.2822**
Ground Water Releases, ha.m					
GW_1	229.4614	296.4918	71.2700	352.3000	225.6781
GW_2	197.2030	276.9134	59.9612	333.0000	201.4249
GW_3	161.9500	254.4200	47.6050	310.7000	174.9200
GW_4	129.6994	234.3902	36.2964	290.0000	150.6726
GW_5	182.2686	266.9829	54.7256	321.0000	190.1965
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	491.7456	448.7143	161.6235	773.0000	484.6520
GW_8	243.3900	304.9600	75.0400	354.0000	235.9100
GW_9	0.0000	0.0000	0.0000	0.0000	0.0000
GW_{10}	0.0000	0.0000	0.0000	0.0000	0.0000
GW_{11}	237.3900	289.6396	160.4896	272.0000	219.3700
GW_{12}	222.4558	264.8131	77.2731	47.0000	146.4600
Total	**2095.5000**	**2637.3000**	**744.2800**	**3055.0000**	**2029.3000**
Optimal Benefits, Rs./ha.m	**40,94,900**	**29,37,000**	**10,17,800**	**10,28,800**	**39,78,800**

Table 7.214: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Valsad Branch Canal for Space Integration Strategy (contd.)

Name of Minor	Dhakawad	Bamanvel	Khambada	Dhamadachi	Chanvai distributary
Optimal Irrigation Intensity,%	**270**	**290**	**140**	**110**	**120**
Area Irrigated, ha					
A_1	136.4100	392.9900	415.0800	23.3800	779.4900
A_2	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	62.3600	166.3700	122.7700	0.0064	37.0300
A_4	9.7400	3.9300	0.0000	0.0000	0.0000
A_5	35.0800	0.0000	3.9000	0.0000	132.5100
A_6	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	261.1300	134.9300	13.8608	58.4600	615.7900
TOTAL	**504.7200**	**698.2200**	**555.6108**	**81.8464**	**1564.8200**
Surface Water Releases, ha.m					
SW_1	28.7160	86.4944	125.6573	46.7058	27.8442
SW_2	32.6880	88.4172	123.9467	47.7243	47.7404
SW_3	0.0000	0.0000	0.0000	0.0000	0.0000
SW_4	0.0000	0.0000	0.0000	0.0000	0.0000
SW_5	0.0000	0.0000	0.0000	0.0000	0.0000
SW_6	0.0000	0.0000	0.0000	0.0000	0.0000
SW_7	0.0000	0.0000	0.0000	0.0000	0.0000
SW_8	0.0000	0.0000	0.0000	0.0000	0.0000
SW_9	171.8500	142.9240	25.1940	0.0000	833.5210
SW_{10}	161.9700	111.4110	50.5460	0.0000	268.5540
SW_{11}	147.9840	74.0409	3.5313	57.9089	183.9238
SW_{12}	154.5007	91.4495	25.4327	47.7243	223.3478
Total	**697.7182**	**594.7377**	**354.3089**	**200.0633**	**1584.9317**
Ground Water Releases, ha.m					
GW_1	169.0172	130.2301	74.2223	72.5677	311.1729
GW_2	163.7841	116.2504	56.6338	71.5864	279.5110
GW_3	158.0600	100.9750	37.4160	70.5140	244.9180
GW_4	152.8333	86.9947	19.8282	69.5330	213.2592
GW_5	161.3612	109.7777	48.4910	71.1325	264.8538
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	348.4348	284.6579	191.0327	163.6992	693.2950
GW_8	171.2300	136.2410	82.2530	74.7020	327.2760
GW_9	0.0000	0.0000	0.0000	0.0000	0.0000
GW_{10}	0.0000	0.0000	0.0000	72.3202	0.0000
GW_{11}	144.1734	125.5836	185.5530	71.1500	277.5885
GW_{12}	110.3643	116.5803	102.5405	71.6956	186.9946
Total	**1579.2000**	**1207.0000**	**797.9700**	**808.9000**	**2798.8700**
Optimal Benefits, Rs./ha.m	**1,87,310**	**1,62,360**	**9,52,220**	**1,86,410**	**5,38,840**

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Surat branch canal, for space integration strategy are illustrated in Fig.7.35, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Bardoli branch canal, for space integration strategy are illustrated in Fig.7.36, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Chalthan branch canal, for space integration strategy are illustrated in Fig.7.37, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Umbhrat branch canal upto 58 R.D., for space integration strategy are illustrated in Fig.7.38, enclosed in C.D.

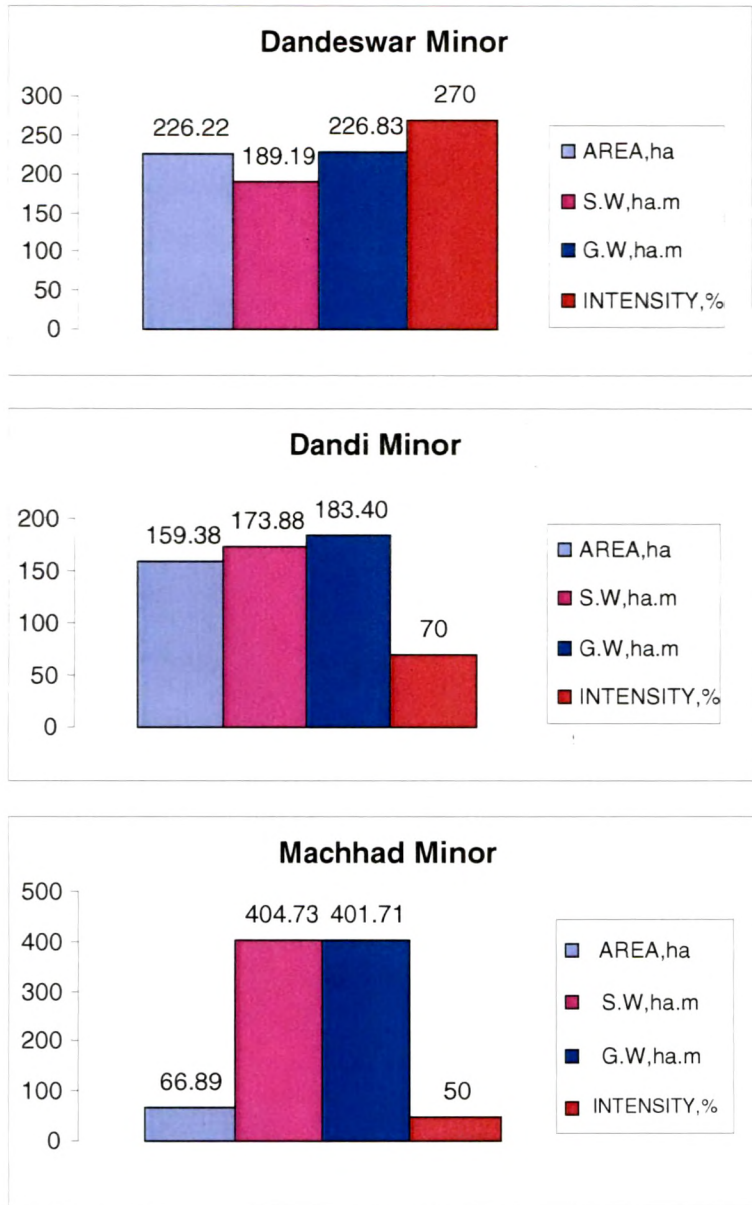
Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Umbhrat branch canal beyond 58 R.D., for space integration strategy are illustrated in Fig.7.39, enclosed in C.D.

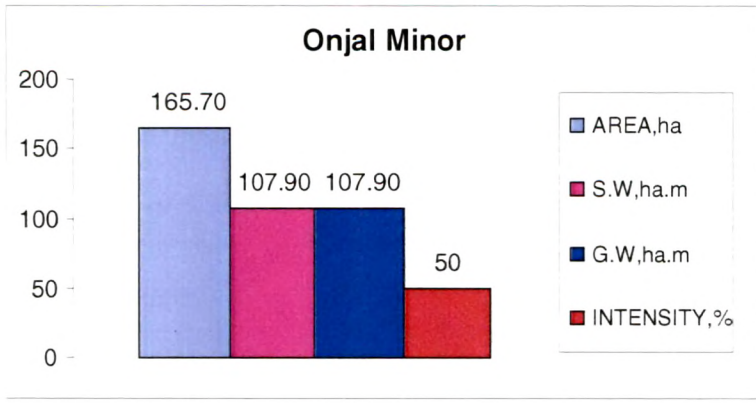
Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Navsari branch canal, for space integration strategy are illustrated in Fig.7.40.

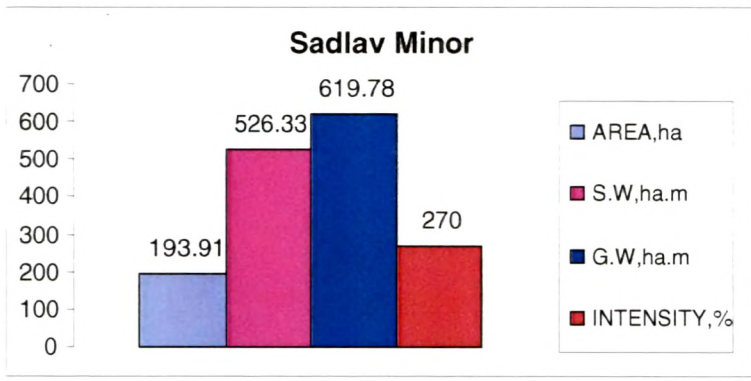
Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Amalsad branch canal, for space integration strategy are illustrated in Fig.7.41, enclosed in C.D.

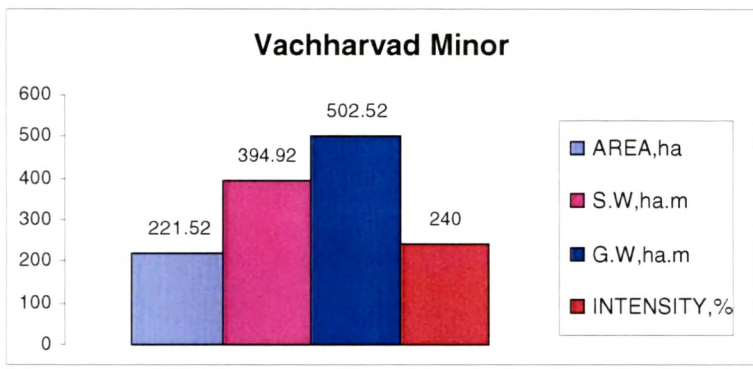
Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Valsad branch canal, for space integration strategy are illustrated in Fig.7.42, enclosed in C.D.

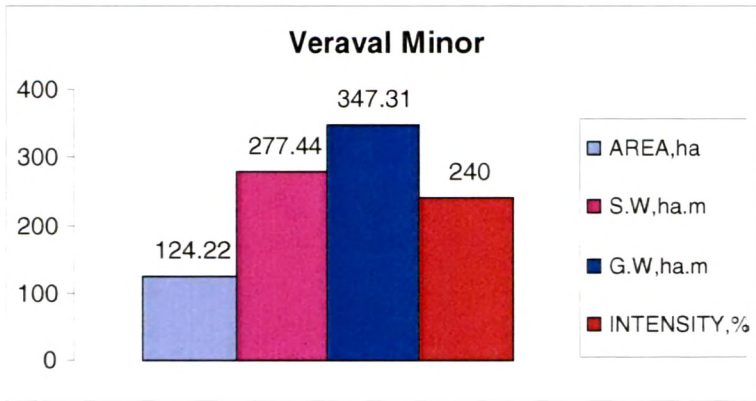
Fig. 7.40: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Navsari Branch Canal, for Space Integration Strategy

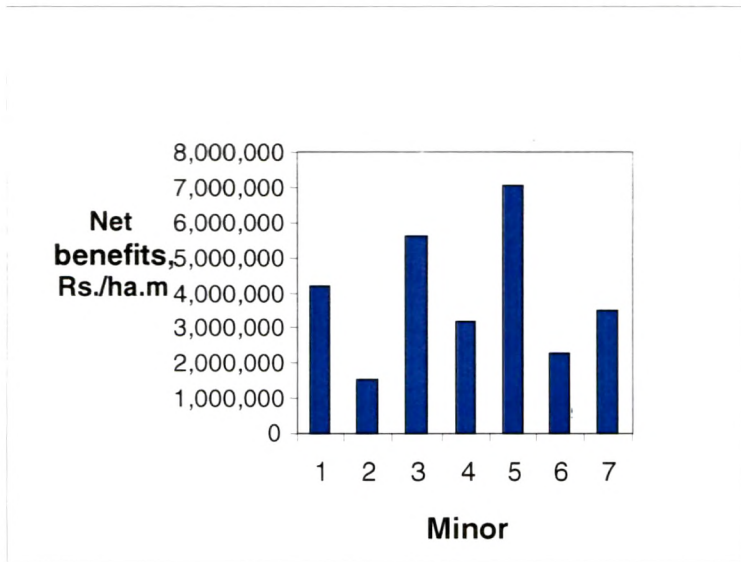



Onjal Minor
200
150
100
50
0
165.70
107.90
107.90
50
AREA,ha
S.W,ha.m
G.W,ha.m
INTENSITY,%


Sadlav Minor
700
600
500
400
300
200
100
0
193.91
526.33
619.78
270
AREA,ha
S.W,ha.m
G.W,ha.m
INTENSITY,%


Vachharvad Minor
600
500
400
300
200
100
0
221.52
394.92
502.52
240
AREA,ha
S.W,ha.m
G.W,ha.m
INTENSITY,%


Veraval Minor
400
300
200
100
0
124.22
277.44
347.31
240
AREA,ha
S.W,ha.m
G.W,ha.m
INTENSITY,%


Net benefits, Rs./ha.m
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1 2 3 4 5 6 7
Minor

The results of sensitivity analysis for Surat branch canal, in which net benefits considering different changes in unit cost of surface water determined, for space integration strategy are illustrated in Fig.7.43, enclosed in C.D.

The results of sensitivity analysis for Bardoli branch canal, in which net benefits considering different changes in unit cost of surface water determined, for space integration strategy are illustrated in Fig.7.44, enclosed in C.D.

The results of sensitivity analysis for Chalthan branch canal, in which net benefits considering different changes in unit cost of surface water determined, for space integration strategy illustrated in Fig.7.45, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal upto 58 R.D., in which net benefits considering different changes in unit cost of surface water determined, for space integration strategy are illustrated in Fig.7.46, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal beyond 58 R.D., in which net benefits considering different changes in unit cost of surface water determined, for space integration strategy are illustrated in Fig.7.47, enclosed in C.D.

The results of sensitivity analysis for Navsari branch canal, in which net benefits considering different changes in unit cost of surface water determined, for space integration strategy are illustrated in Fig.7.48.

The results of sensitivity analysis for Amalsad branch canal, in which net benefits considering different changes in unit cost of surface water determined, for space integration strategy are illustrated in Fig.7.49, enclosed in C.D.

The results of sensitivity analysis for Valsad branch canal, in which net benefits considering different changes in unit cost of surface water determined, for space integration strategy are illustrated in Fig.7.50, enclosed in C.D.

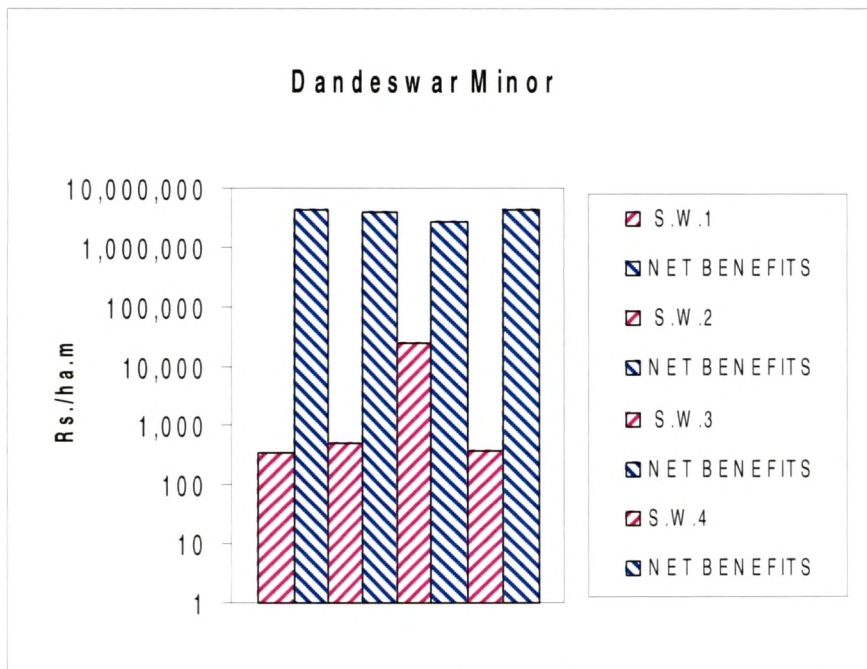
Fig. 7.48: Sensitivity Analysis: Net Benefits Considering Different Changes in Unit Cost of Surface Water and Unit Cost of Ground Water for Navsari Branch Canal, for Space Integration Strategy

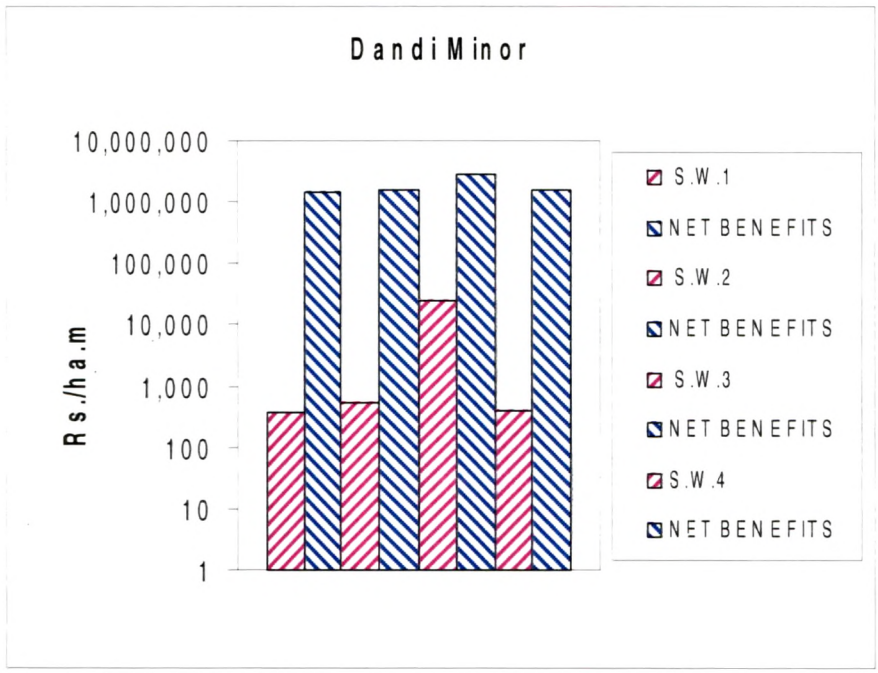
N.B.: S.W.1 = Unit cost of surface water charged by the N.W.R.W.S. & K. department to the farmers.

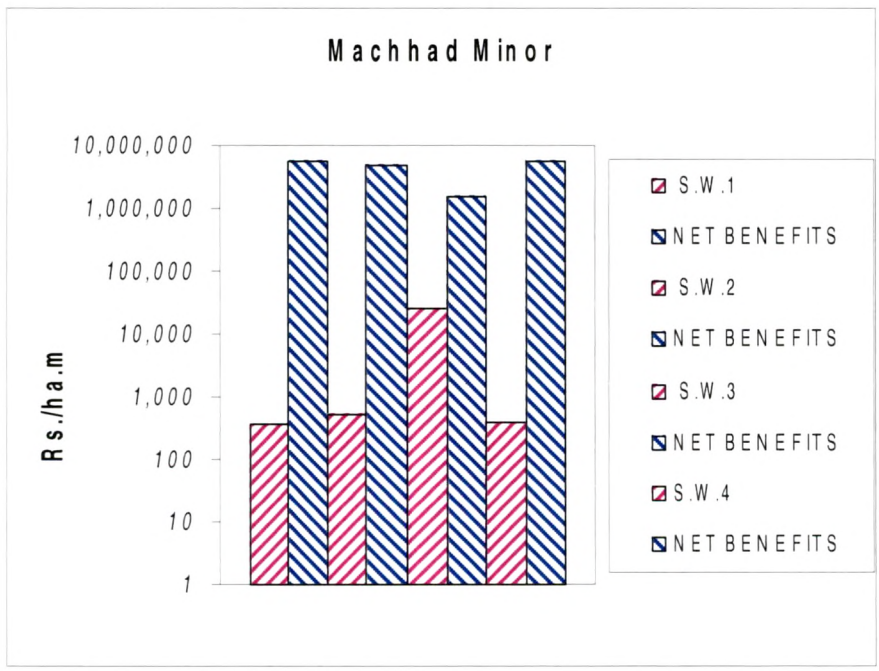
S.W.2 = Actual unit cost of surface water.

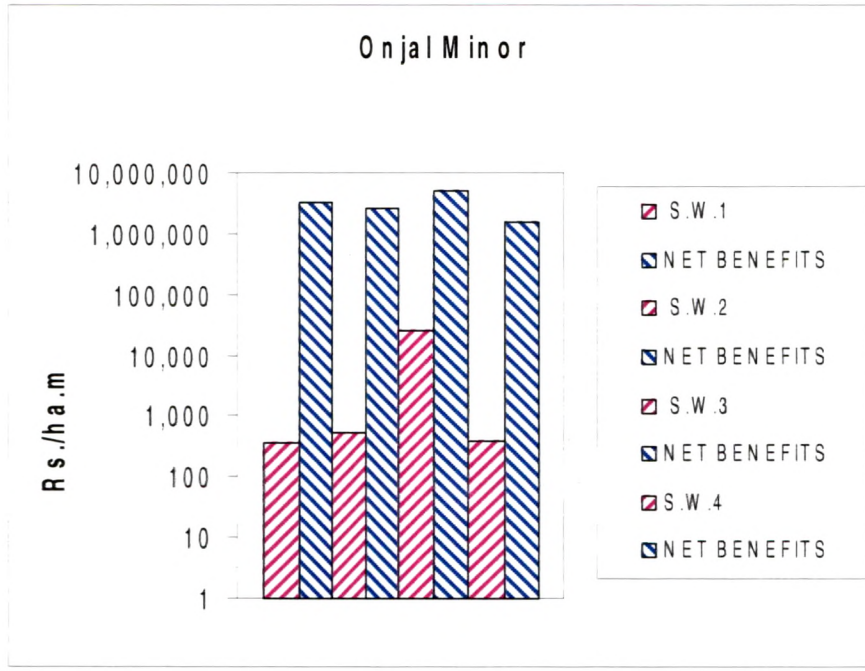
S.W.3 = Unit cost of surface water charged by the N.W.R.W.S. & K. department to the industries.

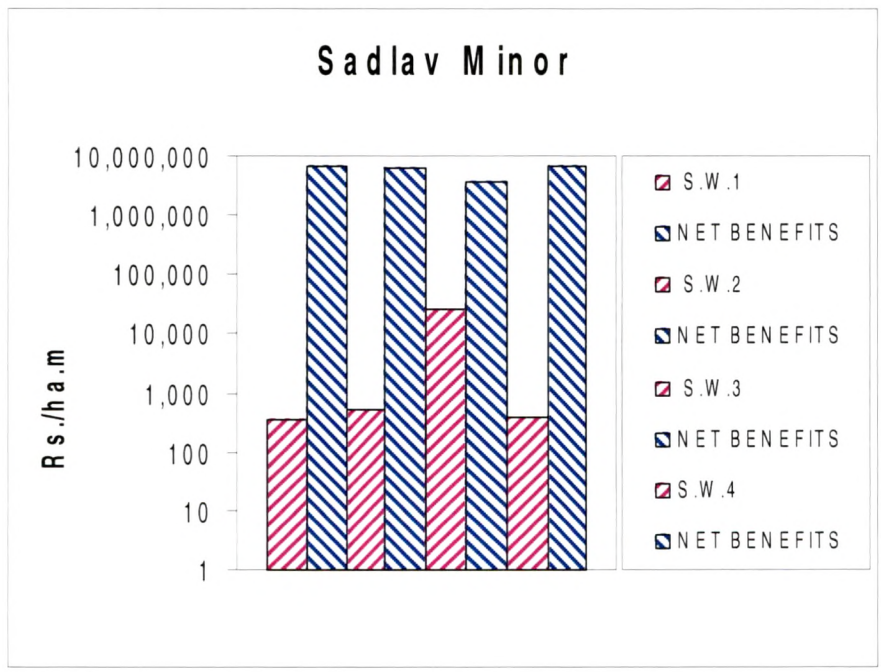
S.W.4 = Actual unit cost of surface water during the last 10 years,i.e. 1999-2000

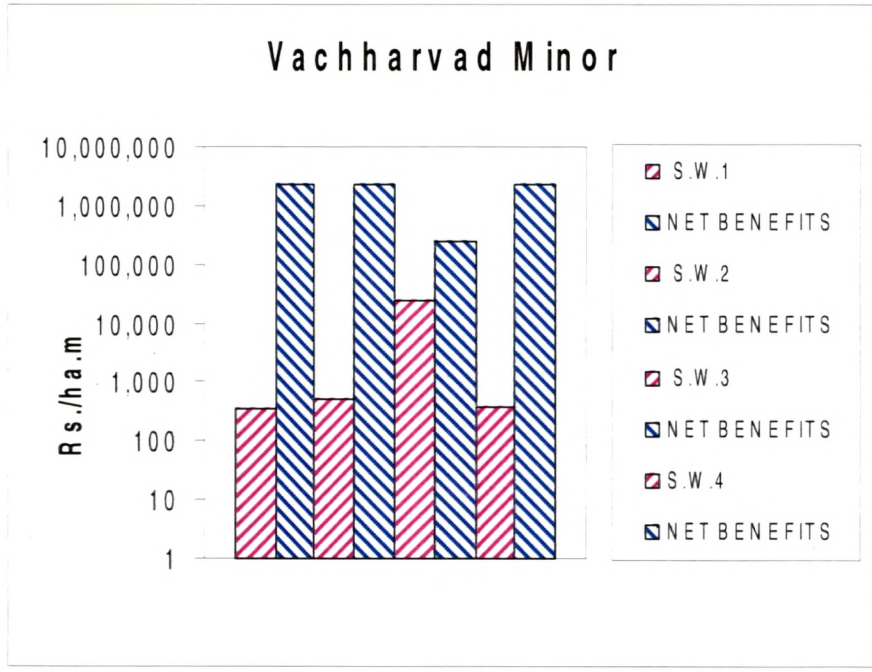


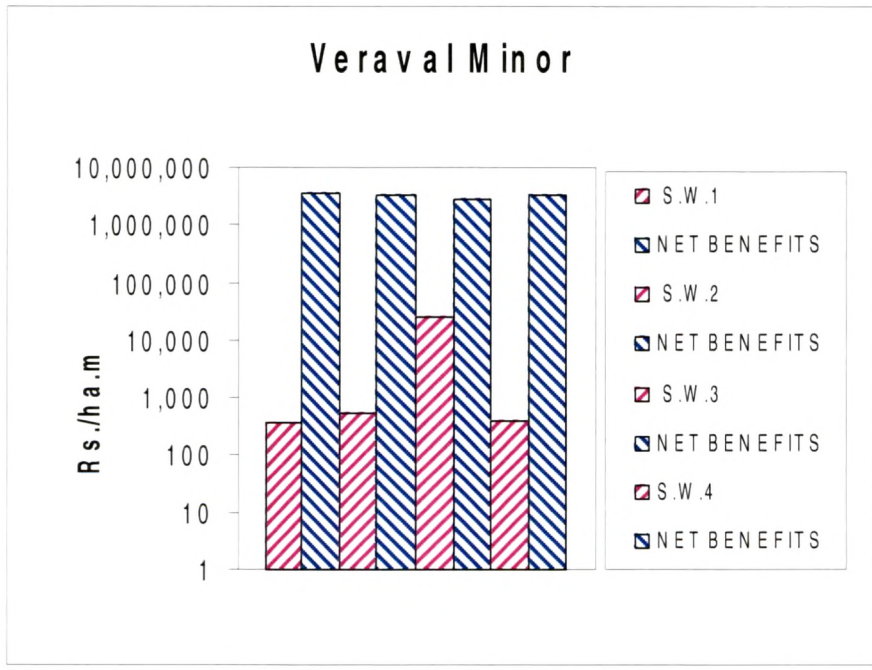

Dandi Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W.1
NET BENEFITS
S.W.2
NET BENEFITS
S.W.3
NET BENEFITS
S.W.4
NET BENEFITS


Machhad Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W.1
NET BENEFITS
S.W.2
NET BENEFITS
S.W.3
NET BENEFITS
S.W.4
NET BENEFITS


Onjal Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W.1
NET BENEFITS
S.W.2
NET BENEFITS
S.W.3
NET BENEFITS
S.W.4
NET BENEFITS


Sadlav Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W.1
NET BENEFITS
S.W.2
NET BENEFITS
S.W.3
NET BENEFITS
S.W.4
NET BENEFITS


Vachharvad Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W.1
NET BENEFITS
S.W.2
NET BENEFITS
S.W.3
NET BENEFITS
S.W.4
NET BENEFITS


Veraval Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W.1
NET BENEFITS
S.W.2
NET BENEFITS
S.W.3
NET BENEFITS
S.W.4
NET BENEFITS

The results of sensitivity analysis for Surat branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for space integration strategy are illustrated in Fig.7.51, enclosed in C.D.

The results of sensitivity analysis for Bardoli branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for space integration strategy are illustrated in Fig.7.52, enclosed in C.D.

The results of sensitivity analysis for Chalthan branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for space integration strategy are illustrated in Fig.7.53, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal upto 58 R.D., in which net benefits considering percentage increase and decrease in selling price/yield determined, for space integration strategy are illustrated in Fig.7.54, enclosed in C.D.

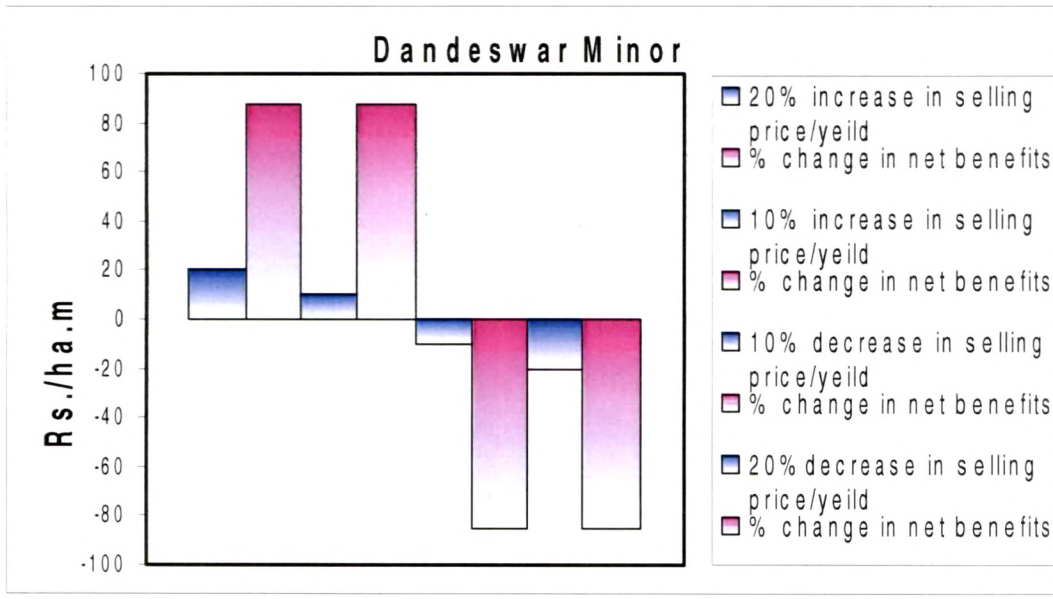
The results of sensitivity analysis for Umbhrat branch canal beyond 58 R.D., in which net benefits considering percentage increase and decrease in selling price/yield determined, for space integration strategy are illustrated in Fig.7.55, enclosed in C.D.

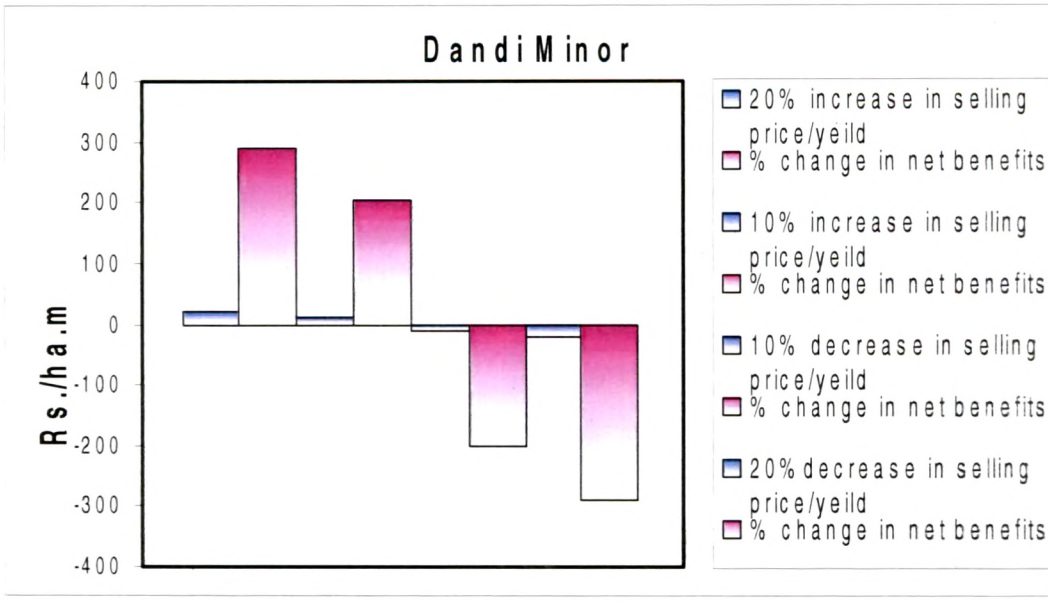
The results of sensitivity analysis for Navsari branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for space integration strategy are illustrated in Fig.7.56.

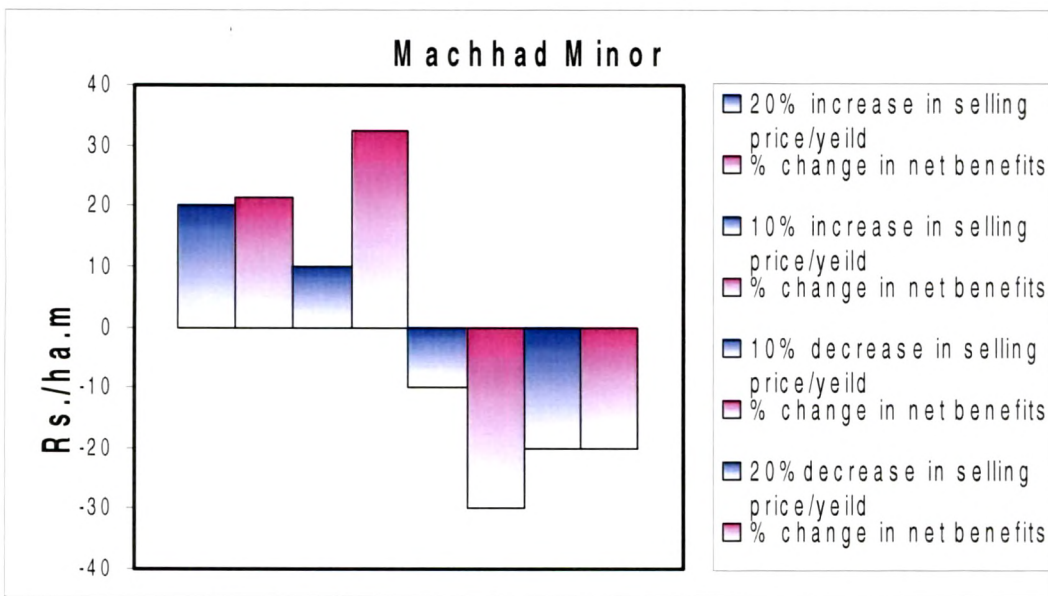
The results of sensitivity analysis for Amalsad branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for space integration strategy are illustrated in Fig.7.57, enclosed in C.D.

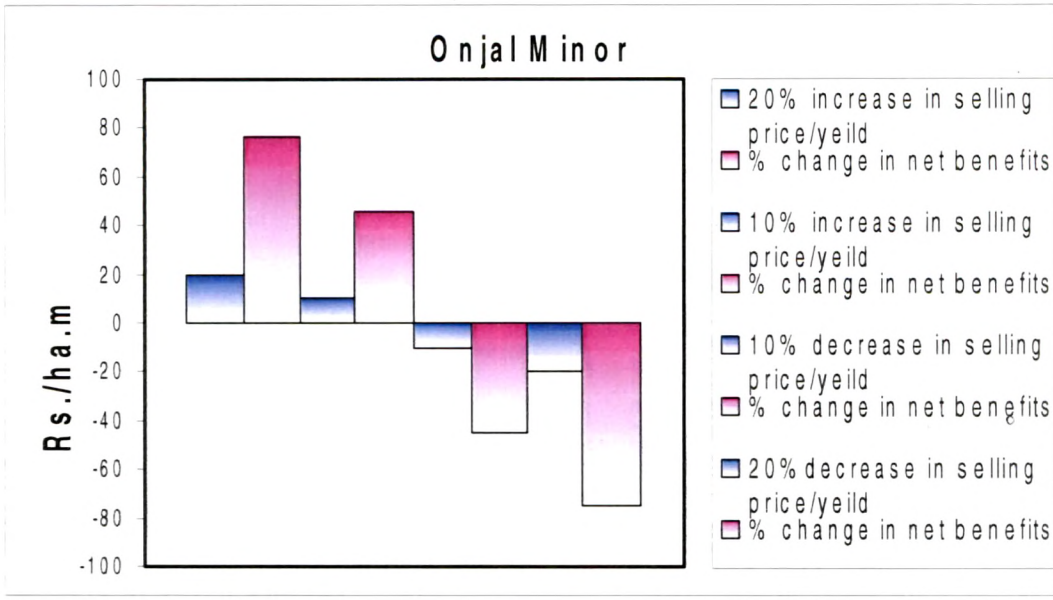
The results of sensitivity analysis for Valsad branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for space integration strategy are illustrated in Fig.7.58, enclosed in C.D.

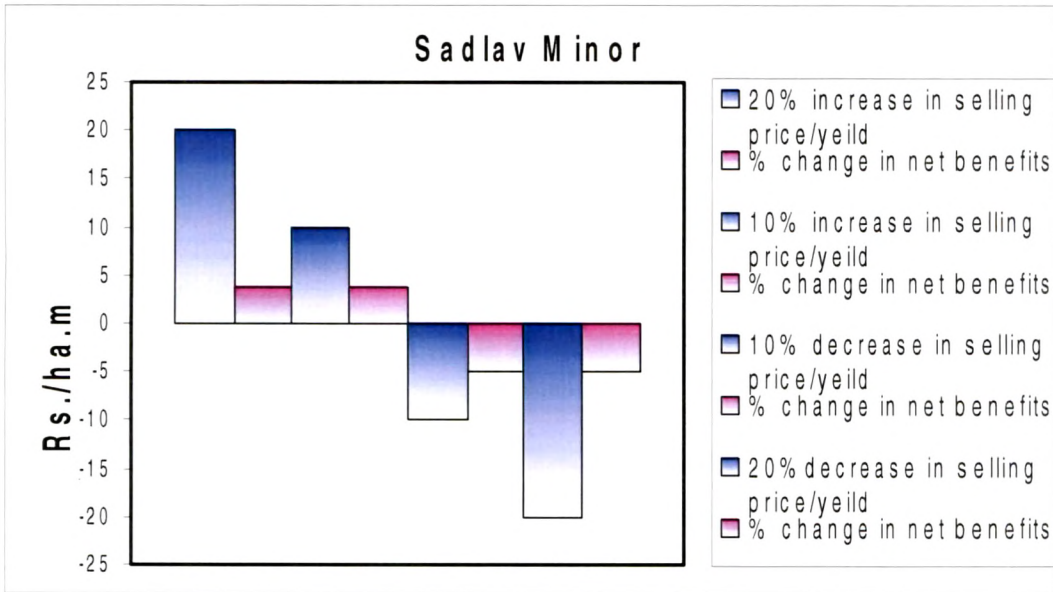
Fig. 7.56 : Sensitivity Analysis: Net Benefits Considering Percentage Increase and Decrease in Selling Price/Yield for Navsari Branch Canal, for Space Integration Strategy

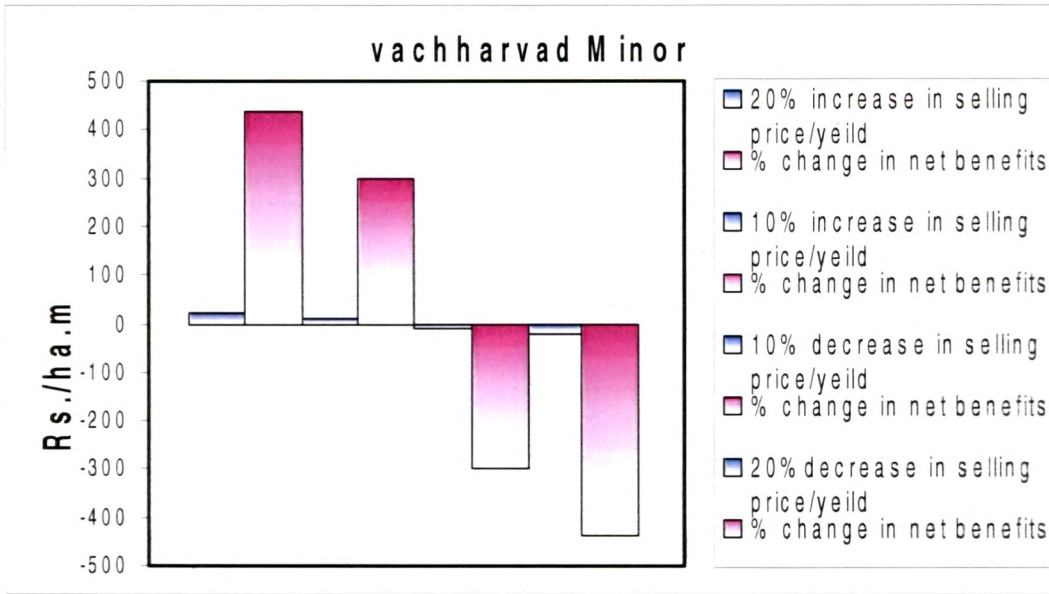


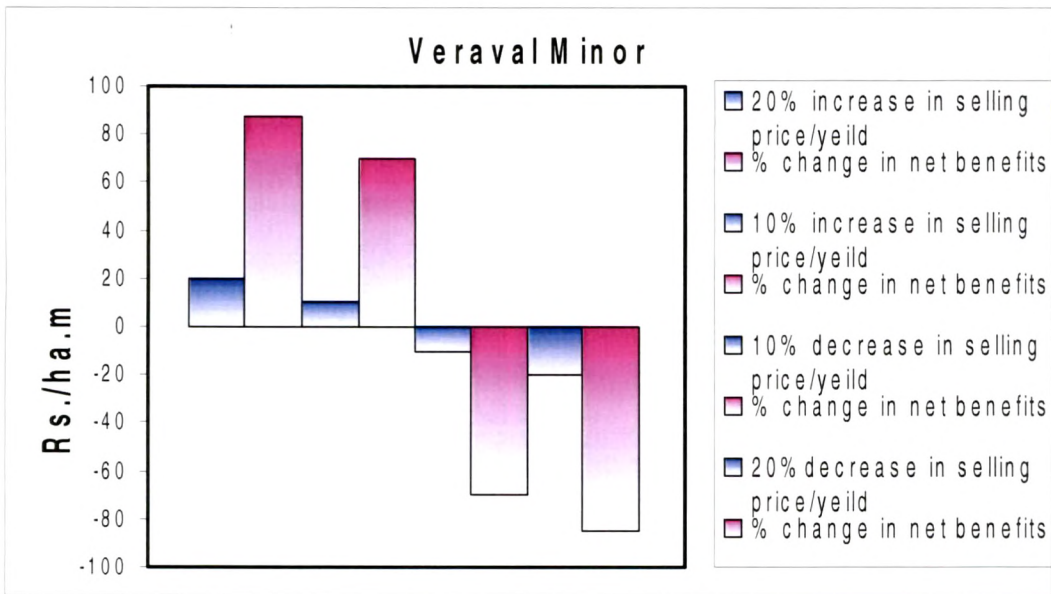

Dandi Minor
400
300
200
100
0
-100
-200
-300
-400
Rs./ha.m
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Machhad Minor
40
30
20
10
0
-10
-20
-30
-40
Rs./ha.m
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Onjal Minor
Rs./ha.m
100
80
60
40
20
0
-20
-40
-60
-80
-100
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Sadlav Minor
Rs./ha.m
25
20
15
10
5
0
-5
-10
-15
-20
-25
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


vachharvad Minor
Rs./ha.m
500
400
300
200
100
0
-100
-200
-300
-400
-500
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Veraval Minor
Rs./ha.m
100
80
60
40
20
0
-20
-40
-60
-80
-100
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits

The results of sensitivity analysis for Surat branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for space integration strategy are illustrated in Fig.7.59, enclosed in C.D.

The results of sensitivity analysis for Bardoli branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for space integration strategy are illustrated in Fig.7.60, enclosed in C.D.

The results of sensitivity analysis for Chalthan branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for space integration strategy are illustrated in Fig.7.61, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal upto 58 R.D., in which net benefits using 10 years average evapotranspiration rate determined, for space integration strategy are illustrated in Fig.7.62, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal beyond 58 R.D., in which net benefits using 10 years average evapotranspiration rate determined, for space integration strategy are illustrated in Fig.7.63, enclosed in C.D.

The results of sensitivity analysis for Navsari branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for space integration strategy are illustrated in Fig.7.64.

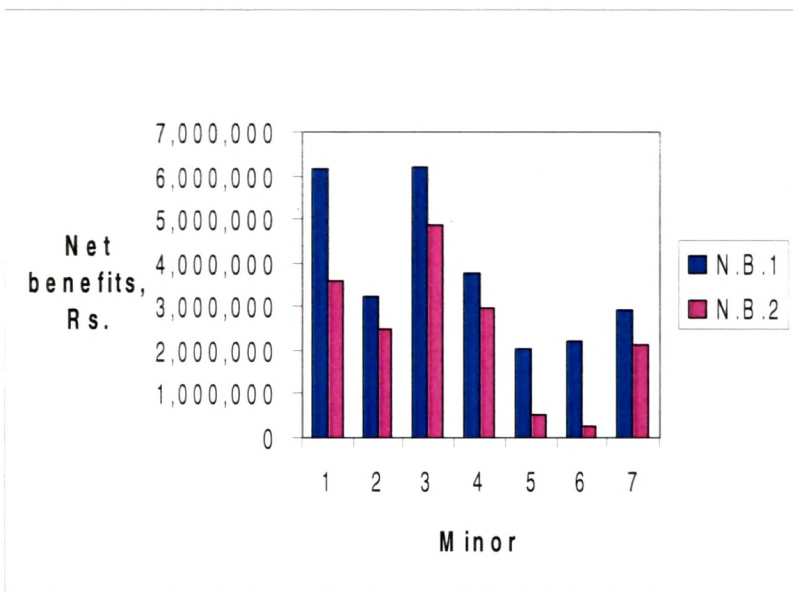
The results of sensitivity analysis for Amalsad branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for space integration strategy are illustrated in Fig.7.65, enclosed in C.D.

The results of sensitivity analysis for Valsad branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for space integration strategy are illustrated in Fig.7.66, enclosed in C.D.

Fig. 7.64: Sensitivity Analysis: Net Benefits Using 10 Years Average Evapotranspiration Rate for Navsari Branch Canal, for Space Integration Strategy

N.B.: N.B.1 = Net benefits obtained using the actual water requirement of the crops during the year 1999-2000

N.B.2 = Net benefits obtained using the actual water requirement of the crops during the last 10 years, i.e. year 1990-1991 to1999-2000

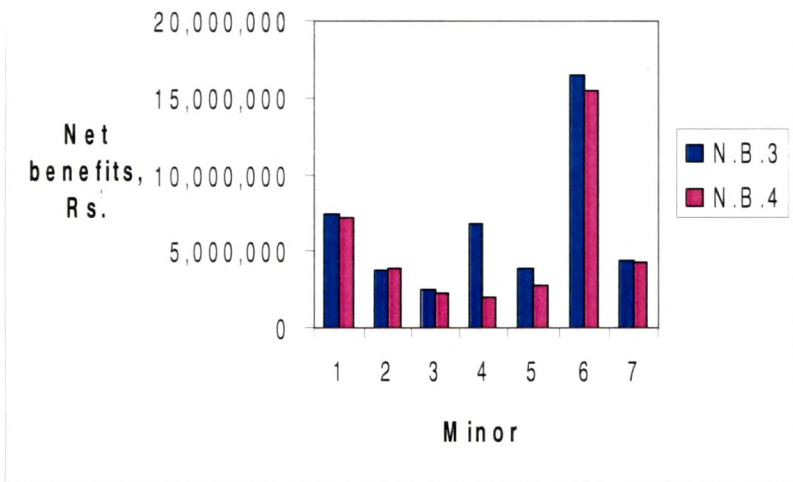


The results of sensitivity analysis using surface water restriction method in Chalthan branch canal, for space integration strategy are illustrated in Fig.7.67.

Fig. 7.67: Sensitivity Analysis: Net Benefits Using Surface Water Restriction Method in Chalthan Branch Canal, for Space Integration Strategy

N.B.: N.B.3 = Net benefits obtained in Chalthan branch canal using both surface and ground water.

N.B.4 = Net benefits obtained in Chalthan using surface water restriction method.

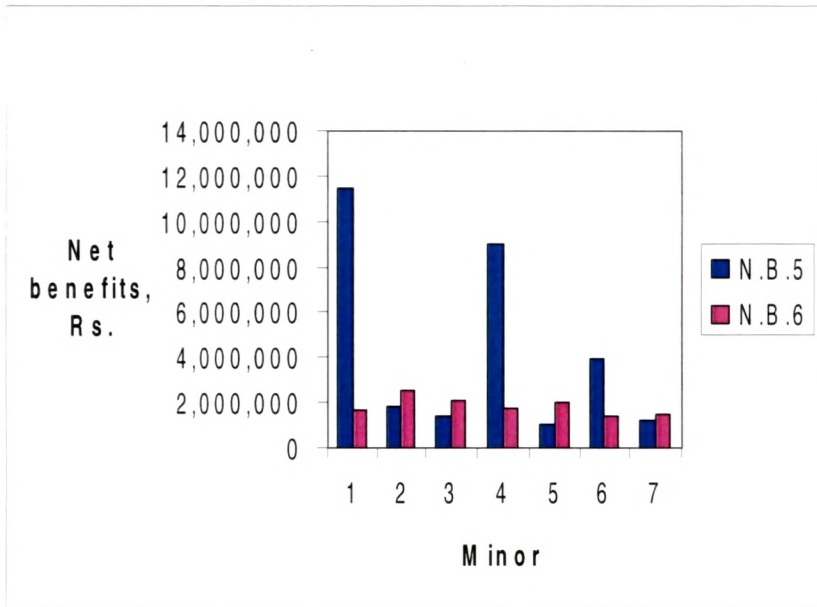


The results of sensitivity analysis using original cropping pattern in Umbhrat branch canal, for space integration strategy are illustrated in Fig.7.68.

Fig. 7.68: Sensitivity Analysis: Net Benefits using Original Cropping Pattern in Umbhrat Branch Canal, for Space Integration Strategy

N.B.: N.B.5 = Net benefits obtained in Umbhrat branch canal using prevailing cropping pattern

N.B.6 = Net benefits obtained in Umbhrat branch canal using original practiced cropping pattern



Fuzzy linear programming (FLP) model

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 17 of Surat branch canal, for space integration strategy are given in Tables 7.215 to 7.231, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Bardoli branch canal, for space integration strategy are given in Tables 7.232 to 7.238, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Chalthan branch canal, for space integration strategy are given in Tables 7.239 to 7.245, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 4 of Umbhrat branch canal upto 58 R.D., for space integration strategy are given in Tables 7.246 to 7.249, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Umbhrat branch canal beyond 58 R.D., for space integration strategy are given in Tables 7.250 to 7.256, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP

for optimal irrigation intensities for minors 1 to 7 of Navsari branch canal, for space integration strategy are given in Tables 7.257 to 7.263.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Amalsad branch canal, for space integration strategy are given in Tables 7.264 to 7.270, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 10 of Valsad branch canal, for space integration strategy are given in Tables 7.271 to 7.280, enclosed in C.D.

Table 7.257: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Dandeswar Minor of Navsari Branch Canal for Space Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	15.1589	11.7647	24.4699
A_2	0.0000	0.0000	0.0000
A_3	30.0428	43.5135	50.2465
A_4	0.0000	0.0000	0.0000
A_5	119.2616	144.2044	99.9999
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	61.7598	50.2284	49.6145
Total	**226.2231**	**249.7110**	**224.3308**
Surface Water Releases, ha.m			
SW_1	27.5176	17.6020	12.3912
SW_2	27.4266	15.8443	12.3917
SW_3	11.5616	29.1065	12.3880
SW_4	11.5589	28.7945	12.3885
SW_5	11.5584	28.7270	12.3886
SW_6	11.5620	29.1610	12.3879
SW_7	11.5676	29.8184	12.3868
SW_8	11.5676	29.8184	12.3868
SW_9	11.5676	29.8184	12.3868
SW_{10}	11.5628	29.2565	12.3878
SW_{11}	14.2749	3.8474	12.3960
SW_{12}	27.4597	16.0325	12.3916
Total	**189.1853**	**287.8269**	**148.6717**
Ground Water Releases, ha.m			
GW_1	19.5240	33.0219	11.4225
GW_2	19.5240	33.0219	11.4225
GW_3	18.5995	31.0811	11.2752
GW_4	18.5995	31.0811	11.2752
GW_5	18.5995	31.0811	11.2752
GW_6	18.7411	32.3456	11.2795
GW_7	18.7112	30.8636	11.5167
GW_8	18.7112	30.8636	11.5167
GW_9	18.7112	30.8636	11.5167
GW_{10}	18.9285	32.6004	11.5227
GW_{11}	18.6595	30.9676	11.4017
GW_{12}	19.5240	33.0219	11.4225
Total	**226.8332**	**380.8134**	**136.8471**
Optimal Benefits, Rs./ha.m	**41,64,100**	**20,81,200**	**60,61,677**
% Change in Net Benefits Due to FLP to that of LP			**45.57**

Table-7.258: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Dandi Minor of Navsari Branch Canal for Space Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	25.8555	15.0913	10.6164
A_2	0.0000	0.0000	0.0000
A_3	23.5605	12.7015	13.6427
A_4	0.0000	0.0000	0.0000
A_5	93.8217	89.7377	26.8593
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	16.1402	24.1652	14.0573
Total	**159.3779**	**141.6957**	**65.1757**
Surface Water Releases, ha.m			
SW_1	9.9212	13.1613	0.0000
SW_2	16.2350	10.8900	0.0000
SW_3	14.8222	11.8360	0.0000
SW_4	15.7627	13.0601	0.0000
SW_5	15.9901	13.4054	0.0000
SW_6	13.4131	10.7386	0.0000
SW_7	13.4131	10.7386	0.0000
SW_8	13.4131	10.7386	0.0000
SW_9	13.4131	10.7386	0.0000
SW_{10}	14.2708	11.2726	0.0000
SW_{11}	19.6978	16.7814	0.0000
SW_{12}	13.5254	13.5325	0.0000
Total	**173.8776**	**146.8937**	**0.0000**
Ground Water Releases, ha.m			
GW_1	15.2853	12.1910	5.6518
GW_2	15.2853	12.1910	5.6518
GW_3	15.2825	12.1891	5.5596
GW_4	15.2825	12.1891	5.5596
GW_5	15.2825	12.1891	5.5596
GW_6	15.2825	12.1891	5.5596
GW_7	15.2826	12.1894	5.7016
GW_8	15.2826	12.1894	5.7016
GW_9	15.2826	12.1894	5.7016
GW_{10}	15.2829	12.1898	5.7057
GW_{11}	15.2825	12.1893	5.6341
GW_{12}	15.2853	12.1910	5.6518
Total	**183.3991**	**146.2767**	**67.6384**
Optimal Benefits, Rs./ha.m	**15,11,900**	**16,55,700**	**12,60,133**
% Change in Net Benefits Due to FLP to that of LP			**-16.65**

Table-7.259: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Machhad Minor of Navsari Branch Canal for Space Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	27.4973	13.9907	0.3568
A_2	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000
A_5	39.3582	39.6065	1.0233
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	0.0335	11.6006	0.0948
Total	**66.8890**	**65.1978**	**1.4749**
Surface Water Releases, ha.m			
SW_1	28.6877	19.8804	0.4866
SW_2	23.8796	20.3883	0.4867
SW_3	37.0686	42.0733	0.4867
SW_4	37.2694	44.8820	0.4867
SW_5	37.2348	45.5615	0.4867
SW_6	36.2151	38.4602	0.4866
SW_7	36.2151	38.4602	0.4866
SW_8	36.2151	38.4602	0.4866
SW_9	36.2151	38.4602	0.4866
SW_{10}	36.7720	40.5462	0.4867
SW_{11}	33.7811	40.7791	0.4867
SW_{12}	25.1719	25.8580	0.4867
Total	**404.7255**	**433.8096**	**5.8399**
Ground Water Releases, ha.m			
GW_1	33.4708	27.1115	14.5240
GW_2	33.4708	27.1115	14.5240
GW_3	33.4463	27.0467	14.5408
GW_4	33.4463	27.0467	14.5408
GW_5	33.4463	27.0467	14.5408
GW_6	33.4463	27.0467	14.5408
GW_7	33.4934	27.1741	14.5111
GW_8	33.4934	27.1741	14.5111
GW_9	33.4934	27.1741	14.5111
GW_{10}	33.5638	27.2066	14.5099
GW_{11}	33.4708	27.1115	14.5240
GW_{12}	33.4708	27.1115	14.5240
Total	**401.7124**	**325.3617**	**174.3024**
Optimal Benefits, Rs./ha.m	**56,08,500**	**39,13,700**	**28,87,946**
% Change in Net Benefits Due to FLP to that of LP			**-48.51**

Table-7.260: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Onjal Minor of Navsari Branch Canal for Space Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	12.0988	15.9151	14.8556
A_2	0.0000	0.0000	0.0000
A_3	25.8320	28.8610	19.0716
A_4	0.0000	0.0000	0.0000
A_5	99.0139	98.5419	99.2403
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	28.7591	29.1012	34.1991
Total	**165.7038**	**172.4192**	**167.3666**
Surface Water Releases, ha.m			
SW_1	8.1059	10.1468	5.3950
SW_2	3.7954	3.8034	5.0894
SW_3	10.1773	11.1129	5.3270
SW_4	10.2636	11.2062	5.3293
SW_5	10.2818	11.2255	5.3299
SW_6	9.9771	10.8904	5.3225
SW_7	9.9771	10.8904	5.3225
SW_8	10.0362	10.9564	5.3238
SW_9	9.9771	10.8904	5.3225
SW_{10}	10.0547	10.9770	5.3242
SW_{11}	10.5831	11.5279	5.3396
SW_{12}	4.6705	4.9594	5.2311
Total	**107.8998**	**118.5867**	**63.6568**
Ground Water Releases, ha.m			
GW_1	13.9444	13.5330	7.4459
GW_2	15.0305	13.5330	7.4459
GW_3	8.0803	13.7734	7.6627
GW_4	8.0803	13.7734	7.6627
GW_5	8.0803	13.7734	7.6627
GW_6	8.0803	13.7734	7.6627
GW_7	8.2179	13.8964	7.6543
GW_8	14.0790	14.1087	7.6092
GW_9	8.2179	13.8964	7.6543
GW_{10}	12.1941	13.9143	7.6490
GW_{11}	9.2883	13.8411	7.6583
GW_{12}	13.9450	13.5330	7.4459
Total	**127.2383**	**165.3495**	**91.2136**
Optimal Benefits, Rs./ha.m	**31,99,500**	**28,28,700**	**37,73,300**
% Change in Net Benefits Due to FLP to that of LP			**17.93**

Table-7.261: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Sadlav Minor of Navsari Branch Canal for Space Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	10.8000	0.0397	0.9995
A_2	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000
A_5	182.5125	222.7762	100.0000
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	0.5965	103.8482	1.3111
Total	**193.9090**	**326.6641**	**102.3106**
Surface Water Releases, ha.m			
SW_1	39.4924	58.4510	10.9247
SW_2	42.3426	56.8703	10.9246
SW_3	38.8349	56.5234	10.9245
SW_4	38.9338	55.8591	10.9245
SW_5	38.9667	55.7194	10.9245
SW_6	38.8280	56.6428	10.9245
SW_7	39.0882	58.1791	10.9245
SW_8	39.0882	58.1791	10.9245
SW_9	39.0882	58.1791	10.9245
SW_{10}	38.8244	56.8549	10.9245
SW_{11}	90.8491	29.7464	10.9243
SW_{12}	41.9918	57.0522	10.9246
Total	**526.3283**	**658.2568**	**131.0942**
Ground Water Releases, ha.m			
GW_1	51.5126	69.7560	17.0361
GW_2	51.5126	69.7560	17.0361
GW_3	51.4501	69.7465	16.9733
GW_4	51.4501	69.7465	16.9733
GW_5	51.4501	69.7465	16.9733
GW_6	52.1161	70.9808	16.9735
GW_7	51.5811	69.7628	17.0955
GW_8	51.5811	69.7628	17.0955
GW_9	51.5811	69.7628	17.0955
GW_{10}	52.5247	71.5219	17.0958
GW_{11}	51.5126	69.7560	17.0361
GW_{12}	51.5126	69.7560	17.0361
Total	**619.7848**	**840.0546**	**204.4201**
Optimal Benefits, Rs./ha.m	**70,35,900**	**40,68,700**	**15,76,005**
% Change in Net Benefits Due to FLP to that of LP			**-77.60**

Table-7.262: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Vachharwad Minor of Navsari Branch Canal for Space Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	8.3320	83.9391	28.8312
A_2	0.0000	0.0000	0.0000
A_3	4.2943	110.5623	56.1406
A_4	0.0000	0.0000	0.0000
A_5	159.3713	194.9655	99.9987
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	49.5267	116.6797	55.0575
Total	**221.5243**	**506.1466**	**240.0280**
Surface Water Releases, ha.m			
SW_1	23.5192	51.6388	16.9133
SW_2	20.3962	51.9820	16.9139
SW_3	40.5070	48.9629	16.9094
SW_4	40.0525	49.1366	16.9100
SW_5	39.9550	49.1744	16.9101
SW_6	40.5869	48.9328	16.9093
SW_7	41.5530	48.5832	16.9078
SW_8	41.5530	48.5832	16.9078
SW_9	41.5530	48.5832	16.9078
SW_{10}	40.7273	48.8802	16.9091
SW_{11}	3.7700	55.7324	16.9195
SW_{12}	20.7474	51.9423	16.9139
Total	**394.9205**	**602.1320**	**202.9319**
Ground Water Releases, ha.m			
GW_1	22.9672	63.4893	12.0149
GW_2	22.9672	63.4893	12.0149
GW_3	47.9718	56.9461	11.8710
GW_4	47.9718	56.9461	11.8710
GW_5	47.9718	56.9461	11.8710
GW_6	49.3681	57.3907	11.8723
GW_7	47.6676	57.2174	12.1310
GW_8	47.6676	57.2174	12.1310
GW_9	47.6676	57.2174	12.1310
GW_{10}	49.5057	57.8925	12.1329
GW_{11}	47.8227	57.0859	12.0069
GW_{12}	22.9672	63.4893	12.0149
Total	**502.5163**	**705.3275**	**144.0628**
Optimal Benefits, Rs./ha.m	**22,89,300**	**70,79,500**	**67,04,284**
% Change in Net Benefits Due to FLP to that of LP			**192.85**

Table-7.263: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Veraval Minor of Navsari Branch Canal for Space Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	3.6485	2.7397	17.0909
A_2	0.0000	0.0000	0.0000
A_3	0.0268	39.6116	35.0032
A_4	0.0000	0.0000	0.0000
A_5	115.8172	131.5566	100.0000
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	4.7295	77.0189	35.1769
Total	**124.2220**	**250.9268**	**187.2710**
Surface Water Releases, ha.m			
SW_1	23.5000	24.3402	10.5123
SW_2	19.0107	24.0046	10.5126
SW_3	23.8821	20.9814	10.5095
SW_4	22.5937	20.6108	10.5099
SW_5	22.2264	20.5323	10.5099
SW_6	24.3766	21.2012	10.5093
SW_7	25.2027	21.8788	10.5086
SW_8	25.2027	21.8788	10.5086
SW_9	25.2027	21.8788	10.5086
SW_{10}	24.5069	21.2730	10.5092
SW_{11}	21.5404	21.1765	10.5113
SW_{12}	20.1970	23.8407	10.5126
Total	**277.4419**	**263.5971**	**126.1224**
Ground Water Releases, ha.m			
GW_1	28.1420	25.8806	10.5906
GW_2	28.1420	25.8806	10.5906
GW_3	29.1285	24.4544	10.4126
GW_4	29.1285	24.4544	10.4126
GW_5	29.1285	24.4544	10.4126
GW_6	29.4510	24.8205	10.4230
GW_7	29.0716	24.4600	10.6318
GW_8	29.0716	24.4600	10.6318
GW_9	29.0716	24.4600	10.6318
GW_{10}	29.7271	25.2058	10.6528
GW_{11}	29.1013	24.4582	10.5275
GW_{12}	28.1420	25.8806	10.5906
Total	**347.3057**	**298.8695**	**126.5083**
Optimal Benefits, Rs./ha.m	**34,76,700**	**44,17,200**	**42,74,741**
% Change in Net Benefits Due to FLP to that of LP			**22.95**

Space – Time Integration Strategy

Linear programming (LP) model

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 17 of Surat branch canal, for space - time integration strategy are given in Tables 7.281 to 7.297, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Bardoli branch canal, for space - time integration strategy are given in Tables 7.298 to 7.304, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Chalthan branch canal, for space - time integration strategy are given in Tables 7.305 to 7.311, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 4 of Umbhrat branch canal upto 58 R.D., for space - time integration strategy are given in Tables 7.312 to 7.315, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Umbhrat branch canal beyond 58 R.D., for space - time integration strategy are given in Tables 7.316 to 7.322, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Navsari branch canal, for space - time integration strategy are given in Tables 7.323 to 7.329.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 7 of Amalsad

branch canal, for space - time integration strategy are given in Tables 7.330 to 7.336, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for different irrigation intensities for minors 1 to 10 of Valsad branch canal, for space - time integration strategy are given in Tables 7.337 to 7.346, enclosed in C.D.

Table 7.323: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Dandeswar Minor of Navsari Branch Canal for Space-Time Integration Strategy

Irrigation Intensity,%	200	210	220	230	240	250	260	270
Area Irrigated, ha								
A_1	19.3415	19.2504	19.1607	19.0713	18.9771	18.8831	19.0596	19.2045
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	8.9799	8.8233	8.6705	8.5197	8.3606	8.2026	8.5535	8.8381
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	124.0533	124.4771	124.9065	125.3412	125.7824	126.1642	126.2324	126.2965
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	79.5808	79.9110	80.2278	80.5349	80.9579	81.5535	80.8905	80.4207
Total	**231.9555**	**232.4618**	**232.9655**	**233.4671**	**234.0780**	**234.8034**	**234.7360**	**234.7598**
Surface water releases, ha.m								
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	17.1014	17.0438	16.9868	16.9297	16.8695	16.8093	16.9107	16.9947
SW_4	18.2695	18.1944	18.1203	18.0464	17.9685	17.8907	18.0312	18.1470
SW_5	18.5074	18.4288	18.3512	18.2739	18.1924	18.1109	18.2595	18.3817
SW_6	32.4168	32.3541	32.2921	32.2303	32.1658	32.0916	32.1183	32.1266
SW_7	1.8635	1.8532	1.8405	1.8250	1.8051	1.7684	1.7969	1.8255
SW_8	1.8635	1.8532	1.8405	1.8250	1.8051	1.7684	1.7969	1.8255
SW_9	1.8635	1.8532	1.8405	1.8250	1.8051	1.7684	1.7969	1.8255
SW_{10}	4.0283	4.1047	4.1793	4.2504	4.3236	4.4236	4.4954	4.6202
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**95.9139**	**95.6854**	**95.4512**	**95.2057**	**94.9351**	**94.6313**	**95.2058**	**95.7467**
Ground Water Releases, ha.m								
GW_1	28.4879	28.4719	28.4547	28.4362	28.4168	28.3963	28.3753	28.3614
GW_2	28.8006	28.7799	28.7581	28.7351	28.7110	28.6858	28.6752	28.6699
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	17.1497	17.1396	17.1295	17.1193	17.1096	17.1038	17.0897	17.0790
GW_8	17.1497	17.1396	17.1295	17.1193	17.1096	17.1038	17.0897	17.0790
GW_9	17.1497	17.1396	17.1295	17.1193	17.1096	17.1038	17.0897	17.0790
GW_{10}	23.0582	23.0115	22.9649	22.9187	22.8708	22.8115	22.7837	22.7399
GW_{11}	28.7868	28.7663	28.7448	28.7220	28.6980	28.6732	28.6632	28.6583
GW_{12}	28.7658	28.7456	28.7244	28.7019	28.6783	28.6536	28.6419	28.6356
Total	**189.3484**	**189.1940**	**189.0354**	**188.8718**	**188.7037**	**188.5318**	**188.4084**	**188.3021**
Optimal Benefits, Rs./ha.m	**4,800,900**	**4,819,300**	**4,837,300**	**4,855,100**	**4,879,400**	**4,913,100**	**4,901,900**	**4,897,100**

Table 7.324: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Dandi Minor of Navsari Branch Canal for Space-Time Integration Strategy

Irrigation Intensity,%	10	20	30	40	50	60	70	80
Area Irrigated, ha								
A_1	38.8520	39.2649	39.5940	39.0375	39.6988	39.8673	40.1452	39.7157
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	4.7578	3.2863	3.8147	5.3862	3.3200	3.2823	3.0761	5.3947
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	129.3106	128.9659	129.1116	128.4903	128.9124	128.9059	128.9870	128.4655
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	89.8879	92.3300	91.4140	90.8910	92.3466	92.4410	92.7972	91.1369
Total	**262.8083**	**263.8471**	**263.9343**	**263.8050**	**264.2778**	**264.4965**	**265.0055**	**264.7128**
Surface water releases, ha.m								
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	29.0732	29.1685	29.3168	28.7838	29.1787	29.1934	29.2868	28.8446
SW_4	34.1045	34.2969	34.4675	33.8544	34.3084	34.3251	34.4323	33.9236
SW_5	35.1295	35.3419	35.5167	34.8873	35.3533	35.3704	35.4805	34.9582
SW_6	15.3769	15.2071	15.2954	14.9804	15.2146	15.2238	15.2796	15.0185
SW_7	0.0000	0.0094	0.0001	0.0000	0.0000	0.0000	0.0000	0.0002
SW_8	0.0000	0.0094	0.0001	0.0000	0.0000	0.0000	0.0000	0.0002
SW_9	0.0000	0.0094	0.0001	0.0000	0.0000	0.0000	0.0000	0.0002
SW_{10}	0.0000	0.0132	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**113.6841**	**114.0558**	**114.5967**	**112.5059**	**114.0550**	**114.1127**	**114.4792**	**112.7457**
Ground Water Releases, ha.m								
GW_1	29.3192	29.0292	29.1350	29.9602	29.0560	29.0582	29.0286	30.0362
GW_2	30.6662	30.4020	30.5138	29.9596	30.4291	30.3928	30.4060	29.9341
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	19.4931	19.2755	19.3898	18.9906	19.2874	19.2991	19.3698	19.0388
GW_8	19.4931	19.2755	19.3898	18.9906	19.2874	19.2991	19.3698	19.0388
GW_9	19.4931	19.2755	19.3898	18.9906	19.2874	19.2991	19.3698	19.0388
GW_{10}	27.1027	26.9269	27.0564	26.6020	26.9378	26.9498	27.0289	26.6518
GW_{11}	30.1112	30.4140	30.3536	29.9609	30.4235	30.4475	30.5591	30.0369
GW_{12}	30.5164	30.4142	30.3606	29.9381	30.2766	30.2793	30.2529	29.7837
Total	**206.1950**	**205.0128**	**205.5888**	**203.3926**	**204.9852**	**205.0249**	**205.3849**	**203.5591**
Optimal Benefits, Rs./ha.m	**5,360,600**	**5,436,200**	**5,414,000**	**5,495,000**	**5,447,600**	**5,453,500**	**5,463,000**	**5,520,700**

Table 7.325: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Machhad Minor of Navsari Branch Canal for Space-Time Integration Strategy

Irrigation Intensity,%	50	60	70	80	90	100	110	120
Area Irrigated, ha								
A_1	41.3744	41.2853	41.0866	40.8224	40.5047	39.8832	39.3131	39.2640
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	61.3067	67.3507	73.3025	79.2113	85.0844	90.7390	91.3268	82.0699
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	69.0799	68.9103	68.6607	68.4120	68.1715	67.8458	67.6639	67.7397
Total	**171.7610**	**177.5463**	**183.0498**	**188.4457**	**193.7606**	**198.4680**	**198.3038**	**189.0736**
Surface water releases, ha.m								
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	29.6549	29.6656	29.5937	29.4727	29.3109	28.9218	28.5686	28.6026
SW_4	34.8222	34.8345	34.7518	34.6127	34.4265	33.9780	33.5708	33.6107
SW_5	35.8747	35.8874	35.8026	35.6597	35.4686	35.0080	34.5898	34.6309
SW_6	15.5886	15.5947	15.5522	15.4805	15.3849	15.1577	14.9515	14.9695
SW_7	2.4573	2.6061	2.5990	2.5301	2.4102	1.8371	1.0477	0.5538
SW_8	2.4573	2.6061	2.5990	2.5301	2.4102	1.8371	1.0477	0.5538
SW_9	2.4573	2.6061	2.5990	2.5301	2.4102	1.8371	1.0477	0.5538
SW_{10}	0.0140	0.0163	0.0172	0.0176	0.0180	0.0194	0.3173	0.6461
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**123.3263**	**123.8168**	**123.5145**	**122.8335**	**121.8395**	**118.5962**	**115.1411**	**114.1212**
Ground Water Releases, ha.m								
GW_1	30.7467	30.7062	30.6066	30.4845	30.3461	30.0826	29.8738	29.9082
GW_2	32.1300	32.0899	31.9874	31.8605	31.7156	31.4361	31.2129	31.2488
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	19.1038	19.0716	19.0197	18.9473	18.8582	18.7235	18.6735	18.8284
GW_8	19.1038	19.0716	19.0197	18.9473	18.8582	18.7235	18.6735	18.8284
GW_9	19.1038	19.0716	19.0197	18.9473	18.8582	18.7235	18.6735	18.8284
GW_{10}	24.4500	24.7225	24.9254	25.0869	25.2144	25.1527	24.8182	24.3497
GW_{11}	27.0299	27.0087	26.9271	26.8169	26.6846	26.4086	26.1763	26.2068
GW_{12}	31.9763	31.9361	31.8339	31.7076	31.5634	31.2857	31.0641	31.0998
Total	**203.6443**	**203.6782**	**203.3395**	**202.7983**	**202.0987**	**200.5362**	**199.1658**	**199.2985**
Optimal Benefits, Rs./ha.m	**2,682,300**	**2,778,100**	**2,871,600**	**2,966,600**	**3,063,100**	**3,159,400**	**3,171,400**	**3,007,100**

Table 7.326: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Onjal Minor of Navsari Branch Canal for Space-Time Integration Strategy

Irrigation Intensity,%	20	30	40	50	60	70	80	90
Area Irrigated, ha								
A_1	38.5357	14.9333	21.2526	21.7975	21.9897	22.0772	22.1506	22.4796
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	2.9291	0.0000	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	128.1282	127.5830	125.2119	125.2042	125.1766	125.1408	125.1020	125.0682
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	92.4502	106.2674	93.9603	93.8082	93.7531	93.7266	93.7038	93.6092
Total	**262.0432**	**248.7837**	**240.4253**	**240.8104**	**240.9199**	**240.9451**	**240.9569**	**241.1575**
Surface water releases, ha.m								
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	28.7653	14.7513	17.8996	18.1718	18.2315	18.2268	18.2119	18.3465
SW_4	33.7666	14.7075	19.4761	19.8444	19.9261	19.9213	19.9029	20.0879
SW_5	34.7854	14.6981	19.7972	20.1851	20.2714	20.2665	20.2474	20.4427
SW_6	15.1505	14.8713	13.6082	13.6185	13.6183	13.6140	13.6085	13.6061
SW_7	0.0001	0.0000	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
SW_8	0.0001	0.0000	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007
SW_9	0.0001	0.0000	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
SW_{10}	0.0001	0.0000	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**112.4682**	**59.0282**	**70.7838**	**71.8226**	**72.0501**	**72.0314**	**71.9735**	**72.4860**
Ground Water Releases, ha.m								
GW_1	28.8055	29.7429	26.6126	26.5891	26.5781	26.5706	26.5634	26.5464
GW_2	30.1443	29.7372	27.0346	27.0369	27.0317	27.0242	27.0161	27.0126
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	19.2061	18.8520	17.2509	17.2638	17.2636	17.2581	17.2512	17.2482
GW_8	27.2762	25.7065	24.4224	24.4571	24.4604	24.4531	24.4432	24.4503
GW_9	19.2061	18.8520	17.2509	17.2638	17.2636	17.2581	17.2512	17.2482
GW_{10}	21.7089	19.8035	27.2117	27.2322	27.2318	27.2232	27.2122	27.2075
GW_{11}	27.5382	29.5185	26.4852	26.4694	26.4604	26.4525	26.4443	26.4271
GW_{12}	29.9956	29.7342	26.9877	26.9871	26.9813	26.9738	26.9658	26.9615
Total	**203.8809**	**201.9468**	**193.2560**	**193.2994**	**193.2709**	**193.2136**	**193.1474**	**193.1018**
Optimal Benefits, Rs./ha.m	**5,412,700**	**5,623,700**	**5,112,500**	**5,113,200**	**5,113,600**	**5,114,100**	**5,114,600**	**5,115,500**

Table 7.327: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Sadlav Minor of Navsari Branch Canal for Space-Time Integration Strategy

Irrigation Intensity,%	250	260	270	280	290	300	310	320
Area Irrigated, ha								
A_1	18.5098	18.4235	18.3455	18.2749	18.2109	18.1528	18.1002	18.0524
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	194.7146	196.0616	197.4220	198.7958	200.1829	201.5835	202.9976	204.4253
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	80.6485	80.5231	80.3850	80.2354	80.0753	79.9053	79.7261	79.5383
Total	**293.8729**	**295.0082**	**296.1525**	**297.3061**	**298.4691**	**299.6416**	**300.8239**	**302.0160**
Surface water releases, ha.m								
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	29.0046	28.9474	28.8950	28.8469	28.8025	28.7616	28.7236	28.6883
SW_4	23.5322	23.4598	23.3941	23.3342	23.2797	23.2298	23.1841	23.1424
SW_5	22.4175	22.3420	22.2735	22.2113	22.1546	22.1029	22.0557	22.0126
SW_6	49.3361	49.2671	49.2025	49.1416	49.0841	49.0296	48.9777	48.9281
SW_7	24.6287	24.6698	24.7097	24.7484	24.7860	24.8226	24.8584	24.8933
SW_8	24.6287	24.6698	24.7097	24.7484	24.7860	24.8226	24.8584	24.8933
SW_9	24.6287	24.6698	24.7097	24.7484	24.7860	24.8226	24.8584	24.8933
SW_{10}	7.9749	7.9636	7.9558	7.9511	7.9489	7.9491	7.9515	7.9559
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**206.1514**	**205.9893**	**205.8500**	**205.7303**	**205.6278**	**205.5408**	**205.4678**	**205.4072**
Ground Water Releases, ha.m								
GW_1	52.7942	52.7464	52.6955	52.6417	52.5852	52.5260	52.4643	52.4002
GW_2	51.3293	51.2774	51.2230	51.1660	51.1067	51.0452	50.9815	50.9156
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	49.0609	49.0296	48.9986	48.9677	48.9368	48.9058	48.8746	48.8430
GW_8	49.0609	49.0296	48.9986	48.9677	48.9368	48.9058	48.8746	48.8430
GW_9	49.0609	49.0296	48.9986	48.9677	48.9368	48.9058	48.8746	48.8430
GW_{10}	57.5034	57.4718	57.4401	57.4084	57.3765	57.3443	57.3117	57.2787
GW_{11}	29.4445	29.3546	29.2694	29.1882	29.1107	29.0363	28.9647	28.8957
GW_{12}	51.4920	51.4407	51.3866	51.3300	51.2710	51.2097	51.1462	51.0806
Total	**389.7461**	**389.3797**	**389.0104**	**388.6374**	**388.2605**	**387.8789**	**387.4922**	**387.0998**
Optimal Benefits, Rs./ha.m	**2,252,500**	**2,273,500**	**2,294,200**	**2,314,600**	**2,334,800**	**2,354,900**	**2,374,900**	**2,394,700**

Table 7.328: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Vachharvad Minor of Navsari Branch Canal for Space-Time Integration Strategy

Irrigation Intensity,%	240	250	260	270	280	290	300	310
Area Irrigated, ha								
A_1	35.6491	35.9787	36.3292	36.7017	37.0975	37.5180	37.8897	37.7654
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	52.3792	52.6897	53.0092	53.3358	53.6683	54.0058	54.3353	54.5775
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	166.9728	167.6018	168.2323	168.8643	169.4979	170.1331	170.7698	171.4078
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	30.4293	29.4404	28.4130	27.3491	26.2501	25.1163	24.0502	23.6772
Total	**285.4304**	**285.7106**	**285.9837**	**286.2509**	**286.5138**	**286.7732**	**287.0450**	**287.4279**
Surface water releases, ha.m								
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	34.6884	34.8803	35.0844	35.3014	35.5321	35.7771	35.9937	35.9191
SW_4	35.1893	35.4531	35.7335	36.0316	36.3484	36.6849	36.9824	36.8819
SW_5	35.2914	35.5697	35.8657	36.1803	36.5146	36.8698	37.1838	37.0780
SW_6	53.4851	53.6615	53.8492	54.0490	54.2615	54.4874	54.6867	54.6147
SW_7	23.7829	23.8215	23.8632	23.9082	23.9567	24.0090	24.0554	24.0360
SW_8	23.7829	23.8215	23.8632	23.9082	23.9567	24.0090	24.0554	24.0360
SW_9	23.7829	23.8215	23.8632	23.9082	23.9567	24.0090	24.0554	24.0360
SW_{10}	8.4279	8.4675	8.5127	8.5632	8.6191	8.6802	8.7367	8.7291
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**238.4308**	**239.4966**	**240.6351**	**241.8501**	**243.1458**	**244.5264**	**245.7495**	**245.3308**
Ground Water Releases, ha.m								
GW_1	44.8502	44.7969	44.7398	44.6783	44.6121	44.5407	44.4804	44.5313
GW_2	44.9843	44.9502	44.9136	44.8738	44.8306	44.7837	44.7451	44.7890
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	35.8791	35.8641	35.8482	35.8314	35.8137	35.7949	35.7777	35.7779
GW_8	35.8791	35.8641	35.8482	35.8314	35.8137	35.7949	35.7777	35.7779
GW_9	35.8791	35.8641	35.8482	35.8314	35.8137	35.7949	35.7777	35.7779
GW_{10}	47.3376	47.3639	47.3913	47.4200	47.4503	47.4822	47.5092	47.4901
GW_{11}	34.7232	34.8287	34.9447	35.0726	35.2135	35.3685	35.4954	35.3359
GW_{12}	44.9694	44.9332	44.8943	44.8521	44.8063	44.7567	44.7157	44.7604
Total	**324.5020**	**324.4652**	**324.4283**	**324.3910**	**324.3539**	**324.3165**	**324.2789**	**324.2404**
Optimal Benefits, Rs./ha.m	**3,408,200**	**3,386,400**	**3,363,300**	**3,338,800**	**3,313,100**	**3,286,200**	**3,261,900**	**3,264,400**

Table 7.329: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Different Irrigation Intensities for Veraval Minor of Navsari Branch Canal for Space-Time Integration Strategy

Irrigation Intensity,%	240	250	260	270	280	290	300	310
Area Irrigated, ha								
A_1	29.5944	36.8974	36.6923	36.5717	36.5104	35.8081	36.3170	36.7346
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0637	1.8230	2.1284	2.0425	1.9035	1.6470	2.1436	2.9706
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	123.1663	123.0691	122.9333	122.7874	122.6660	122.6471	122.7001	123.1814
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	98.9784	92.6437	91.9845	92.0242	92.1765	92.7658	91.1097	89.8270
Total	**251.8028**	**254.4332**	**253.7385**	**253.4258**	**253.2564**	**252.8680**	**252.2704**	**252.7136**
Surface water releases, ha.m								
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	23.4379	27.7005	27.5468	27.4417	27.3777	26.9156	27.1650	27.4710
SW_4	26.6481	32.4961	32.3156	32.2024	32.1398	31.5525	31.9372	32.3014
SW_5	27.3020	33.4730	33.2870	33.1722	33.1099	32.4970	32.9093	33.2853
SW_6	30.1341	33.4243	33.2827	33.1774	33.1083	32.7160	32.8761	33.1521
SW_7	0.3337	0.6202	0.6139	0.5835	0.5620	0.5793	0.4835	0.9284
SW_8	0.3337	0.6202	0.6139	0.5835	0.5620	0.5793	0.4835	0.9284
SW_9	0.3337	0.6202	0.6139	0.5835	0.5620	0.5793	0.4835	0.9284
SW_{10}	0.3593	0.7444	0.7447	0.7215	0.7074	0.7401	0.6608	1.0659
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**108.8825**	**129.6989**	**129.0185**	**128.4657**	**128.1291**	**126.1591**	**126.9989**	**130.0609**
Ground Water Releases, ha.m								
GW_1	28.3690	28.0671	28.0749	28.0215	27.9670	27.9278	27.8156	28.0265
GW_2	29.2284	29.3509	29.3515	29.2959	29.2418	29.1690	29.0931	29.3196
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	18.5444	18.4002	18.2999	18.2024	18.1223	17.9640	17.8388	17.9068
GW_8	18.5444	18.4002	18.2999	18.2024	18.1223	17.9640	17.8388	17.9068
GW_9	18.5444	18.4002	18.2999	18.2024	18.1223	17.9640	17.8388	17.9068
GW_{10}	24.8120	25.4491	25.3309	25.2247	25.1410	24.9111	24.8471	24.9584
GW_{11}	29.8444	29.5940	29.4071	29.3394	29.3076	29.2363	28.9401	28.8882
GW_{12}	29.1329	29.2082	29.2096	29.1543	29.1002	29.0311	28.9511	29.1759
Total	**197.0199**	**196.8699**	**196.2737**	**195.6430**	**195.1245**	**194.1673**	**193.1634**	**194.0890**
Optimal Benefits, Rs./ha.m	**5,468,000**	**5,337,900**	**5,320,900**	**5,323,300**	**5,328,900**	**5,350,000**	**5,309,000**	**5,284,500**

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Surat branch canal, for space - time integration are given in Table 7.347.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Bardoli branch canal, for space - time integration strategy are given in Table 7.348.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Chalthan branch canal, for space - time integration strategy are given in Table 7.349.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Umbhrat branch canal upto 58 R.D., for space - time integration strategy are given in Table 7.350.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Umbhrat branch canal beyond 58 R.D, for space - time integration strategy are given in Table 7.351.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Navsari branch canal, for space - time integration Strategy are given in Table 7.352.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Amalsad branch canal, for space - time integration strategy are given in Table 7.353.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Valsad branch canal, for space - time integration strategy are given in Table 7.354.

Table 7.347: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Surat Branch Canal for Space-Time Integration Strategy

Name of Minor	Bhairav	Dumas distributary	Kalsad	Katargam distributary	Khajod
Optimal Irrigation Intensity,%	**70**	**420**	**320**	**150**	**230**
Area Irrigated, ha					
A_1	19.4224	6.3166	32.5329	20.5327	48.6832
A_2	0.0000	10.1767	0.0000	0.0063	0.0028
A_3	4.0149	3.5807	0.0000	0.0000	1.5443
A_4	2.0272	21.2451	0.0000	28.2774	23.5602
A_5	21.2755	86.7349	125.2736	95.2235	36.2174
A_6	0.0000	9.1525	0.0000	0.0000	0.0000
A_7	2.5087	3.2001	0.0000	18.9341	35.8295
A_8	0.0000	48.7509	0.0000	0.0000	0.0000
A_9	0.0000	20.8407	0.0000	20.4619	0.0000
A_{10}	87.8850	84.0431	78.2107	72.2530	72.6225
Total	**137.1337**	**294.0413**	**236.0172**	**255.6889**	**218.4599**
Surface water releases, ha.m					
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	13.7521	12.9685	21.3213	15.6543	24.4862
SW_4	17.0371	13.3855	26.0980	14.7430	26.6046
SW_5	17.5665	11.4540	27.5263	14.2317	30.3640
SW_6	11.3096	14.9778	16.6253	9.3914	25.5280
SW_7	0.6975	2.5116	0.7174	6.6234	0.0009
SW_8	0.6724	2.5116	0.7174	7.3513	0.0009
SW_9	0.6676	2.6550	0.7174	8.4897	0.0008
SW_{10}	0.6581	2.9698	0.9059	7.9518	0.0009
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**62.3609**	**63.4338**	**94.6290**	**84.4366**	**106.9863**
Ground Water Releases, ha.m					
GW_1	25.9192	26.1550	29.3900	28.6419	25.2754
GW_2	26.6227	26.8711	30.4344	29.5589	26.1601
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	9.1472	12.3629	13.3736	8.8709	15.9872
GW_8	11.0913	12.3629	13.3736	11.0518	15.9872
GW_9	11.4642	14.8394	13.3736	20.5344	17.2090
GW_{10}	12.1556	20.7182	14.4784	16.1313	26.1574
GW_{11}	21.3683	25.3914	23.3185	19.9930	25.8542
GW_{12}	26.9522	26.4921	30.2635	28.0239	25.8243
Total	**144.7207**	**165.1930**	**168.0056**	**162.8061**	**178.4548**
Optimal Benefits, Rs./ha.m	**4,183,100**	**9,554,600**	**4,787,300**	**8,075,400**	**6,627,100**

Table 7.347: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Surat Branch Canal for Space-Time Integration Strategy (Contd.)

Name of Minor	Kholwad	Nagod distributary	Palsod	Pasodra	Puna subminor
Optimal Irrigation Intensity,%	**130**	**150**	**170**	**180**	**160**
Area Irrigated, ha					
A_1	14.6474	8.6971	0.0018	43.0665	29.5528
A_2	14.8985	0.0000	0.0000	0.0000	17.8111
A_3	0.0000	0.0000	0.0000	0.0000	0.0000
A_4	4.6888	0.9602	28.0787	34.5250	67.8642
A_5	60.6542	105.6426	152.2102	49.8394	29.4266
A_6	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	2.1687	2.5126	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	16.4055	0.0000	0.0000	0.0000
A_{10}	77.3672	78.2458	107.2053	46.6874	43.9701
Total	**174.4248**	**212.4638**	**287.4960**	**174.1183**	**188.6248**
Surface water releases, ha.m					
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	14.2718	11.8268	4.7137	31.2414	26.0269
SW_4	16.4673	13.4338	0.0014	36.5402	30.0105
SW_5	15.3617	12.0960	0.0015	37.6196	30.0055
SW_6	8.5279	3.5551	12.1148	23.1951	23.1572
SW_7	0.6408	0.0001	12.8044	0.0000	0.0019
SW_8	0.1466	0.0001	12.8044	0.0000	0.0019
SW_9	0.0616	0.0001	12.8044	0.0000	0.0015
SW_{10}	0.0866	0.0001	11.6596	0.0000	0.0001
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**55.5643**	**40.9121**	**66.9042**	**128.5963**	**109.2055**
Ground Water Releases, ha.m					
GW_1	25.1250	20.7911	44.2188	28.0910	29.6784
GW_2	25.8572	21.7021	42.6578	29.7364	31.5884
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	7.2601	4.3667	23.7664	21.3187	16.1135
GW_8	12.0597	12.4699	23.7664	22.6120	16.1135
GW_9	12.7903	13.7856	23.7664	28.7931	16.8434
GW_{10}	13.0453	12.7171	22.5494	27.8088	19.5723
GW_{11}	18.1177	15.3366	32.6781	25.3972	22.7079
GW_{12}	25.2516	21.6969	42.4866	28.6329	28.1220
Total	**139.5069**	**122.8660**	**255.8899**	**212.3901**	**180.7394**
Optimal Benefits, Rs./ha.m	**70,18,100**	**50,98,600**	**88,20,800**	**58,21,900**	**1,33,30,000**

Table 7.347: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Surat Branch Canal for Space-Time Integration Strategy (Contd.)

Name of Minor	Sania	Saroli subminor	Segwa	Simada	Surat branch	Umbhel	Vihan
Optimal Irrigation Intensity,%	**170**	**180**	**260**	**180**	**190**	**260**	**180**
Area Irrigated, ha							
A_1	15.9091	29.2449	26.1066	39.8535	5.7348	17.8419	0.9279
A_2	6.9109	0.0185	0.0000	0.0000	19.8217	0.0000	0.0000
A_3	14.2867	2.5671	0.0000	19.1701	0.5315	0.0000	0.0000
A_4	21.5300	77.9269	25.4018	28.1212	48.7997	7.0967	4.6107
A_5	65.7979	0.0000	90.7277	32.7247	47.4076	64.9792	92.2280
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	20.0096	0.0000	0.0000	8.8018	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	65.4748	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	35.3209	57.2583	41.3245	44.8726	79.0752	70.6410	4.6841
Total	**159.7555**	**167.0157**	**203.5702**	**164.7421**	**266.8453**	**169.3606**	**102.4507**
Surface water releases, ha.m							
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4.8949
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	5.0000
SW_3	11.8480	13.1903	20.1099	16.5665	13.8394	12.1852	2.6956
SW_4	14.0907	16.8859	22.0466	20.8846	14.6439	14.3128	2.7879
SW_5	14.4707	19.1291	22.7520	23.6549	13.4301	15.0961	2.8100
SW_6	7.3265	11.4224	14.3860	14.6056	8.0700	7.8702	2.6108
SW_7	0.0000	0.0045	0.0000	0.0000	0.0338	0.0459	2.5308
SW_8	0.0000	0.0047	0.0000	0.0000	0.0338	0.0663	2.5921
SW_9	0.0000	0.0072	0.0000	0.0000	0.0338	0.0670	2.6085
SW_{10}	0.0002	0.0068	0.0000	0.0000	0.0068	0.0781	2.6926
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4.0331
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4.9890
Total	**47.7361**	**60.6509**	**79.2945**	**75.7116**	**50.0916**	**49.7216**	**40.2453**
Ground Water Releases, ha.m							
GW_1	21.8939	27.1354	21.6755	27.5601	28.8515	23.5857	8.5313
GW_2	22.7712	28.7842	22.6435	28.7078	29.7219	24.2158	8.5431
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.3007
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.3007
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.3007
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.3007
GW_7	5.8897	9.0862	11.5470	11.8267	9.8485	6.1844	14.9501
GW_8	7.6239	9.4519	19.1196	12.8846	9.8485	7.9286	13.9694
GW_9	15.2460	11.3034	20.4250	17.6867	9.8485	15.5887	13.9245
GW_{10}	23.7322	11.6018	20.6730	16.8457	11.7424	12.8358	13.9573
GW_{11}	11.6740	20.3579	17.1761	18.0993	25.4059	16.9759	8.4483
GW_{12}	21.6243	28.7842	21.3962	28.3098	27.5249	23.9259	8.4934
Total	**130.4552**	**146.5050**	**154.6559**	**161.9207**	**152.7921**	**131.2408**	**100.0202**
Optimal Benefits, Rs./ha.m	**65,66,800**	**125,57,000**	**57,28,100**	**64,87,200**	**1,38,55,000**	**46,24,800**	**9,38,550**

Table 7.348: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Bardoli Branch Canal for Space-Time Integration Strategy

Name of Minor	Baleswar	Ena distributary	Gangadhara	Kareli	Kharwasa	Palsana	Tundi
Optimal Irrigation Intensity,%	**150**	**130**	**110**	**180**	**170**	**150**	**140**
Area Irrigated, ha							
A_1	22.8784	25.6371	30.7690	21.5926	22.0550	148.5686	24.8922
A_2	0.0000	0.0003	0.0000	0.0000	0.0000	8.5112	0.0010
A_3	0.0000	0.0026	0.0000	0.0000	0.0000	126.3320	0.0000
A_4	16.0346	16.5931	42.1957	10.1754	18.1120	89.4317	43.3384
A_5	72.3160	109.8268	34.5187	105.2181	111.6159	170.0297	54.4165
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	122.7919	1.2506
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	76.7162	92.0913	50.9248	83.3449	74.9528	175.4262	71.3058
Total	**187.9452**	**244.1512**	**158.4082**	**220.3310**	**226.7357**	**841.0913**	**195.2045**
Surface Water Releases, ha.m							
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	14.9854	11.5198	20.2251	14.9226	15.0684	42.1521	10.0801
SW_4	18.3531	14.8197	24.6831	17.7579	18.0655	32.7723	13.5695
SW_5	19.3575	16.7838	26.0342	18.3354	18.6760	48.7114	15.3032
SW_6	10.4817	10.2644	14.5611	10.6171	10.5172	93.3775	10.7145
SW_7	0.0002	0.6013	0.0028	2.2964	0.0015	59.5968	0.0898
SW_8	0.0002	1.1324	0.0024	3.1555	0.0049	61.7081	0.0430
SW_9	0.0002	1.4506	0.0020	3.6181	0.0061	63.3778	0.0216
SW_{10}	0.0002	0.5582	0.0018	2.3664	0.0021	63.1033	0.0878
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**63.1785**	**57.1302**	**85.5125**	**73.0694**	**62.3417**	**464.7993**	**49.9095**
Ground Water Releases, ha.m							
GW_1	27.2938	26.4590	25.9687	28.4219	27.1087	128.6630	28.5009
GW_2	28.2047	27.2066	27.3785	29.2190	28.0546	124.0761	29.5548
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	8.7619	8.2388	12.7667	8.5179	8.7589	110.8457	9.5051
GW_8	10.8287	11.2810	13.7601	11.2495	11.9190	112.6292	11.1157
GW_9	11.9024	12.8179	14.3696	12.6072	13.4988	113.4600	12.0006
GW_{10}	9.4529	9.1286	13.6359	9.1598	9.4570	111.0242	10.3220
GW_{11}	20.1836	22.2928	20.2344	21.1233	20.0166	106.3501	20.6144
GW_{12}	27.6291	27.1071	33.8573	28.9760	27.3670	131.4562	28.3126
Total	**144.2571**	**144.5318**	**161.9712**	**149.2746**	**146.1806**	**938.5045**	**149.9261**
Optimal Benefits, Rs./ha.m	**61,78,100**	**79,04,200**	**74,46,200**	**62,40,000**	**70,18,600**	**2,36,80,000**	**92,81,500**

Table 7.349: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Chalthan Branch Canal for Space-Time Integration Strategy

Name of Minor	Bhesthan	Chalthan branch	Devdha	Lajpur distributary	Talangpur	Udhna distributary	vanj
Optimal Irrigation Intensity,%	**200**	**230**	**220**	**140**	**140**	**180**	**210**
Area Irrigated, ha							
A_1	10.2073	18.1417	10.2242	14.4271	17.4421	14.9248	5.5617
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0019	0.0000	0.0000	0.0000	0.0014	0.0001	0.3071
A_4	53.3814	7.8646	3.0735	0.0000	1.6630	19.5844	16.3253
A_5	105.1267	104.9418	111.6388	100.1462	107.6126	110.9093	99.5144
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	1.0749	0.0000	0.0000	0.0782	13.6721	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	80.6159
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	81.0738	82.5118	86.9688	81.5836	82.3873	91.6457	59.0660
Total	**250.8660**	**213.4599**	**211.9053**	**196.2351**	**222.7785**	**237.0643**	**261.3904**
Surface Water Releases, ha.m							
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	7.6027	12.9727	8.6746	9.4965	12.4186	5.7131	3.6136
SW_4	8.9486	15.0909	9.3873	11.8977	13.9921	6.6824	4.4616
SW_5	9.0488	15.5224	9.5325	12.2118	14.7578	7.8342	4.7058
SW_6	16.7889	9.7561	17.4896	6.1582	4.5800	16.8717	2.2543
SW_7	0.1555	0.0543	0.0916	0.7542	0.6480	0.0001	0.6698
SW_8	0.1555	0.1177	0.0916	0.7542	0.6480	0.0001	0.6698
SW_9	0.1408	0.1494	0.0550	0.0601	0.1214	0.0001	0.0002
SW_{10}	0.0283	0.0652	0.0236	0.0122	0.1270	0.0001	8.6120
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**42.8691**	**53.7287**	**45.3458**	**41.3449**	**47.2929**	**37.1018**	**24.9871**
Ground Water Releases, ha.m							
GW_1	28.0241	27.7664	27.7880	25.9142	23.4082	26.4956	18.1735
GW_2	28.8437	28.3419	27.9319	26.4224	23.8726	26.7705	18.4876
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	8.9811	9.1210	8.5129	7.6048	5.6325	7.5569	2.6784
GW_8	8.9811	11.9974	8.5129	7.6048	5.6325	7.5569	2.6784
GW_9	11.5420	13.4100	11.2761	16.1809	15.2308	10.3980	16.9602
GW_{10}	15.3932	9.6116	15.4732	16.5433	15.8684	14.7145	19.1880
GW_{11}	21.3606	20.4823	19.8123	18.9948	18.4053	20.7407	19.2453
GW_{12}	26.5094	28.2437	28.1063	26.5291	23.7286	26.4831	19.0045
Total	**149.6352**	**148.9743**	**147.4136**	**145.7943**	**131.7789**	**140.7162**	**116.4159**
Optimal Benefits, Rs./ha.m	**1,39,96,000**	**79,13,000**	**74,83,600**	**66,21,300**	**72,18,800**	**1,01,54,000**	**78,85,000**

Table 7.350: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Umbhrat Branch Canal upto 58 R.D. for Space-Time Integration Strategy

Name of Minor	Mahuwa	Malekpur	Nizar	Pera distributary
Optimal Irrigation Intensity,%	200	320	250	160
Area Irrigated, ha				
A_1	29.6358	14.8030	23.7844	60.9001
A_2	0.0000	0.0000	0.0000	63.7318
A_3	0.0000	0.0000	0.0000	53.8203
A_4	4.5799	0.0000	21.9902	62.6439
A_5	112.9500	100.3974	113.3894	155.8066
A_6	0.0000	0.0000	0.0215	0.0000
A_7	19.9077	0.0000	11.0329	0.0000
A_8	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000
A_{10}	75.6551	86.1176	76.4775	88.6498
Total	**242.7285**	**201.3180**	**246.6959**	**485.5525**
Surface Water Releases, ha.m				
SW_1	0.0000	0.0000	0.0000	37.7089
SW_2	0.0000	0.0000	0.0000	37.7212
SW_3	20.8888	11.6565	13.3030	33.0661
SW_4	23.7739	13.0138	19.6111	33.0423
SW_5	25.0750	13.2903	20.2441	32.8880
SW_6	15.0885	10.0226	12.7631	32.6384
SW_7	1.2249	0.3631	0.4291	32.7942
SW_8	1.2249	0.3631	0.4291	32.7942
SW_9	1.2249	0.3631	0.4291	32.7942
SW_{10}	1.4509	0.0002	0.4811	32.5532
SW_{11}	0.0000	0.0000	0.0000	34.2536
SW_{12}	0.0000	0.0000	0.0000	36.6183
Total	**89.9518**	**49.0727**	**67.6897**	**408.8726**
Ground Water Releases, ha.m				
GW_1	28.2751	29.0652	28.3677	48.8820
GW_2	29.0152	29.4286	29.1560	49.0433
GW_3	0.0000	0.0000	0.0000	42.6311
GW_4	0.0000	0.0000	0.0000	42.6311
GW_5	0.0000	0.0000	0.0000	42.6311
GW_6	0.0000	0.0000	0.0000	42.6311
GW_7	11.8514	9.9954	10.0829	42.1985
GW_8	11.8514	9.9954	10.0829	32.7512
GW_9	11.8514	9.9954	10.0829	32.7512
GW_{10}	18.1964	14.8481	16.3009	44.3776
GW_{11}	21.4733	20.9911	20.8895	43.2812
GW_{12}	28.9179	29.3882	28.9762	48.3813
Total	**161.4321**	**153.7074**	**153.9390**	**512.1907**
Optimal Benefits, Rs./ha.m	**75,18,500**	**68,79,500**	**98,35,400**	**3,12,32,000**

Table 7.351: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Umbhrat Branch Canal beyond 58 R.D. for Space-Time Integration Strategy

Name of Minor	Bhinar	Borsi	Kalkachha	Kasba	Maroli	Nagod	Umrath
Optimal Irrigation Intensity,%	**100**	**10**	**160**	**230**	**90**	**100**	**70**
Area Irrigated, ha							
A_1	202.6805	0.0000	20.5584	29.4939	34.2350	42.4404	7.1138
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	164.0312	172.2324	112.9975	101.4563	121.4566	119.6653	150.3071
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	175.3639	0.0000	64.5278	73.5849	57.3682	71.7146	113.8838
Total	**542.0756**	**172.2324**	**198.0837**	**204.5351**	**213.0598**	**233.8203**	**271.3047**
Surface Water Releases, ha.m							
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	151.8953	34.5976	17.0816	23.9221	24.7711	30.6220	30.1455
SW_4	175.3938	34.5976	18.5620	26.8274	29.2195	35.9264	17.4067
SW_5	180.1805	34.5976	18.8636	27.4193	30.1257	37.0070	14.8118
SW_6	116.2124	34.5976	13.0514	28.9667	12.6616	22.5671	49.4895
SW_7	104.7396	0.0020	0.0000	0.4380	0.6568	3.8911	36.4356
SW_8	104.7396	0.0020	0.0000	0.4380	0.6568	3.8911	36.4356
SW_9	104.7396	0.0020	0.0002	0.4380	1.6344	3.8911	36.4356
SW_{10}	150.8412	0.0007	0.0000	0.4644	5.3397	6.5105	31.9654
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1088.7420**	**138.3971**	**67.5588**	**108.9139**	**105.0656**	**144.3063**	**253.1257**
Ground Water Releases, ha.m							
GW_1	115.2416	34.5976	27.0500	31.8798	25.3522	31.9086	75.7799
GW_2	121.5320	34.5976	27.4463	32.6575	26.5430	33.3286	72.3699
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	83.4266	43.8585	16.5452	20.1823	15.8751	19.4724	72.4223
GW_8	83.4266	43.8585	16.5452	20.1823	15.8751	19.4724	72.4223
GW_9	83.4266	43.8585	25.4097	20.1823	26.2895	19.4724	72.4223
GW_{10}	81.1231	69.1798	25.7246	25.3101	26.6529	22.5123	70.3440
GW_{11}	109.7442	34.5976	22.1228	26.7227	22.2959	26.8434	68.4545
GW_{12}	120.8330	34.5976	27.4463	32.5711	26.4107	33.1708	72.7488
Total	**798.7537**	**339.1457**	**188.2901**	**209.6881**	**185.2944**	**206.1809**	**576.9640**
Optimal Benefits, Rs./ha.m	**40,15,100**	**24,93,900**	**31,96,500**	**33,41,000**	**32,29,900**	**38,57,700**	**1,32,090**

Table 7.352: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Navsari Branch Canal for Space-Time Integration Strategy

Name of Minor	Dandeswar	Dandi	Machhad	Onjal	Sadlav	Vachharvad	Veraval
Optimal Irrigation Intensity,%	**250**	**80**	**110**	**30**	**320**	**240**	**240**
Area Irrigated, ha							
A_1	18.8831	39.7157	39.3131	14.9333	18.0524	35.6491	29.5944
A_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	8.2026	5.3947	0.0000	0.0000	0.0000	52.3792	0.0637
A_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_5	126.1642	128.4655	91.3268	127.5830	204.4253	166.9728	123.1663
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	81.5535	91.1369	67.6639	106.2674	79.5383	30.4293	98.9784
Total	**234.8034**	**264.7128**	**198.3038**	**248.7837**	**302.0160**	**285.4304**	**251.8028**
Surface Water Releases, ha.m							
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	16.8093	28.8446	28.5686	14.7513	28.6883	34.6884	23.4379
SW_4	17.8907	33.9236	33.5708	14.7075	23.1424	35.1893	26.6481
SW_5	18.1109	34.9582	34.5898	14.6981	22.0126	35.2914	27.3020
SW_6	32.0916	15.0185	14.9515	14.8713	48.9281	53.4851	30.1341
SW_7	1.7684	0.0002	1.0477	0.0000	24.8933	23.7829	0.3337
SW_8	1.7684	0.0002	1.0477	0.0000	24.8933	23.7829	0.3337
SW_9	1.7684	0.0002	1.0477	0.0000	24.8933	23.7829	0.3337
SW_{10}	4.4236	0.0002	0.3173	0.0000	7.9559	8.4279	0.3593
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**94.6313**	**112.7457**	**115.1411**	**59.0282**	**205.4072**	**238.4308**	**108.8825**
Ground Water Releases, ha.m							
GW_1	28.3963	30.0362	29.8738	29.7429	52.4002	44.8502	28.3690
GW_2	28.6858	29.9341	31.2129	29.7372	50.9156	44.9843	29.2284
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	17.1038	19.0388	18.6735	18.8520	48.8430	35.8791	18.5444
GW_8	17.1038	19.0388	18.6735	25.7065	48.8430	35.8791	18.5444
GW_9	17.1038	19.0388	18.6735	18.8520	48.8430	35.8791	18.5444
GW_{10}	22.8115	26.6518	24.8182	19.8035	57.2787	47.3376	24.8120
GW_{11}	28.6732	30.0369	26.1763	29.5185	28.8957	34.7232	29.8444
GW_{12}	28.6536	29.7837	31.0641	29.7342	51.0806	44.9694	29.1329
Total	**188.5318**	**203.5591**	**199.1658**	**201.9468**	**387.0998**	**324.5020**	**197.0199**
Optimal Benefits, Rs./ha.m	**49,13,100**	**55,20,700**	**31,71,400**	**56,23,700**	**23,94,700**	**34,08,200**	**54,68,000**

Table 7.353: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Amalsad Branch Canal for Space-Time Integration Strategy

Name of Minor	Abrama	Arda	Chijgam	Devdha	Mandher	Masa	Panar
Optimal Irrigation Intensity	**70**	**230**	**140**	**200**	**130**	**170**	**120**
Area Irrigated, ha							
A_1	21.5800	83.8523	34.9275	27.0027	26.1822	30.5583	12.7253
A_2	24.5326	0.0000	10.8952	0.0000	0.0000	0.0000	18.8694
A_3	1.0839	138.3428	0.0064	9.3503	14.7731	0.6490	0.0001
A_4	19.5312	0.0000	30.3508	31.1292	42.1065	38.5383	18.3379
A_5	101.4758	343.7599	113.4811	111.3060	105.9282	110.7195	118.5705
A_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	88.7213	148.3923	76.5821	67.6768	58.0453	70.7018	83.9339
Total	**256.9248**	**714.3473**	**266.2431**	**246.4650**	**247.0353**	**251.1669**	**252.4371**
Surface Water Releases, ha.m							
SW_1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_3	26.9820	93.0259	23.9630	10.7133	21.5765	23.1452	17.8618
SW_4	29.8780	88.2425	28.2710	12.2005	23.9781	27.0107	18.7314
SW_5	28.7812	87.2681	29.5646	14.5721	24.4673	27.7981	17.8610
SW_6	18.5386	110.8683	20.0005	30.3330	34.9161	18.4923	13.7361
SW_7	0.3524	93.0188	4.0068	0.0017	2.4747	0.8835	0.0096
SW_8	0.3524	93.0188	4.0068	0.0017	2.4747	0.8835	0.0096
SW_9	32.8634	93.0188	14.3648	0.0017	2.4747	14.3203	12.0006
SW_{10}	0.0943	99.8644	5.2758	0.0025	6.1905	1.9335	0.0001
SW_{11}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**137.8423**	**758.3256**	**129.4533**	**67.8265**	**118.5526**	**114.4671**	**80.2102**
Ground Water Releases, ha.m							
GW_1	27.8750	137.2535	24.4755	26.8029	30.4327	24.6277	25.1082
GW_2	29.0026	135.9730	25.7754	27.0896	31.4226	25.9947	25.5928
GW_3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	17.6484	109.5353	16.0343	16.3821	18.4021	15.7650	15.6225
GW_8	17.6484	109.5353	16.0343	16.3821	18.4021	15.7650	15.6225
GW_9	20.8547	109.5353	27.8436	16.3821	18.4021	26.2044	25.6299
GW_{10}	26.8847	113.2478	26.9140	22.9834	23.9706	26.2276	24.8660
GW_{11}	28.1017	110.3912	26.7437	27.0896	32.1612	25.3222	24.7324
GW_{12}	27.7915	136.1152	24.9514	27.0897	29.9053	24.4953	24.7308
Total	**195.8070**	**961.5866**	**188.7722**	**180.2015**	**203.0987**	**184.4019**	**181.9051**
Optimal Benefits, Rs./ha.m	**1,14,51,000**	**93,61,700**	**1,03,37,000**	**85,15,600**	**92,91,000**	**91,62,500**	**1,03,04,000**

Table 7.354: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Valsad Branch Canal for Space-Time Integration Strategy

Name of Minor	Minkachh	Matvad	Khapariya	Gadat	Pati
Optimal Irrigation Intensity,%	**200**	**200**	**140**	**160**	**130**
Area Irrigated, ha					
A_1	941.2300	646.9741	253.3300	510.0000	625.5400
A_2	0.0000	6.7881	0.0000	5.8000	0.0000
A_3	389.7400	350.7185	224.1000	1092.0000	288.4100
A_4	0.0000	2.4282	0.0000	0.4309	0.0000
A_5	17.5400	33.9405	38.9700	380.0000	144.2100
A_6	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	475.4900	230.7954	243.5900	861.3000	307.9000
TOTAL	**1824.0000**	**1271.4793**	**759.9900**	**2884.2000**	**1366.0600**
Surface Water Releases, ha.m					
SW_1	183.6736	196.4013	0.0000	0.0000	0.0000
SW_2	274.8257	257.0634	78.3094	7.5000	180.6984
SW_3	0.0000	0.0000	0.0000	0.0000	0.0000
SW_4	0.0000	0.0000	0.0000	0.0000	0.0000
SW_5	0.0000	0.0000	0.0000	0.0000	0.0000
SW_6	0.0000	0.0000	0.0000	0.0000	0.0000
SW_7	29.7692	83.3766	67.7603	133.2000	136.6683
SW_8	38.5408	87.1157	66.7471	132.4000	134.3450
SW_9	29.7692	83.3760	67.7600	133.2000	136.6600
SW_{10}	70.7039	98.6440	64.7130	132.1000	126.7200
SW_{11}	267.2943	255.3306	74.1478	25.6000	175.6200
SW_{12}	183.6736	196.5174	0.0000	0.0000	0.0000
Total	**1078.2503**	**1257.8259**	**419.4388**	**564.0000**	**890.7409**
Ground Water Releases, ha.m					
GW_1	349.4359	288.5466	124.9284	247.7000	230.5639
GW_2	316.7836	267.2766	115.4492	225.2000	208.0023
GW_3	281.1070	244.0800	105.0900	200.6000	183.3500
GW_4	248.4556	222.9100	95.6131	178.3000	160.7900
GW_5	301.6668	257.3580	111.0607	214.7000	197.5500
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	521.7877	399.8689	159.0600	319.8000	292.9991
GW_8	511.4160	393.4700	156.7000	307.7000	289.3500
GW_9	521.7877	399.8689	159.0600	319.8000	292.9900
GW_{10}	474.7421	374.4922	152.0600	300.6000	277.5400
GW_{11}	302.2714	258.2142	111.2300	215.6000	197.9700
GW_{12}	320.4116	269.9226	116.5000	228.0000	210.5000
Total	4149.8600	3376.0000	1406.7000	2758.0000	2541.6000
Optimal Benefits, Rs./ha.m	**28,09,400**	**2,25,550**	**10,42,400**	**3,86,990**	**28,09,400**

Table 7.354: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Valsad Branch Canal for Space-Time Integration Strategy (contd.)

Name of Minor	Dhakawad	Bamanvel	Khambada	Dhamadachi	Chanvai distributary
Optimal Irrigation Intensity,%	**80**	**270**	**140**	**110**	**120**
Area Irrigated, ha					
A_1	136.4100	392.9900	415.0800	23.3800	779.4900
A_2	0.0000	0.0000	0.0000	0.0000	0.0000
A_3	62.3600	166.3700	122.7700	0.0406	37.0300
A_4	9.7400	3.9300	0.0000	0.0000	0.0000
A_5	35.0800	0.0000	3.9000	0.0000	132.5100
A_6	0.0000	0.0000	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000	0.0000	0.0000
A_{10}	261.1300	134.9300	378.0500	58.4600	615.7900
TOTAL	504.7200	698.2200	919.8000	81.8806	1564.8200
Surface Water Releases, ha.m					
SW_1	0.0000	67.9601	0.0017	28.9262	0.0000
SW_2	36.5568	89.9712	74.6193	39.3251	84.2047
SW_3	0.0000	0.0000	0.0000	0.0000	0.0000
SW_4	0.0000	0.0000	0.0000	0.0000	0.0000
SW_5	0.0000	0.0000	0.0000	0.0000	0.0000
SW_6	0.0000	0.0000	0.0000	0.0000	0.0000
SW_7	0.0000	0.0079	41.6459	0.0005	0.0024
SW_8	0.0005	0.0674	41.3548	0.0006	0.0015
SW_9	0.0000	0.0079	41.6450	0.0005	0.0024
SW_{10}	0.0054	37.7921	40.2180	0.0086	0.0000
SW_{11}	40.9051	91.1405	67.6150	38.2946	72.3713
SW_{12}	0.0000	68.2106	0.0017	28.9262	0.0000
Total	**77.4678**	**355.1577**	**307.1031**	**135.4823**	**156.5823**
Ground Water Releases, ha.m					
GW_1	105.3403	114.0567	152.5194	51.7791	213.0798
GW_2	99.6991	99.6855	135.6767	50.8761	180.2722
GW_3	93.5350	82.1222	117.2744	49.8890	144.4268
GW_4	87.8944	66.2578	100.4317	48.9870	111.6192
GW_5	97.0874	92.0126	127.8791	50.4580	165.0834
GW_6	0.0000	0.0000	0.0000	0.0000	0.0000
GW_7	157.4700	146.1045	217.3221	75.7022	338.0170
GW_8	156.3000	178.4100	214.5380	77.5720	334.0460
GW_9	157.4700	181.4010	217.3221	75.7000	338.0170
GW_{10}	152.4900	138.6950	203.1123	74.9000	309.0990
GW_{11}	97.1910	92.4580	128.1910	50.4740	165.6910
GW_{12}	100.3200	101.4300	137.5481	50.9760	183.9170
Total	**1304.8000**	**1292.6000**	**1751.8000**	**657.3100**	**2483.2700**
Optimal Benefits, Rs./ha.m	**4,65,390**	**1,56,900**	**4,11,840**	**4,11,410**	**4,14,820**

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Surat branch canal, for space - time integration strategy are illustrated in Fig.7.69, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Bardoli branch canal, for space - time integration strategy are illustrated in Fig.7.70, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Chalthan branch canal, for space - time integration strategy are illustrated in Fig.7.71, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Umbhrat branch canal upto 58 R.D., for space - time integration strategy are illustrated in Fig.7.72, enclosed in C.D.

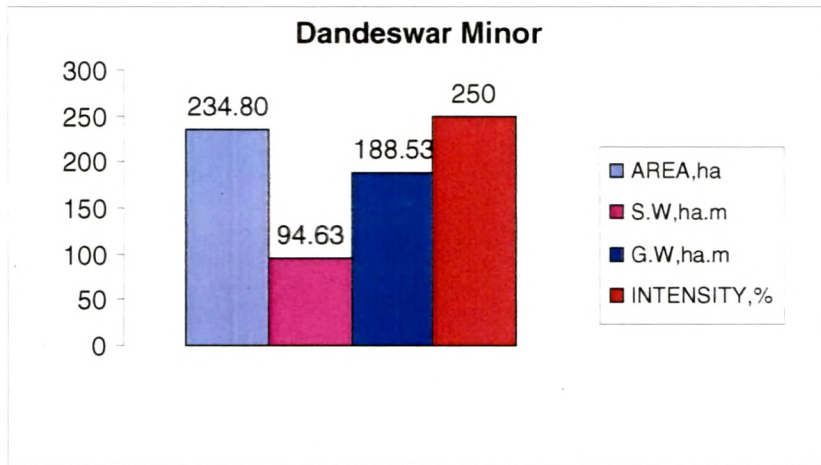
Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Umbhrat branch canal beyond 58 R.D., for space - time integration strategy are illustrated in Fig.7.73, enclosed in C.D.

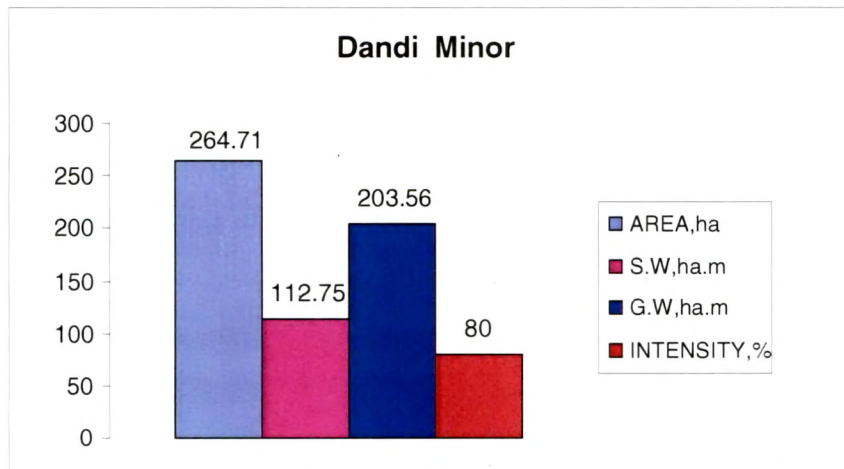
Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Navsari branch canal, for space - time integration strategy are illustrated in Fig.7.74.

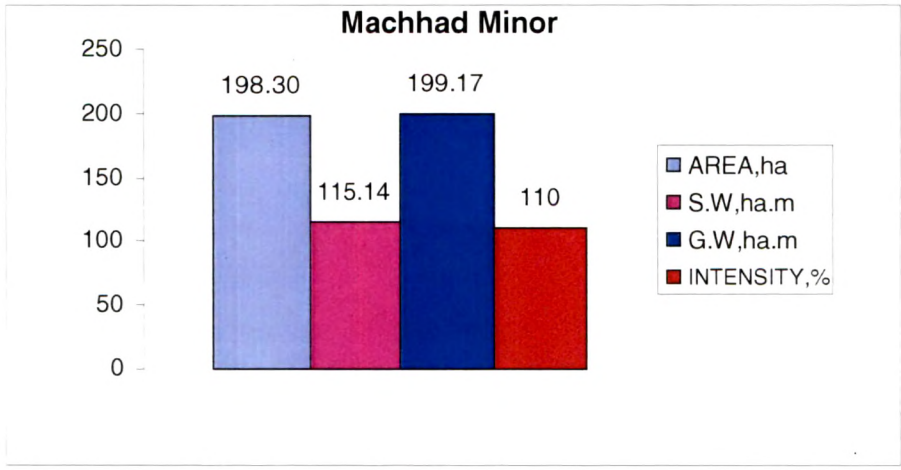
Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Amalsad branch canal, for space - time integration strategy are illustrated in Fig.7.75, enclosed in C.D.

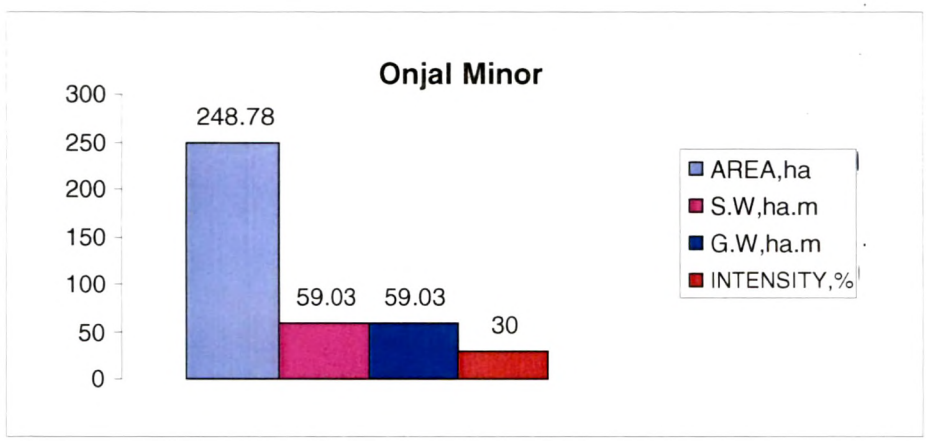
Area irrigated, surface water releases, ground water releases, optimal benefits for optimal irrigation intensities for Valsad branch canal, for space - time integration strategy are illustrated in Fig.7.76, enclosed in C.D.

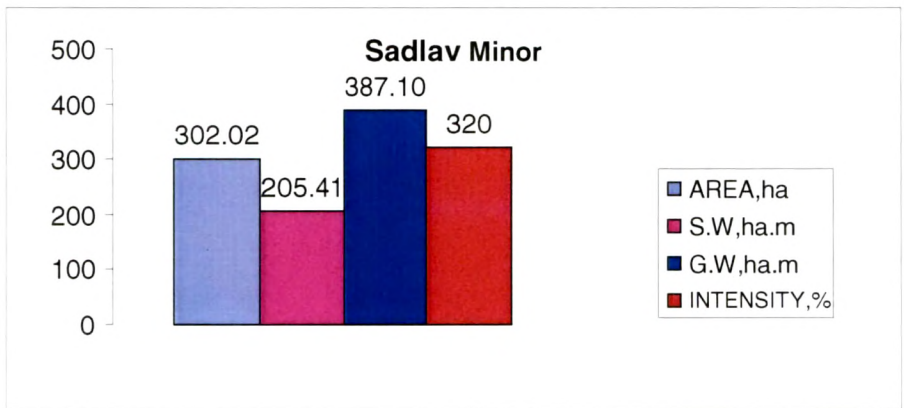
Fig.7.74: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits for Optimal Irrigation Intensities for Navsari Branch Canal, for Space – Time Integration Strategy

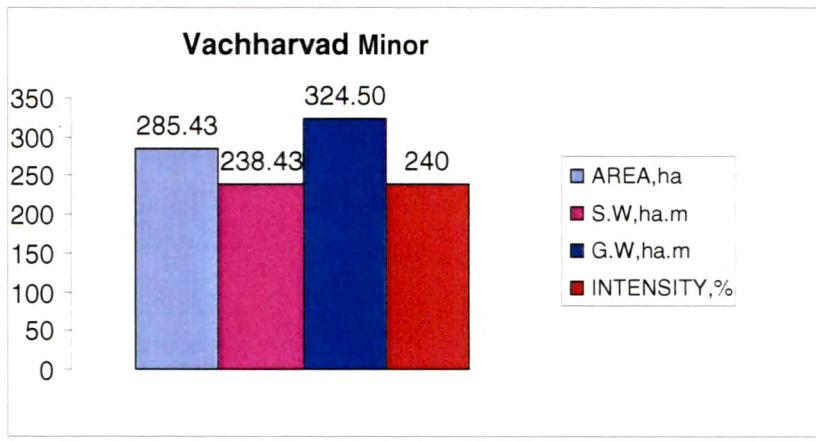


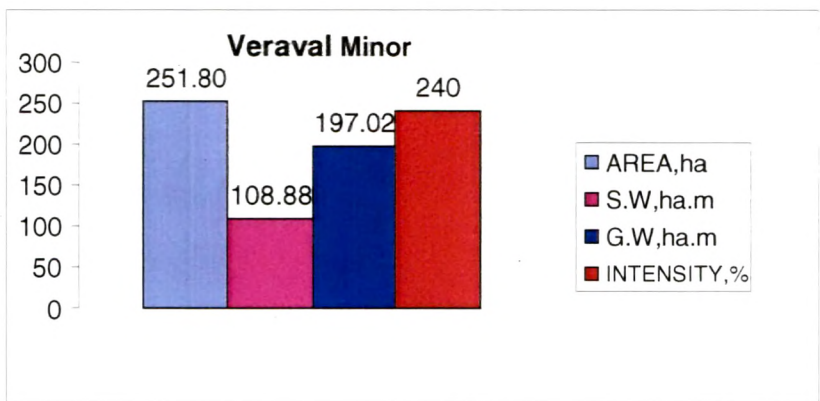


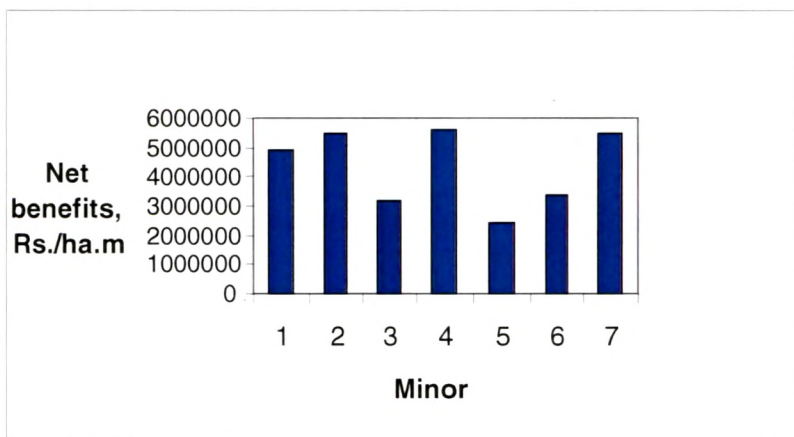

Machhad Minor
250
200
150
100
50
0
198.30
115.14
199.17
110
AREA,ha
S.W,ha.m
G.W,ha.m
INTENSITY,%


Onjal Minor
300
250
200
150
100
50
0
248.78
59.03
59.03
30
AREA,ha
S.W,ha.m
G.W,ha.m
INTENSITY,%


Sadlav Minor
500
400
300
200
100
0
302.02
205.41
387.10
320
AREA,ha
S.W,ha.m
G.W,ha.m
INTENSITY,%


Vachharvad Minor
350
300
250
200
150
100
50
0
285.43
238.43
324.50
240
AREA,ha
S.W,ha.m
G.W,ha.m
INTENSITY,%


Veraval Minor
300
250
200
150
100
50
0
251.80
108.88
197.02
240
AREA,ha
S.W,ha.m
G.W,ha.m
INTENSITY,%


Net benefits, Rs./ha.m
6000000
5000000
4000000
3000000
2000000
1000000
0
1
2
3
4
5
6
7
Minor

The results of sensitivity analysis for Surat branch canal, in which net benefits considering different changes in unit cost of surface water determined, for space - time integration strategy are illustrated in Fig.7.77, enclosed in C.D.

The results of sensitivity analysis for Bardoli branch canal, in which net benefits considering different changes in unit cost of surface water determined, for space - time integration strategy are illustrated in Fig.7.78, enclosed in C.D.

The results of sensitivity analysis for Chalthan branch canal, in which net benefits considering different changes in unit cost of surface water determined, for space - time integration strategy illustrated in Fig.7.79, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal upto 58 R.D., in which net benefits considering different changes in unit cost of surface water determined, for space - time integration strategy are illustrated in Fig.7.80, enclosed in C.D.

The results of sensitivity analysis for Umbhrat beyond branch canal 58 R.D., in which net benefits considering different changes in unit cost of surface water determined, for space - time integration strategy are illustrated in Fig.7.81, enclosed in C.D.

The results of sensitivity analysis for Navsari branch canal, in which net benefits considering different changes in unit cost of surface water determined, for space - time integration strategy are illustrated in Fig.7.82.

The results of sensitivity analysis for Amalsad branch canal, in which net benefits considering different changes in unit cost of surface water determined, for space - time integration strategy are illustrated in Fig.7.83, enclosed in C.D.

The results of sensitivity analysis for Valsad branch canal, in which net benefits considering different changes in unit cost of surface water determined, for space - time integration strategy are illustrated in Fig.7.84, enclosed in C.D.

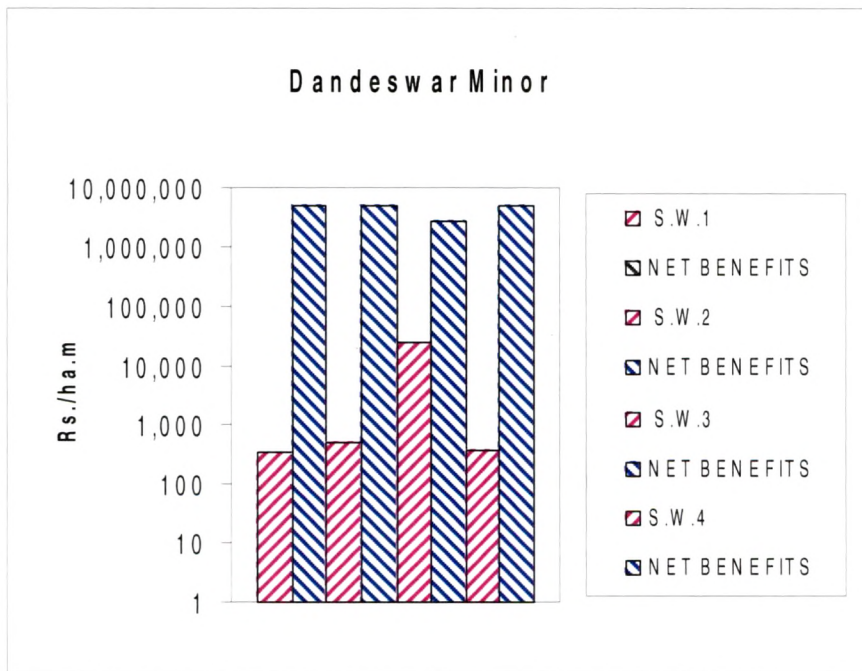
Fig. 7.82: Sensitivity Analysis: Net Benefits Considering Different Changes in Unit Cost of Surface Water and Unit Cost of Ground Water for Navsari Branch Canal, for Space - Time Integration Strategy

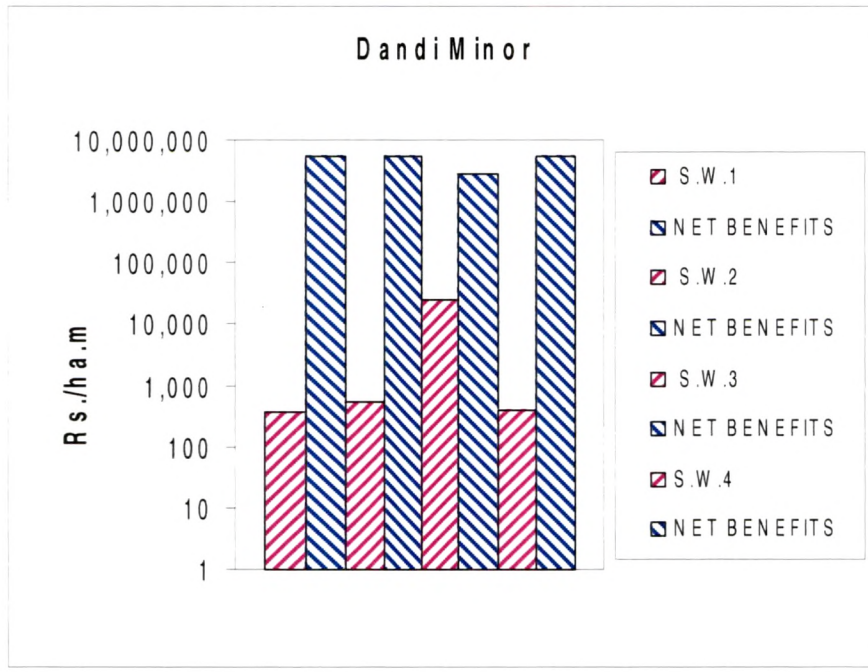
N.B.: S.W.1 = Unit cost of surface water charged by the N.W.R.W.S. & K. department to the farmers.

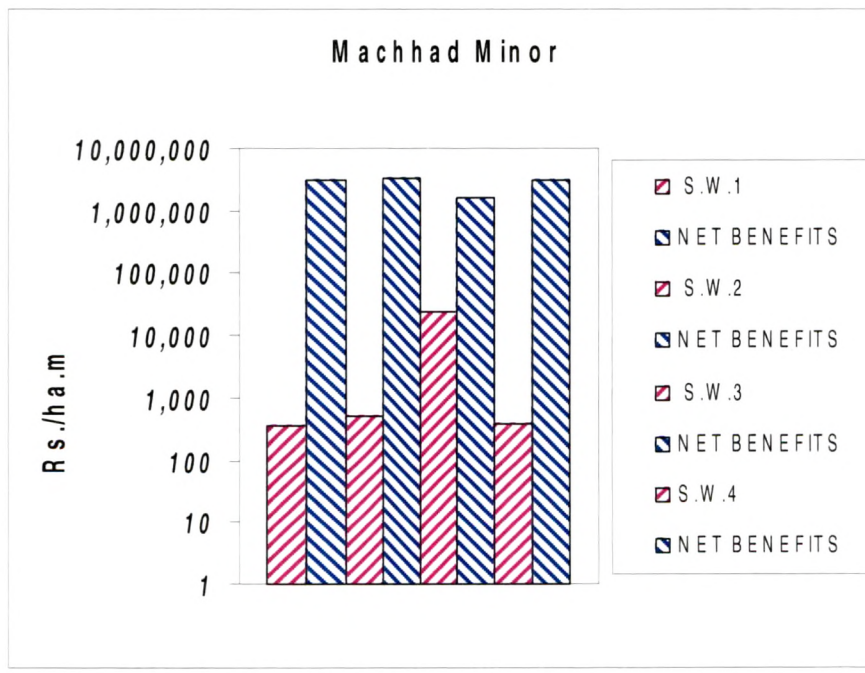
S.W.2 = Actual unit cost of surface water.

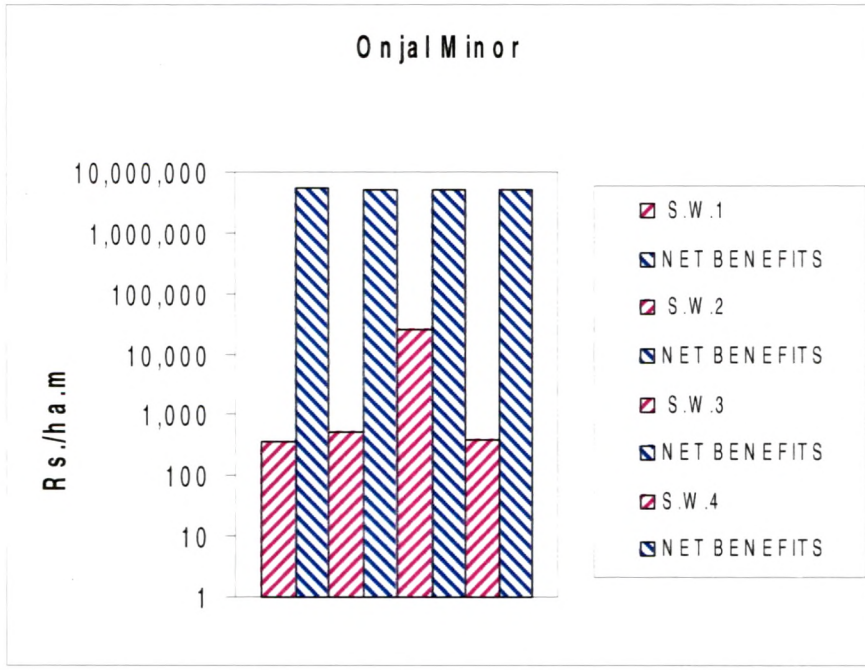
S.W.3 = Unit cost of surface water charged by the N.W.R.W.S. & K. department to the industries.

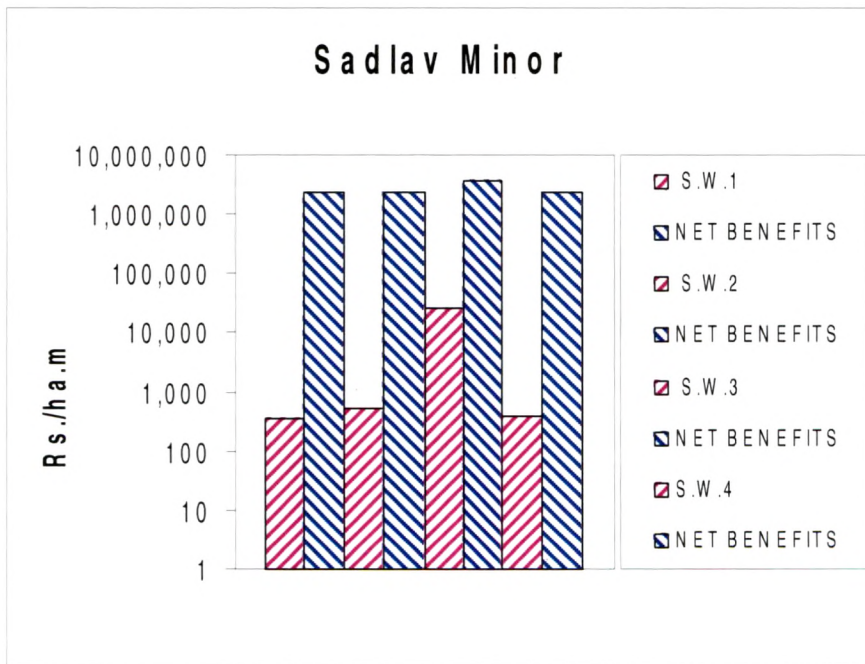
S.W.4 = Actual unit cost of surface water during the last 10 years,i.e. 1999-2000

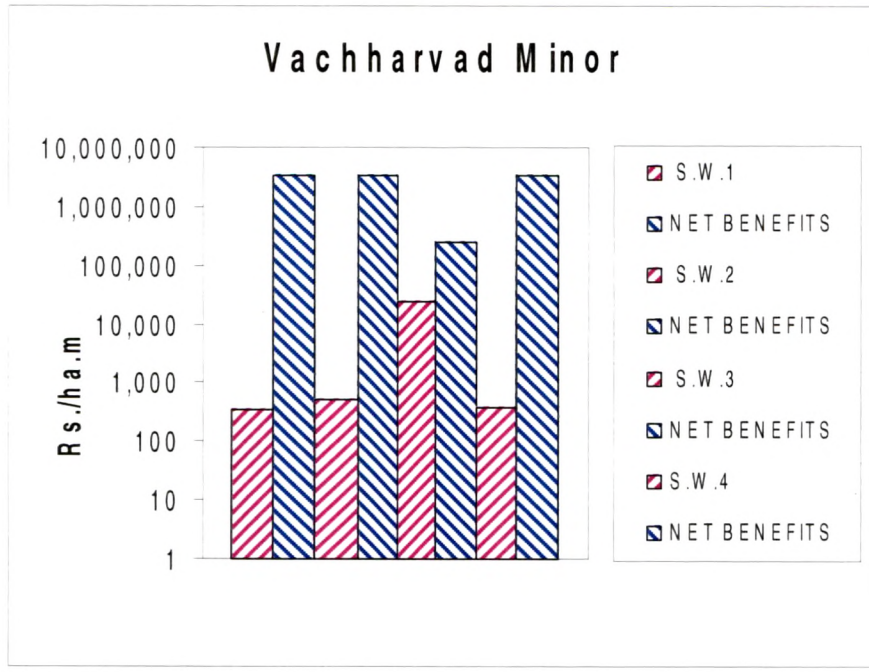


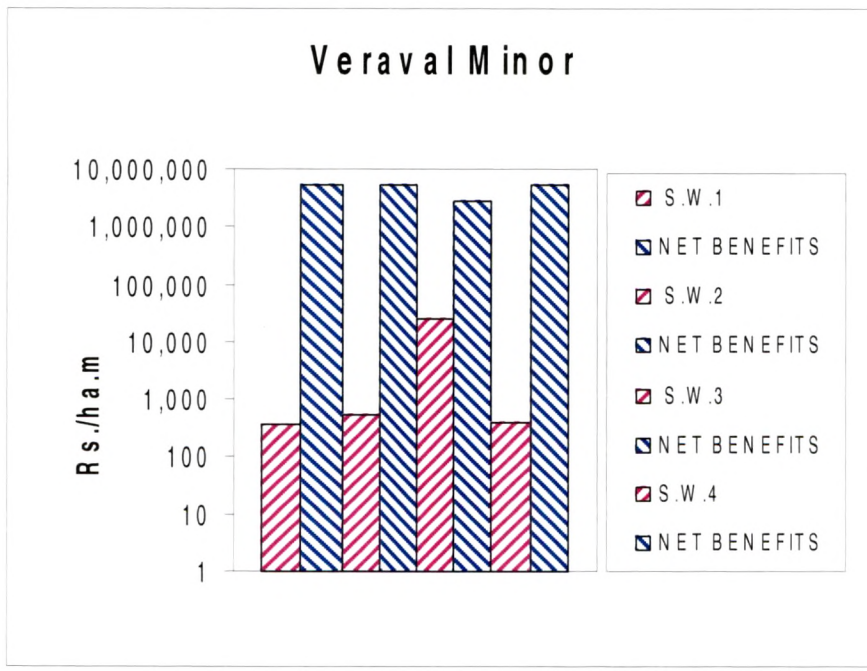

Dandi Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W.1
NET BENEFITS
S.W.2
NET BENEFITS
S.W.3
NET BENEFITS
S.W.4
NET BENEFITS


Machhad Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W.1
NET BENEFITS
S.W.2
NET BENEFITS
S.W.3
NET BENEFITS
S.W.4
NET BENEFITS


Onjal Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W.1
NET BENEFITS
S.W.2
NET BENEFITS
S.W.3
NET BENEFITS
S.W.4
NET BENEFITS


Sadlav Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W.1
NET BENEFITS
S.W.2
NET BENEFITS
S.W.3
NET BENEFITS
S.W.4
NET BENEFITS


Vachharvad Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W.1
NET BENEFITS
S.W.2
NET BENEFITS
S.W.3
NET BENEFITS
S.W.4
NET BENEFITS


Veraval Minor
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Rs./ha.m
S.W.1
NET BENEFITS
S.W.2
NET BENEFITS
S.W.3
NET BENEFITS
S.W.4
NET BENEFITS

The results of sensitivity analysis for Surat branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for space - time integration strategy are illustrated in Fig.7.85, enclosed in C.D.

The results of sensitivity analysis for Bardoli branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for space - time integration strategy are illustrated in Fig.7.86, enclosed in C.D.

The results of sensitivity analysis for Chalthan branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for space - time integration strategy are illustrated in Fig.7.87, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal upto 58 R.D., in which net benefits considering percentage increase and decrease in selling price/yield determined, for space - time integration strategy are illustrated in Fig.7.88, enclosed in C.D.

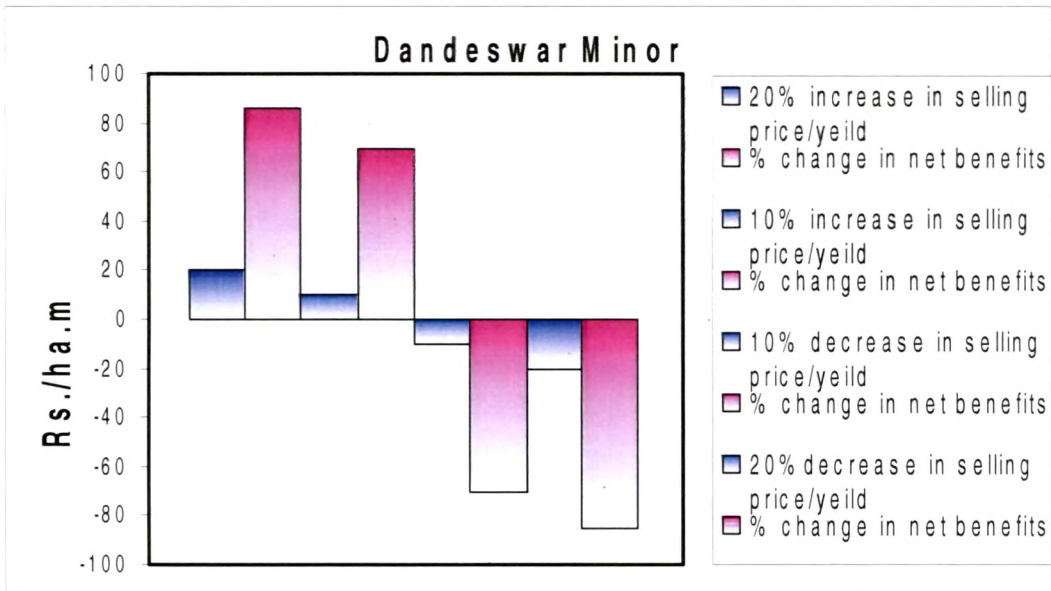
The results of sensitivity analysis for Umbhrat branch canal beyond 58 R.D., in which net benefits considering percentage increase and decrease in selling price/yield determined, for space - time integration strategy are illustrated in Fig.7.89, enclosed in C.D.

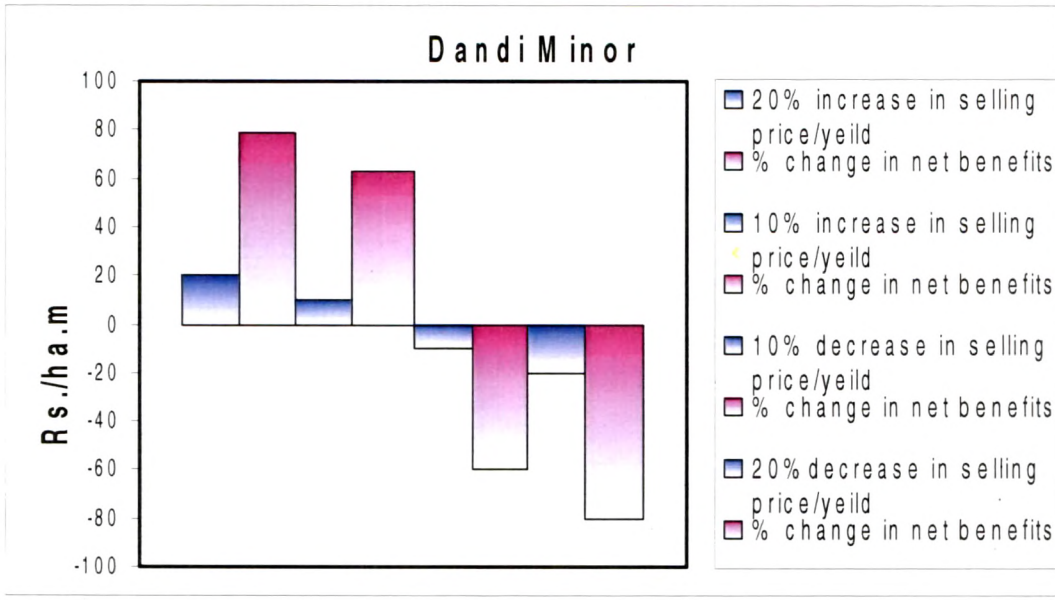
The results of sensitivity analysis for Navsari branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for space - time integration strategy are illustrated in Fig.7.90.

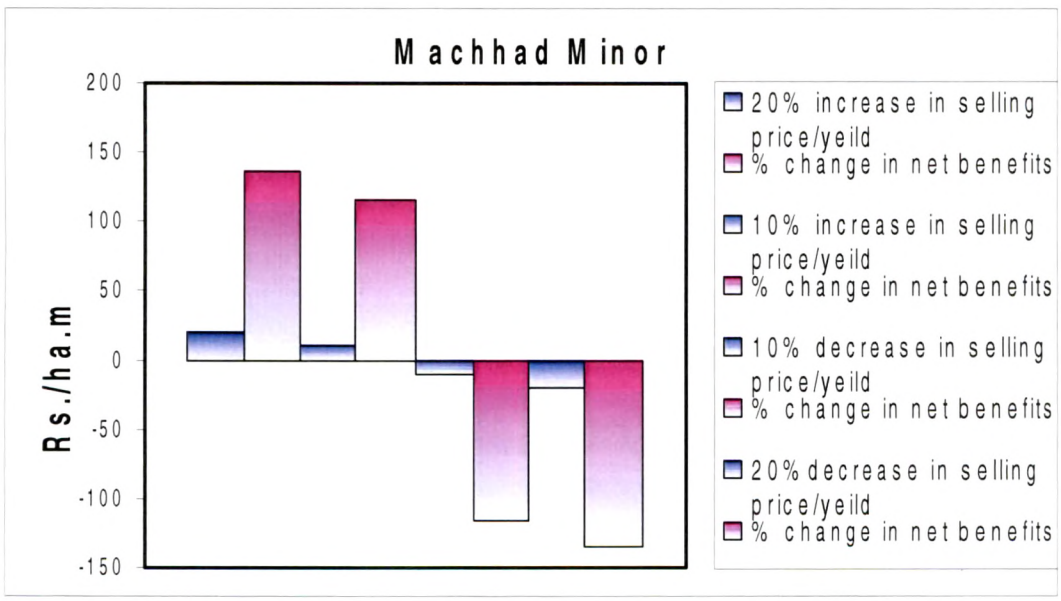
The results of sensitivity analysis for Amalsad branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for space - time integration strategy are illustrated in Fig.7.91, enclosed in C.D.

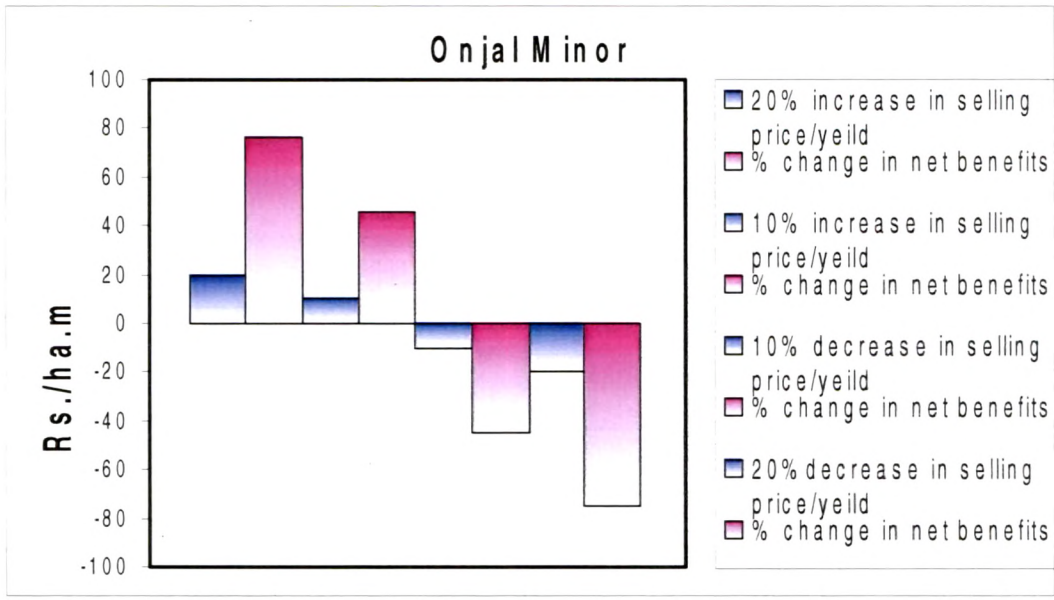
The results of sensitivity analysis for Valsad branch canal, in which net benefits considering percentage increase and decrease in selling price/yield determined, for space - time integration strategy are illustrated in Fig.7.92, enclosed in C.D.

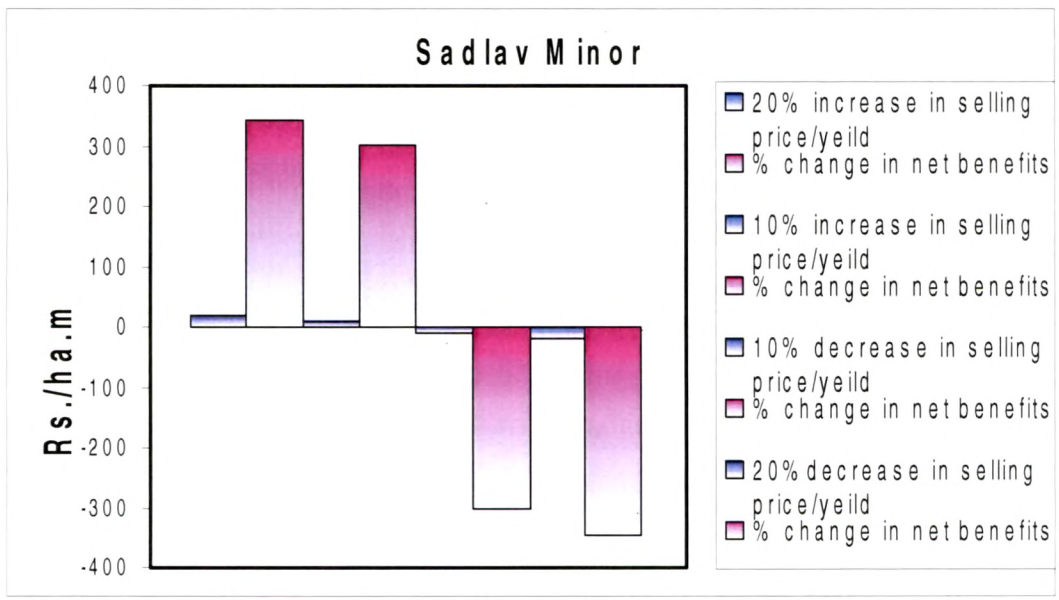
Fig. 7.90: Sensitivity Analysis: Net Benefits Considering Percentage Increase and Decrease in Selling Price/Yield for Navsari Branch Canal, for Space – Time Integration Strategy

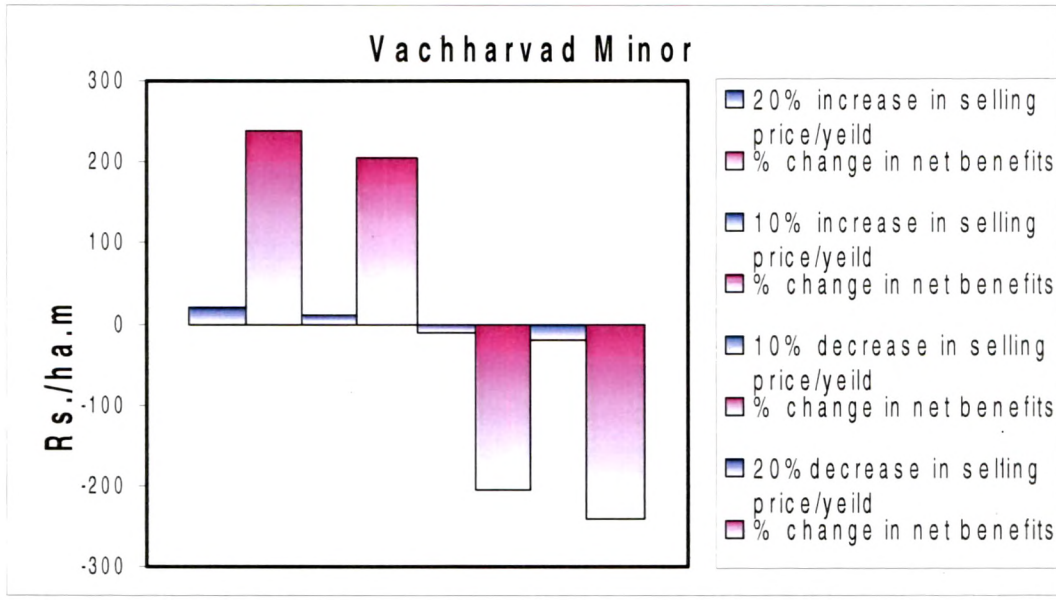


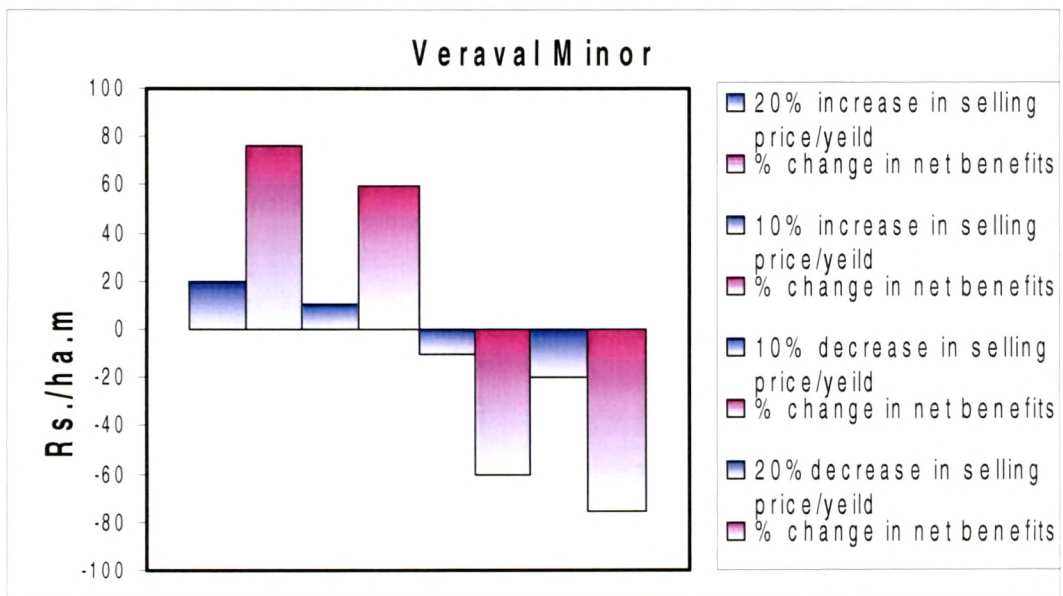

Dandi Minor
Rs./ha.m
100
80
60
40
20
0
-20
-40
-60
-80
-100
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Machhad Minor
Rs./ha.m
200
150
100
50
0
-50
-100
-150
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Onjal Minor
Rs./ha.m
100
80
60
40
20
0
-20
-40
-60
-80
-100
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Sadlav Minor
Rs./ha.m
400
300
200
100
0
-100
-200
-300
-400
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Vachharvad Minor
300
200
100
0
-100
-200
-300
Rs./ha.m
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits


Veraval Minor
100
80
60
40
20
0
-20
-40
-60
-80
-100
Rs./ha.m
20% increase in selling price/yeild
% change in net benefits
10% increase in selling price/yeild
% change in net benefits
10% decrease in selling price/yeild
% change in net benefits
20% decrease in selling price/yeild
% change in net benefits

The results of sensitivity analysis for Surat branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for space – time integration strategy are illustrated in Fig.7.93, enclosed in C.D.

The results of sensitivity analysis for Bardoli branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for space – time integration strategy are illustrated in Fig.7.94, enclosed in C.D.

The results of sensitivity analysis for Chalthan branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for space – time integration strategy are illustrated in Fig.7.95, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal upto 58 R.D., in which net benefits using 10 years average evapotranspiration rate determined, for space – time integration strategy are illustrated in Fig.7.96, enclosed in C.D.

The results of sensitivity analysis for Umbhrat branch canal beyond 58 R.D., in which net benefits using 10 years average evapotranspiration rate determined, for space – time integration strategy are illustrated in Fig.7.97, enclosed in C.D.

The results of sensitivity analysis for Navsari branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for space – time integration strategy are illustrated in Fig.7.98.

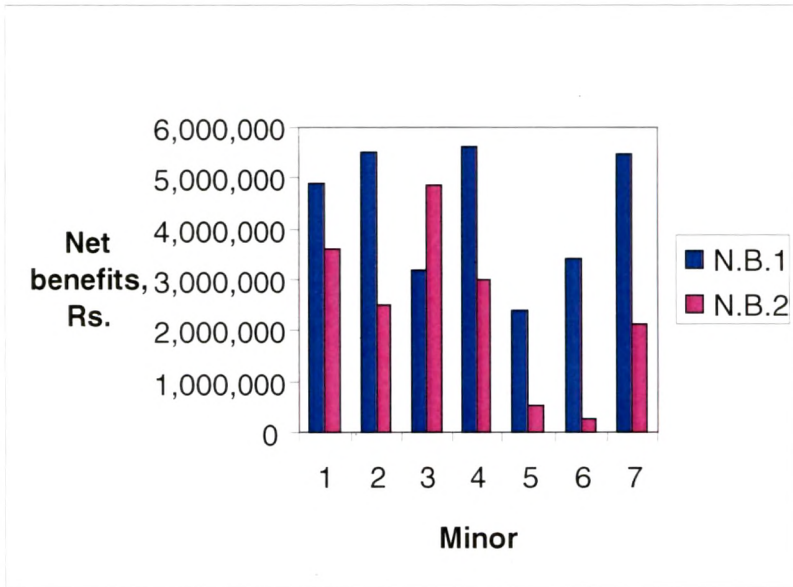
The results of sensitivity analysis for Amalsad branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for space – time integration strategy are illustrated in Fig.7.99, enclosed in C.D.

The results of sensitivity analysis for Valsad branch canal, in which net benefits using 10 years average evapotranspiration rate determined, for space – time integration strategy are illustrated in Fig.7.100, enclosed in C.D.

Fig. 7.98: Sensitivity Analysis: Net Benefits Using 10 Years Average Evapotranspiration Rate for Navsari Branch Canal, for Space - Time Integration Strategy

N.B.: N.B.1 = Net benefits obtained using the actual water requirement of the crops during the year 1999-2000

N.B.2 = Net benefits obtained using the actual water requirement of the crops during the last 10 years, i.e. year 1990-1991 to1999-2000

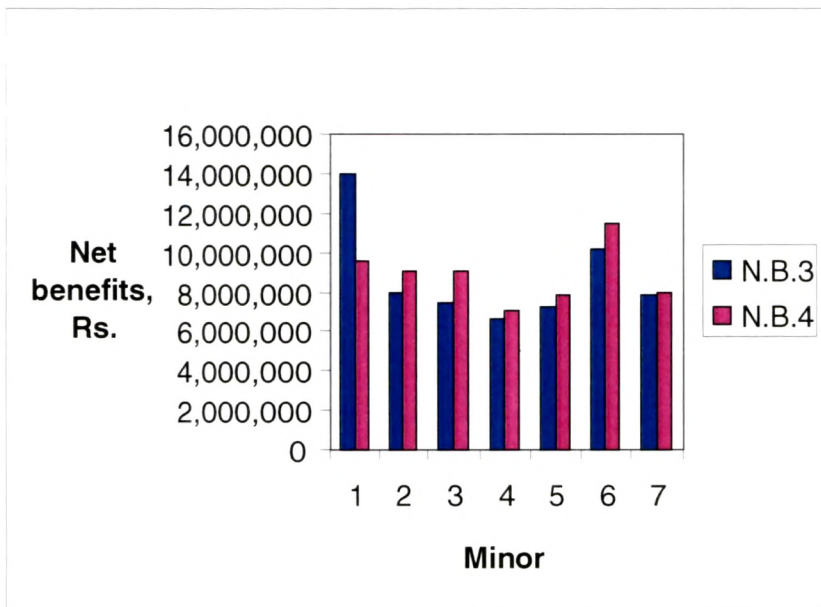


The results of sensitivity analysis using surface water restriction method in Chalthan branch canal, for space - time integration strategy are illustrated in Fig.7.101.

Fig. 7.101: Sensitivity Analysis: Net Benefits Using Surface Water Restriction Method in Chalthan Branch Canal, for Space - Time Integration Strategy

N.B.: N.B.3 = Net benefits obtained in Chalthan branch canal using both surface and ground water.

N.B.4 = Net benefits obtained in Chalthan using surface water restriction method.

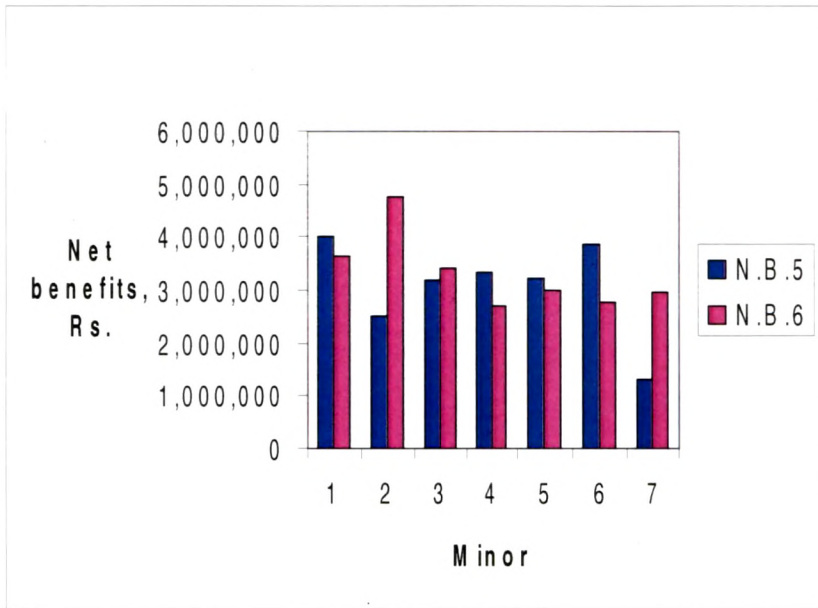


The results of sensitivity analysis using original cropping pattern, for space - time integration strategy are illustrated in Fig.7.102.

Fig. 7.102: Sensitivity Analysis: Net Benefits using Original Cropping Pattern in Umbhrat Branch Canal, for Space - Time Integration Strategy

N.B.: N.B.5 = Net benefits obtained in Umbhrat branch canal using prevailing cropping pattern

N.B.6 = Net benefits obtained in Umbhrat branch canal using original practiced cropping pattern



Fuzzy linear programming (FLP) model

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 17 of Surat branch canal, for space – time integration strategy are given in Tables 7.355 to 7.371, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Bardoli branch canal, for space – time integration strategy are given in Tables 7.372 to 7.378, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Chalthan branch canal, for space – time integration strategy are given in Tables 7.379 to 7.385, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 4 of Umbhrat branch canal upto 58 R.D., for space – time integration strategy are given in Tables 7.386 to 7.389, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Umbhrat branch canal beyond 58 R.D., for space – time integration strategy are given in Tables 7.390 to 7.396, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP

for optimal irrigation intensities for minors 1 to 7 of Navsari branch canal, for space – time integration strategy are given in Tables 7.397 to 7.403.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 7 of Amalsad branch canal, for space – time integration strategy are given in Tables 7.404 to 7.410, enclosed in C.D.

Area irrigated, surface water releases, ground water releases, optimal benefits and % change in net benefits due to FLP over that due to of LP for optimal irrigation intensities for minors 1 to 10 of Valsad branch canal, for space – time integration strategy are given in Tables 7.411 to 7.420, enclosed in C.D.

Table 7.397: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Dandeswar Minor of Navsari Branch Canal for Space-Time Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	18.8831	18.4626	0.0004
A_2	0.0000	0.0000	0.0000
A_3	8.2026	29.0822	0.0175
A_4	0.0000	0.0000	0.0000
A_5	126.1642	155.2849	100.0312
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	81.5535	48.2856	80.3034
Total	**234.8034**	**251.1153**	**180.3525**
Surface Water Releases, ha.m			
SW_1	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000
SW_3	16.8093	20.9652	32.7199
SW_4	17.8907	19.6602	31.6951
SW_5	18.1109	19.3944	31.4863
SW_6	32.0916	38.3656	46.9404
SW_7	1.7684	17.3504	55.3670
SW_8	1.7684	17.3504	55.3670
SW_9	1.7684	17.3504	55.3670
SW_{10}	4.4236	2.7799	72.6408
SW_{11}	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000
Total	**94.6313**	**153.2165**	**381.5835**
Ground Water Releases, ha.m			
GW_1	28.3963	33.4450	23.4482
GW_2	28.6858	33.0957	23.1738
GW_3	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000
GW_7	17.1038	26.4361	0.0041
GW_8	17.1038	26.4361	0.0041
GW_9	17.1038	26.4361	0.0041
GW_{10}	22.8115	35.9731	0.0140
GW_{11}	28.6732	23.3986	13.4765
GW_{12}	28.6536	33.1345	23.2043
Total	**188.5318**	**238.3552**	**83.3291**
Optimal Benefits, Rs./ha.m	**49,13,100**	**39,11,000**	**50,83,405**
% Change in Net Benefits Due to FLP to that of LP			**3.47**

Table 7.398: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Dandi Minor of Navsari Branch Canal for Space-Time Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	39.7157	33.2424	6.7328
A_2	0.0000	0.0000	0.0000
A_3	5.3947	2.6660	0.0000
A_4	0.0000	0.0000	0.0000
A_5	128.4655	123.2566	100.3748
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	91.1369	72.7871	85.1142
Total	**264.7128**	**231.9521**	**192.2218**
Surface Water Releases, ha.m			
SW_1	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000
SW_3	28.8446	23.9828	43.9832
SW_4	33.9236	28.3347	44.1802
SW_5	34.9582	29.2212	44.2204
SW_6	15.0185	12.1360	43.4469
SW_7	0.0002	0.0004	67.7613
SW_8	0.0002	0.0004	67.7613
SW_9	0.0002	0.0004	67.7613
SW_{10}	0.0002	0.0002	83.0503
SW_{11}	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000
Total	**112.7457**	**93.6761**	**462.1649**
Ground Water Releases, ha.m			
GW_1	30.0362	22.9986	25.4430
GW_2	29.9341	24.1633	25.4957
GW_3	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000
GW_7	19.0388	15.3846	0.0000
GW_8	19.0388	15.3846	0.0000
GW_9	19.0388	15.3846	0.0000
GW_{10}	26.6518	22.5174	0.0000
GW_{11}	30.0369	24.2719	19.1739
GW_{12}	29.7837	24.0341	25.4899
Total	**203.5591**	**164.1391**	**95.6025**
Optimal Benefits, Rs./ha.m	**55,20,700**	**46,81,100**	**52,78,166**
% Change in Net Benefits Due to FLP to that of LP			**-4.39**

Table 7.399: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Machhad Minor of Navsari Branch Canal for Space-Time Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	39.3131	33.1474	8.4427
A_2	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000
A_5	91.3268	89.9775	99.9066
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	67.6639	53.8018	53.8470
Total	**198.3038**	**176.9267**	**162.1963**
Surface Water Releases, ha.m			
SW_1	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000
SW_3	28.5686	24.0811	6.7905
SW_4	33.5708	28.4285	8.5525
SW_5	34.5898	29.3141	8.9114
SW_6	14.9515	12.2466	1.9940
SW_7	1.0477	0.1434	0.0642
SW_8	1.0477	0.1434	0.0642
SW_9	1.0477	0.1434	0.0642
SW_{10}	0.3173	0.0834	0.2721
SW_{11}	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000
Total	**115.1411**	**94.5839**	**26.7131**
Ground Water Releases, ha.m			
GW_1	29.8738	24.0785	14.8945
GW_2	31.2129	25.2423	15.3661
GW_3	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000
GW_7	18.6735	15.4866	0.8153
GW_8	18.6735	15.4866	0.8153
GW_9	18.6735	15.4866	0.8153
GW_{10}	24.8182	21.1704	6.0344
GW_{11}	26.1763	21.3198	9.8539
GW_{12}	31.0641	25.1130	15.3137
Total	**199.1658**	**163.3838**	**63.9085**
Optimal Benefits, Rs./ha.m	**31,71,400**	**27,88,100**	**41,19,995**
% Change in Net Benefits Due to FLP to that of LP			**29.91**

Table 7.400: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Onjal Minor of Navsari Branch Canal for Space-Time Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	14.9333	10.6961	37.3440
A_2	0.0000	0.0000	0.0000
A_3	0.0000	0.0009	0.0000
A_4	0.0000	0.0000	0.0000
A_5	127.5830	119.7967	101.3953
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	106.2674	75.0738	82.3516
Total	**248.7837**	**205.5675**	**221.0909**
Surface Water Releases, ha.m			
SW_1	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000
SW_3	14.7513	10.5081	70.8944
SW_4	14.7075	10.5078	77.2924
SW_5	14.6981	10.5078	78.5957
SW_6	14.8713	10.5089	53.4777
SW_7	0.0000	0.0000	83.3195
SW_8	0.0000	0.0008	104.4422
SW_9	0.0000	0.0000	83.3195
SW_{10}	0.0000	0.0006	93.4670
SW_{11}	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000
Total	**59.0282**	**42.0340**	**644.8084**
Ground Water Releases, ha.m			
GW_1	29.7429	21.0178	26.3592
GW_2	29.7372	21.0178	28.0719
GW_3	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000
GW_7	18.8520	13.3221	0.0231
GW_8	25.7065	21.0173	1.3759
GW_9	18.8520	13.3221	0.0231
GW_{10}	19.8035	21.0155	0.0429
GW_{11}	29.5185	20.8559	19.8688
GW_{12}	29.7342	21.0176	27.8816
Total	**201.9468**	**152.5861**	**103.6465**
Optimal Benefits, Rs./ha.m	**56,23,700**	**43,48,600**	**55,45,950**
% Change in Net Benefits Due to FLP to that of LP			**-1.38**

Table 7.401: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Sadlav Minor of Navsari Branch Canal for Space-Time Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	18.0524	17.5417	0.0115
A_2	0.0000	0.0000	0.0000
A_3	0.0000	0.0000	0.0000
A_4	0.0000	0.0000	0.0000
A_5	204.4253	256.5042	99.9838
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	79.5383	79.6361	38.1218
Total	**302.0160**	**353.6820**	**138.1171**
Surface Water Releases, ha.m			
SW_1	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000
SW_3	28.6883	36.6726	9.5673
SW_4	23.1424	26.6970	9.2703
SW_5	22.0126	24.6650	9.2098
SW_6	48.9281	60.3731	24.4519
SW_7	24.8933	48.0128	3.4856
SW_8	24.8933	48.0128	3.4856
SW_9	24.8933	48.0128	3.4856
SW_{10}	7.9559	35.4188	7.1208
SW_{11}	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000
Total	**205.4072**	**327.8649**	**70.0769**
Ground Water Releases, ha.m			
GW_1	52.4002	66.3690	11.2449
GW_2	50.9156	63.6986	11.1654
GW_3	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000
GW_7	48.8430	68.0618	3.3988
GW_8	48.8430	68.0618	3.3988
GW_9	48.8430	68.0618	3.3988
GW_{10}	57.2787	73.7075	7.7873
GW_{11}	28.8957	29.2730	6.2820
GW_{12}	51.0806	63.9953	11.1742
Total	**387.0998**	**501.2288**	**57.8502**
Optimal Benefits, Rs./ha.m	**23,94,700**	**14,22,700**	**31,00,584**
% Change in Net Benefits Due to FLP to that of LP			**29.48**

Table 7.402: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Vachharvad Minor of Navsari Branch Canal for Space-Time Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	35.6491	32.0405	0.0000
A_2	0.0000	0.0000	0.0000
A_3	52.3792	65.5975	0.0000
A_4	0.0000	0.0000	0.0000
A_5	166.9728	206.8078	99.9995
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	30.4293	59.0046	62.7521
Total	**285.4304**	**363.4504**	**162.7516**
Surface Water Releases, ha.m			
SW_1	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000
SW_3	34.6884	40.2474	9.4720
SW_4	35.1893	35.9680	9.1753
SW_5	35.2914	35.0963	9.1148
SW_6	53.4851	62.4277	24.3622
SW_7	23.7829	48.9106	16.0133
SW_8	23.7829	48.9106	16.0133
SW_9	23.7829	48.9106	16.0133
SW_{10}	8.4279	38.2272	25.3320
SW_{11}	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000
Total	**238.4308**	**358.6984**	**125.4962**
Ground Water Releases, ha.m			
GW_1	44.8502	61.8565	17.3368
GW_2	44.9843	60.7109	17.2573
GW_3	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000
GW_7	35.8791	52.6963	0.0052
GW_8	35.8791	52.6963	0.0052
GW_9	35.8791	52.6963	0.0052
GW_{10}	47.3376	61.0170	2.8745
GW_{11}	34.7232	37.1253	10.2324
GW_{12}	44.9694	60.8382	17.2662
Total	**324.5020**	**439.6368**	**64.9828**
Optimal Benefits, Rs./ha.m	**34,08,200**	**46,67,400**	**44,18,079**
% Change in Net Benefits Due to FLP to that of LP			**29.63**

Table 7.403: Area Irrigated, Surface Water Releases, Ground Water Releases, Optimal Benefits and % Change in Net Benefits Due to FLP to that of LP for Optimal Irrigation Intensities for Veraval Minor of Navsari Branch Canal for Space-Time Integration Strategy

Area Irrigated, ha	Flp1	Flp2	Flp3
A_1	29.5944	1.3853	17.6200
A_2	0.0000	0.0000	0.0000
A_3	0.0637	30.3113	0.0001
A_4	0.0000	0.0000	0.0000
A_5	123.1663	133.0481	100.8805
A_6	0.0000	0.0000	0.0000
A_7	0.0000	0.0000	0.0000
A_8	0.0000	0.0000	0.0000
A_9	0.0000	0.0000	0.0000
A_{10}	98.9784	63.5966	84.5128
Total	**251.8028**	**228.3413**	**203.0134**
Surface Water Releases, ha.m			
SW_1	0.0000	0.0000	0.0000
SW_2	0.0000	0.0000	0.0000
SW_3	23.4379	9.0155	54.2077
SW_4	26.6481	5.0368	56.6309
SW_5	27.3020	4.2264	57.1245
SW_6	30.1341	20.4828	59.9715
SW_7	0.3337	12.9037	74.2545
SW_8	0.3337	12.9037	74.2545
SW_9	0.3337	12.9037	74.2545
SW_{10}	0.3593	10.8176	93.3649
SW_{11}	0.0000	0.0000	0.0000
SW_{12}	0.0000	0.0000	0.0000
Total	**108.8825**	**88.2902**	**544.0630**
Ground Water Releases, ha.m			
GW_1	28.3690	37.5695	25.9085
GW_2	29.2284	36.5045	26.5572
GW_3	0.0000	0.0000	0.0000
GW_4	0.0000	0.0000	0.0000
GW_5	0.0000	0.0000	0.0000
GW_6	0.0000	0.0000	0.0000
GW_7	18.5444	21.7047	0.0004
GW_8	18.5444	21.7047	0.0004
GW_9	18.5444	21.7047	0.0004
GW_{10}	24.8120	25.0694	0.0007
GW_{11}	29.8444	24.8260	20.7220
GW_{12}	29.1329	36.6228	26.4851
Total	**197.0199**	**225.7063**	**99.6747**
Optimal Benefits, Rs./ha.m	**54,68,000**	**43,83,000**	**53,72,160**
% Change in Net Benefits Due to FLP to that of LP			**-1.75**

7.4 ANALYSIS

General Strategy

The optimal irrigation intensities are achieved by linear programming and fuzzy linear programming.

In the Surat branch canal the maximum irrigation intensity that can be achieved is 360% for Dumas distributary and the second ranked irrigation intensity can be achieved is 330% for Umbhel minor, which is also its existing irrigation intensity. Similarly, for Palsod minor the maximum area irrigated can be 298.5883 ha and the optimal net benefits available can be 1,95,33,000 Rs./ha.m for Saroli subminor.

In the Bardoli branch canal the maximum irrigation intensity that can be achieved is 240% for Kharwasa minor and the maximum area irrigated is 246.4807 ha for Palsana minor. The optimal net benefits are also the maximum for Palsana minor i.e. 1,35,16,000 Rs./ha.m in entire Bardoli branch canal command area.

In the Chalthan branch canal the maximum irrigation intensity that can be achieved is 250% for Chalthan branch and the maximum area irrigated comes to be 291.3226 ha for Bhestan minor. The optimal net benefits achieved are for Udhna distributary which comes out to be 1,80,14,000 Rs./ha.m

In the Umbhrat branch canal upto 58 R.D. the maximum irrigation intensity that can be achieved is 270% for Nizar minor and the maximum area irrigated comes to be 465.7690 ha for Pera distributary with optimal net benefits of 3,02,70,000 Rs./ha.m

In the Umbhrat branch canal beyond 58 R.D. the Borsi minor is having the least optimal irrigation intensity of 10%. The maximum irrigation intensity achieved is 160% for Kalakachha minor with optimal net benefits of

28,42,900 Rs./ha.m. The maximum area irrigated is 206.1035 ha in Umbhrat minor.

In Navsari branch canal 310% irrigation intensity can be achieved for Veraval minor. The maximum area irrigated comes to be 278.7256 ha for Vachharvad minor and the optimal net benefits that can be achieved in any minor of Navsari branch canal is 37,87,500 Rs./ha.m for Onjal minor.

In Amalsad branch canal the maximum irrigation intensity that can be achieved is 280% with maximum area irrigated of 631.81 ha for Arda minor. The optimal net benefits that can be achieved is 1,46,32,000 Rs./ha.m for Chijgam minor.

In Valsad branch canal the maximum irrigation intensity that can be achieved comes out to be 270% for Bamanval minor and the maximum area irrigated is 35.2381 ha for Dhakawad minor with optimal net benefits that can be achieved are 4,65,390 Rs./ha.m.

In fuzzy linear programming models the change in net benefits due to FLP over that of LP are observed. The maximum increase in net benefit is observed to be 45% for Vachharvad minor and the maximum decrease is 65%, for Sadlav minor.

Space Integration Strategy

The optimal irrigation intensities are achieved by linear programming and fuzzy linear programming.

In the Surat branch canal the maximum irrigation intensity that can be achieved is 390% for Dumas distributary and the second ranked irrigation intensity can be achieved is 330% for Umbhel minor, which is also its existing irrigation intensity. The maximum area irrigated can be 229.1269 ha and the maximum net benefits available can be 1,43,79,000 Rs./ha.m for Surat branch.

In the Bardoli branch canal the maximum irrigation intensity that can be achieved is 220% for Baleswar minor and the maximum area irrigated is 218.0219 ha for Palsana minor. The optimal net benefits are also the maximum for Palsana minor i.e. 1,28,12,000 Rs./ha.m in entire Bardoli branch canal command area.

In the Chalthan branch canal the maximum irrigation intensity that can be achieved is 230% for Chalthan branch and the maximum area irrigated comes to be 207.2016 ha for Udhna distributary. The optimal net benefits achieved are also for Udhna distributary which comes out to be 1,64,99,000 Rs./ha.m

In the Umbhrat branch canal upto 58 R.D. the maximum irrigation intensity that can be achieved is 270% for Nizar minor and the maximum area irrigated comes to be 485.5525 ha for Pera distributary with optimal net benefits of 3,12,32,000 Rs./ha.m

In the Umbhrat branch canal beyond 58 R.D. the Borsi minor is having the least optimal irrigation intensity of 10%. The maximum irrigation intensity achieved is 230% for Kasba minor with maximum area irrigated of 191.9255 ha. The optimal benefits of 1,15,06,000 Rs./ha.m can be achieved in Bhinar minor.

In Navsari branch canal 270% irrigation intensity can be achieved for Dandeswar minor with the maximum area irrigated of 226.2231 ha. The optimal net benefits that can be achieved in any minor of Navsari branch canal is 70,35,900 Rs./ha.m for Sadlav minor.

In Amalsad branch canal the maximum irrigation intensity that can be achieved is 240% for Devdha minor. The maximum area irrigated is 539.4808 ha for Arda minor. The optimal net benefits that can be achieved is 1,02,28,000 Rs./ha.m for Chijgam minor.

In Valsad branch canal the maximum irrigation intensity that can be achieved comes out to be 200% for Minkachh minor and the maximum area irrigated is 35.2381 ha for Dhakawad minor. The optimal net benefits that can be achieved are 4,11,840 Rs./ha.m for Khambada minor.

In fuzzy linear programming models the change in net benefits due to FLP over that of LP are observed. The maximum increase in net benefit is observed to be 192.85% for Vachharvad minor and the maximum decrease is 77.60%, for Sadlav minor.

Space - Time Integration Strategy

The optimal irrigation intensities are achieved by linear programming and fuzzy linear programming.

In the Surat branch canal the maximum irrigation intensity that can be achieved is 420% for Dumas distributary, which is also its existing irrigation intensity with the maximum area irrigated of 294.0413 ha and the maximum net benefits available can be 1,38,55,000 Rs./ha.m for Surat branch.

In the Bardoli branch canal the maximum irrigation intensity that can be achieved is 180% for Kareli minor and the maximum area irrigated is 841.0913 ha for Palsana minor. The optimal net benefits are also the maximum for Palsana minor i.e. 2,36,80,000 Rs./ha.m in entire Bardoli branch canal command area.

In the Chalthan branch canal the maximum irrigation intensity that can be achieved is 230% for Chalthan branch and the maximum area irrigated comes to be 261.3904 ha for Vanj minor. The optimal net benefits achieved are comes to be 1,39,96,000 Rs./ha.m

In the Umbhrat branch canal upto 58 R.D. the maximum irrigation intensity that can be achieved is 320% for Malekpur minor and the

maximum area irrigated comes to be 485.5525 ha for Pera distributary with optimal net benefits of 3,12,32,000 Rs./ha.m

In the Umbhrat branch canal beyond 58 R.D. the Borsi minor is having the least optimal irrigation intensity of 10%. The maximum irrigation intensity achieved is 230% for Kasba minor. The maximum area irrigated is 271.3047 ha for Umbhrat minor. The optimal benefits of 40,15,100 Rs./ha.m can be achieved in Bhinar minor.

In Navsari branch canal 320% irrigation intensity can be achieved for Sadlav minor with the maximum area irrigated of 302.0160 ha. The optimal net benefits that can be achieved in any minor of Navsari branch canal is 56,23,700 Rs./ha.m for Onjal minor.

In Amalsad branch canal the maximum irrigation intensity that can be achieved is 230% for Arda minor with the maximum area irrigated of 714.3473 ha. The optimal net benefits that can be achieved is 1,14,51,000 Rs./ha.m for Abrama minor.

In Valsad branch canal the maximum irrigation intensity that can be achieved comes out to be 200% for Matwad minor and the maximum area irrigated is 27.6539 ha for Pati minor minor. The optimal net benefits that can be achieved are 41,48,200 Rs./ha.m for Chanvai Distributary.

In fuzzy linear programming models the change in net benefits due to FLP over that of LP are observed. As shown over here, the maximum increase in net benefit is observed to be 30% for Sadlav, Machhad and Vachharvad minors and the maximum decrease is 5% for Dandi minor.

Analysis Considering All Strategies

As presented above in each branch canal, though the irrigation intensity is maximum and the area irrigated is also maximum, the optimal net benefits are not the maximum for that respective minor, but it is for another minor. The reason for this is, though the area and the irrigation intensity are

maximum, the optimal net benefit is not only the function of these, but it is also related with water released and its costs. Therefore, the optimal net benefits tend to decrease when the cost of water increases. For example, in general strategy, the optimal cropped area of Arda minor of Amalsad branch is 631.81 ha but at the same time, the surface and ground water releases are maximum compared to the other minors i.e. 833.7468 ha.m and 1074.8687 ha.m respectively, which make the net benefits to be minimum i.e. 21,78,500 Rs./ha.m when compared to the command area of other minors.

In sensitivity analysis considering unit cost of SW1, the cost charged to the farmers i.e. 360 Rs./ha.m, SW2, the actual unit cost of surface water i.e. 527 Rs./ha.m, SW3, the cost charged to the industries i.e. 25,000 Rs./ha.m and SW4, the average unit cost during last ten years i.e. 385 Rs./ha.m are considered to check the behavior of the optimal and the study reveals that in almost every minor the optimal net benefits are more in case of SW1 and they are minimum in case of SW3, as the increase in unit cost of surface water tends to decrease the optimal net benefits.

In sensitivity analysis considering ten years evapotranspiration rate, the deviations of the net benefits are observed. Evapotranspiration rate as per the year 1999-2000 is different from that of average of the last ten years rate. This study reveals that the change of evapotranspiration rate completely changes the optimal benefits ranging from 15% to 100% increase in some minors and 20% to 50% decrease in optimal benefits in other minors. The reason is when the water required is more it will try to decrease the net benefits and therefore in majority of the cases the net benefits decrease as the average water requirement during last ten years is much more compared to that of 1999-2000.

In sensitivity analysis using surface water restriction method in Chalthan branch canal due to restriction of surface water, ground water is used

completely. Basically the reason for adopting this method in this command is, particularly in this canal it was observed that for the crop water requirement of 173 ha.m, through surface water 133 ha.m and through ground water irrigation 278 ha.m is released. This trend of irrigation started to introduce problems of water logging which was less than 10% in the command area and after introducing the project with continuous increment have risen to about 85%. The study reveals that by introduction of use of only ground water the maximum net benefits are improved and moreover the problem of waterlogging can be minimized. This can be effectively seen in fig nos. 7.33, 7.67 and 7.101, out of the three strategies, the third strategy i.e. space time integration strategy shows more benefits with this method, as it has the flexibility of using any source of water as and when required, resulting in maximum net benefits.

In sensitivity analysis using originally practiced cropping pattern before the project was started in Umbhrat branch canal rather than growing crops like sugarcane and most dominantly paddy, a study has been carried out to check the deviation of the optimal by growing the originally practiced crops before the project started. As seen from figure 7.34, 7.68 and 7.102, it is evident that the maximum benefits can be attained using the prevalent cropping rather than originally practiced cropping pattern. The reason for this is due to salinity problems, the originally used crops cannot be grown effectively with optimal net benefits. Therefore it can be replaced with salt tolerant crops.

In fuzzy linear programming models the change in net benefits due to FLP over that of LP are observed. The maximum increase in net benefit is observed to be 45% for Vachharvad minor and the maximum decrease is 64.58% for Sadlav minor. The reason over here is though the fuzzification gives more space for the optimum to improve, depending on other constraints the optimal in some cases may utilize that fuzzified values but in other cases it may even decline.

This reveals that the space – time integration strategy gives the optimal net benefits at par with that of the optimal net benefits obtained by the fuzzy linear programming.

In Surat branch canal, comparison of existing and strategywise irrigation intensity and optimal benefits of different minors are given in Table 7.421, enclosed in CD.

In Bardoli branch canal, comparison of existing and strategywise irrigation intensity and optimal benefits of different minors are given in Table 7.422, enclosed in CD.

In Chalthan branch canal, comparison of existing and strategywise irrigation intensity and optimal benefits of different minors are given in Table 7.423, enclosed in CD.

In Umbhrat branch canal upto 58 R.D., comparison of existing and strategywise irrigation intensity and optimal benefits of different minors are given in Table 7.424, enclosed in CD.

In Umbhrat branch canal beyond 58 R.D., comparison of existing and strategywise irrigation intensity and optimal benefits of different minors are given in Table 7.425, enclosed in CD.

In Navsari branch canal, comparison of existing and strategywise irrigation intensity and optimal benefits of different minors are given in Table 7.426.

Table 7.426: Minorwise Irrigation Intensity and Optimal Benefits as Per Different Strategies for Navsari branch canal

Minor	Existing		General strategy		Space integration strategy		Space – time strategy	
	Irrigation intensity %	Optimal benefits Rs./ha.m	Irrigation intensity %	Optimal benefits Rs./ha.m	Irrigation intensity %	Optimal benefits Rs./ha.m	Irrigation intensity %	Optimal benefits Rs./ha.m
Dandeswar	200	61,50,800	200	61,50,800	270	41,64,100	250	49,13,100
Dandi	10	32,41,200	20	32,48,900	70	15,11,900	80	55,20,700
Machhad	50	55,20,800	120	62,01,600	50	56,08,500	110	31,71,400
Onjal	20	32,04,600	30	37,87,600	50	31,99,500	30	56,23,700
Sadlav	250	20,33,600	250	20,33,600	270	70,35,900	320	23,94,700
Vachharvad	240	22,10,100	240	22,10,100	240	22,89,300	240	34,08,200
Veraval	240	23,82,200	310	25,69,500	240	34,76,700	240	55,68,000

In Dandeswar minor the existing irrigation intensity is 200%. As per general strategy, the optimal irrigation intensity is also 200% and optimal net benefits are 61,50,800 Rs./ha.m.

In Dandi minor the existing irrigation intensity is 10%. As per space - time integration strategy, 80% irrigation intensity can be achieved and the optimal net benefits increase from 32, 41,200 Rs./ha.m to 55,20,700 Rs./ha.m.

In Machhad minor the existing irrigation intensity is 50%. As per general strategy, 120% optimal irrigation intensity can be achieved and optimal net benefits increase from 55,20,800 Rs./ha.m to 62,01,600 Rs./ha.m.

In Onjal minor the existing irrigation intensity is 20%. As per space - time integration strategy, 30% irrigation intensity can be achieved and the optimal net benefits increase from 32, 04,600 Rs./ha.m to 56,23,700 Rs./ha.m.

In Sadlav minor the existing irrigation intensity is 250%. As per space - time integration strategy, 270% irrigation intensity can be achieved and

the optimal net benefits increase from 20,33,600 Rs./ha.m to 70,35,900 Rs./ha.m.

In Vachharvad minor the existing irrigation intensity is 240%. As per space - time integration strategy, 240% irrigation intensity can be achieved and the optimal net benefits increase from 22,10,100 Rs./ha.m to 34,08,200 Rs./ha.m.

In Veraval minor the existing irrigation intensity is 240%. As per space - time integration strategy, the optimal irrigation intensity is also 240% and the optimal net benefits increase from 23,82,200 Rs./ha.m to 54,68,000 Rs./ha.m.

In Amalsad branch canal, comparison of existing and strategywise irrigation intensity and optimal benefits of different minors are given in Table 7.427, enclosed in CD.

In Valsad branch canal, comparison of existing and strategywise irrigation intensity and optimal benefits of different minors are given in Table 7.428, enclosed in CD.

From Table 7.421, the recommended strategies in different minors of Surat branch canal, according to the maximum optimal net benefits are tabulated in Table 7.429, enclosed in CD.

From Table 7.422, the recommended strategies in different minors of Bardoli branch canal, according to the maximum optimal net benefits are tabulated in Table 7.430, enclosed in CD.

From Table 7.423, the recommended strategies in different minors of Chalthan branch canal, according to the maximum optimal net benefits are tabulated in Table 7.431, enclosed in CD.

From Table 7.424, the recommended strategies in different minors of Umbhrat branch canal upto 58 R.D., according to the maximum optimal net benefits are tabulated in Table 7.432, enclosed in CD.

From Table 7.425, the recommended strategies in different minors of Umbhrat branch canal upto 58 R.D., according to the maximum optimal net benefits are tabulated in Table 7.433, enclosed in CD.

From Table 7.426, the recommended strategies in different minors of Navsari branch canal, according to the maximum optimal net benefits are tabulated in Table 7.434.

Table 7.434: Recommended Strategies in Different Minors of Navsari Branch Canal, According to the Maximum Optimal Net Benefits

	General strategy	Space integration strategy	Space - time integration strategy
Minor	Dandeswar	Sadlav	Dandi
	Machhad		Onjal
			Vachharvad
			Veraval

For Dandeswar and Machhad minors, general strategy gives more optimal net benefits because this strategy results in more area irrigated by more surface water, which costs at the cheapest rate of 360 Rs./ha.m resulting in more optimal net benefits.

For Sadlav minor, space integration strategy gives more optimal net benefits, because out of the three strategies, this strategy results in maximum use of surface water, which costs at the cheapest rate of 360 Rs./ha.m resulting in more optimal net benefits.

For Dandi, Onjal, Vachharvad and Veral minors, space –time integration strategy gives more optimal net benefits, because out of the three strategies, this strategy results in more area irrigated by more surface water and less ground water. As the other two strategies making more use of ground water and the surface water costs being cheaper compared

to ground water cost, consequently resulting in more optimal net benefits in space – time integration strategy.

From Table 7.427, the recommended strategies in different minors of Amalsad branch canal, according to the maximum optimal net benefits are tabulated in Table 7.435, enclosed in CD.

From Table 7.428, the recommended strategies in different minors of Valsad branch canal, according to the maximum optimal net benefits are tabulated in Table 7.436, enclosed in CD.

C.C.A., Existing Irrigation Intensities and Optimal Irrigation Intensities that can be Achieved for General, Space and Space – Time Strategies of Various Minors of Various Branch Canals of K.L.B.M.C. Command Area are given in Table 7.437.

Table 7.437: C.C.A., Existing Irrigation Intensities and Optimal Irrigation Intensities that can be Achieved for General, Space and Space – Time Strategies of Various Minors of Various Branch Canals of K.L.B.M.C. Command Area

Name of branch canal	Minor	C.C.A. ha	Existing irrigation intensity %	Optimal Irrigation Intensity,%		
				General	Space integration	Space time integration
Surat	Bhairav	771.00	60	130	60	70
	Dumas Distributary	11,100.00	423	360	390	420
	Kalsad	3,271.00	254	280	260	320
	Katargam Dist.	16,736.00	126	200	200	150
	Khajod	2,450.00	215	220	280	230
	Kholwad	4,363.00	73	130	140	130
	Nagod Dist.	17,954.00	99	170	100	150
	Palsod	4,247.00	128	130	200	170
	Pasodra	4,300.00	153	220	150	180
	Puna Subminor	2,590.00	110	130	180	160
	Sania	3,760.00	134	200	200	170
	Saroli Subminor	2,643.00	132	160	200	180
	Segwa	1,700.00	224	290	290	260
	Simada	4,690.00	136	210	210	180
	Surat Branch	8,200.00	142	150	150	190
	Umbhel	1,220.00	331	330	330	260
	Vihan	1,720.00	112	180	180	180
Bardoli	Baleswar	2,633.00	153	220	220	150
	Ena Dist.	5,797.00	57	130	130	130
	Gangadhara	1,230.00	38	100	110	110
	Kareli	5,210.00	115	170	160	180
	Kharwasa	6,137.00	175	240	170	170
	Palsana Dist.	21,686.00	108	180	150	150
	Tundi	6,332.00	67	140	140	140
Chalthan	Bhesthan	12,400.00	131	200	150	200
	Chalthan branch	6,150.00	157	230	230	230
	Devdha	4,780.00	150	220	220	220
	Lajpur dist.	8,900.00	94	160	90	140
	Talangpur	11,670.00	71	140	120	140
	Udhna Dist.	8,190.00	117	130	130	180
	Vanj	6,100.00	140	210	210	210

Umbhrat Upto 58 R.D.	Mahuwa	1,870.00	135	200	200	200
	Malekpur	6,750.00	253	250	250	320
	Nizar	5,940.00	201	270	270	250
	Pera Dist.	18,900.00	130	130	160	160
Umbhrat Beyond 58 R.D.	Bhinar	44.50	100	110	130	100
	Borsi	100.81	1	10	10	10
	Kalkachka	3,0.36	105	160	160	160
	Kasba	66.33	163	230	230	230
	Maroli	27.80	61	60	80	90
	Nagod	20.34	104	170	100	100
	Umrath	81.97	49	120	120	70
Navsari	Dandeswar	12.23	275	270	270	250
	Dandi	104.20	10	20	70	80
	Machhad	28.36	50	120	50	110
	Onjal	26.40	17	30	50	30
	Sadlav	29.54	322	250	270	320
	Vachharvad	28.70	237	240	240	240
	Veraval	39.74	312	310	240	240
Amalsad	Abrama	30.00	42	110	110	70
	Arda	44.43	220	280	220	230
	Chijgam	26.70	116	160	190	140
	Devdha	24.50	168	220	240	200
	Mandher	51.14	59	80	70	130
	Masa	30.20	105	150	170	170
	Panar	45.50	96	170	150	120
Valsad	Bamanvel	469.43	294	270	290	270
	Chanvai Dist.	445.00	49	120	120	120
	Dhakawad	881.58	34	80	270	80
	Dhamadachi	339.00	36	110	110	110
	Gadat	1,618.80	87	160	160	160
	Khambada	1,039.00	72	140	140	140
	Khapariya	560.86	72	140	140	140
	Matvad	340.93	126	200	200	200
	Minkachh	715.68	124	200	200	200
	Pati	1,076.97	54	120	130	130

Surface water released, surface water to be utilized by various strategies and surplus surface water available after adopting these strategies in 1999-2000 at K.L.B.M.C. command area are given in Table 7.438. This surplus surface water can be transferred to the water scarce areas or else it can be even diverted to any other projects like Gangamati project.

Table 7.438: Surface Water Released, Surface Water to be utilized by Various Strategies and Surplus Water Available after Adopting these Strategies at K.L.B.M.C.

Surface water available in k.l.b.m.c. command area ha.m	Surface Water To Be Utilized			Surplus Surface Water		
	General strategy ha.m	Space integration strategy ha.m	Space time integration strategy ha.m	General strategy ha.m	Space integration strategy ha.m	Space time integration strategy ha.m
1,38,389	5,420	17,215	12,478	1,32,969	1,21,175	1,25,911

Optimal cropping pattern for all the three strategies for all the minors of Surat branch canal are given in table 7.439,enclosed in CD.

Optimal cropping pattern for all the three strategies for all the minors of Bardoli branch canal are given in table 7.440,enclosed in CD.

Optimal cropping pattern for all the three strategies for all the minors of Chalthan branch canal are given in table 7.441,enclosed in CD.

Optimal cropping pattern for all the three strategies for all the minors of Umbhrat branch canal upto 58 R.D. branch canal are given in table 7.442,enclosed in CD.

Optimal cropping pattern for all the three strategies for all the minors of Umbhrat branch canal beyond 58 R.D. branch canal are given in table 7.443,enclosed in CD.

Optimal cropping pattern for all the three strategies for all the minors of Navsari branch canal are given in table 7.444.

Table 7.444: Optimal Cropping Pattern for All the Three Strategies for All the Minors of Navsari Branch Canal

Minor	Area irrigated	Optimal cropping pattern			
		Existing	General	Space integration	Space time integration
		Irrigation intensity, %			
	ha	275	270	270	250
Dandeswar	Sugarcane	151.00	6.8658	15.1589	18.8831
	Banana	0.00	0.0000	0.0000	0.0000
	Mango	11.00	0.0336	30.0428	8.2026
	Cabbage	0.00	0.0000	0.0000	0.0000
	Paddy	845.00	213.7914	119.2616	126.1642
	Jowar	0.00	0.0000	0.0000	0.0000
	Wheat	0.00	0.0000	0.0000	0.0000
	Cotton	0.00	0.0000	0.0000	0.0000
	Groundnut	0.00	0.0000	0.0000	0.0000
	Grass	274.00	40.3535	61.7598	81.5535

Minor	Area irrigated	Optimal cropping pattern			
		Existing	General	Space integration	Space time integration
		Irrigation intensity, %			
	ha	10	20	70	80
Dandi	Sugarcane	9.00	38.8945	25.8555	39.7157
	Banana	0.00	0.0000	0.0000	0.0000
	Mango	3.00	0.2974	23.5605	5.3947
	Cabbage	0.00	0.0000	0.0000	0.0000
	Paddy	123.00	120.1737	93.8217	128.4655
	Jowar	0.00	0.0000	0.0000	0.0000
	Wheat	0.00	0.0000	0.0000	0.0000
	Cotton	0.00	0.0000	0.0000	0.0000
	Groundnut	0.00	0.0000	0.0000	0.0000
	Grass	60.00	65.0393	16.1402	91.1369

Minor	Area irrigated	Optimal Cropping Pattern			
		Existing	General	Space integration	Space time integration
		Irrigation intensity, %			
	ha	50	120	50	110
Machhad	Sugarcane	69.00	5.1313	27.4973	39.3131
	Banana	0.00	0.0000	0.0000	0.0000
	Mango	0.00	0.0000	0.0000	0.0000
	Cabbage	0.00	0.0000	0.0000	0.0000
	Paddy	32.00	76.8000	39.3582	91.3268
	Jowar	0.00	0.0000	0.0000	0.0000
	Wheat	0.00	0.0000	0.0000	0.0000
	Cotton	0.00	0.0000	0.0000	0.0000
	Groundnut	0.00	0.0000	0.0000	0.0000
	Grass	191.00	83.2664	0.0335	67.6639

Minor	Area irrigated	Optimal Cropping Pattern			
		Existing	General	Space integration	Space time integration
		Irrigation intensity, %			
	ha	20	30	50	30
Onjal	Sugarcane	7.00	33.4220	12.0988	14.9333
	Banana	0.00	0.0000	0.0000	0.0000
	Mango	7.00	2.7014	25.8320	0.0000
	Cabbage	0.00	0.0000	0.0000	0.0000
	Paddy	157.00	119.9945	99.0139	127.5830
	Jowar	0.00	0.0000	0.0000	0.0000
	Wheat	0.00	0.0000	0.0000	0.0000
	Cotton	0.00	0.0000	0.0000	0.0000
	Groundnut	0.00	0.0000	0.0000	0.0000
	Grass	54.00	73.6635	28.7591	106.2674

Minor	Area irrigated	Optimal Cropping Pattern			
		Existing	General	Space integration	Space time integration
		Irrigation intensity, %			
	ha	320	250	270	320
Sadlav	Sugarcane	165.00	8.0086	10.8000	18.0524
	Banana	0.00	0.0000	0.0000	0.0000
	Mango	0.00	0.0000	0.0000	0.0000
	Cabbage	0.00	0.0000	0.0000	0.0000
	Paddy	1400.00	193.7818	182.5125	204.4253
	Jowar	0.00	0.0000	0.0000	0.0000
	Wheat	0.00	0.0000	0.0000	0.0000
	Cotton	0.00	0.0000	0.0000	0.0000
	Groundnut	0.00	0.0000	0.0000	0.0000
	Grass	304.00	58.5073	0.5965	79.5383

Minor	Area irrigated	Optimal Cropping Pattern			
		Existing	General	Space integration	Space time integration
		Irrigation intensity, %			
	ha	240	240	240	240
Vachharvad	Sugarcane	548.00	52.1860	8.3320	35.6491
	Banana	0.00	0.0000	0.0000	0.0000
	Mango	34.00	59.5865	4.2943	52.3792
	Cabbage	0.00	0.0000	0.0000	0.0000
	Paddy	1140.00	162.5696	159.3713	166.9728
	Jowar	0.00	0.0000	0.0000	0.0000
	Wheat	0.00	0.0000	0.0000	0.0000
	Cotton	0.00	0.0000	0.0000	0.0000
	Groundnut	0.00	0.0000	0.0000	0.0000
	Grass	285.00	4.3835	49.5267	30.4293

Minor	Area irrigated	Optimal Cropping Pattern			
		Existing	General	Space integration	Space time integration
		Irrigation intensity, %			
	ha	210	310	240	240
Veraval	Sugarcane	230.00	1.1201	3.6485	29.5944
	Banana	0.00	0.0000	0.0000	0.0000
	Mango	31.00	1.0803	0.0268	0.0637
	Cabbage	0.00	0.0000	0.0000	0.0000
	Paddy	765.00	110.6594	115.8172	123.1663
	Jowar	0.00	0.0000	0.0000	0.0000
	Wheat	0.00	0.0000	0.0000	0.0000
	Cotton	0.00	0.0000	0.0000	0.0000
	Groundnut	0.00	0.0000	0.0000	0.0000
	Grass	177.00	41.0053	4.7295	98.9784

Scrutiny of the table 7.444 reveals that the existing area of sugarcane should be decreased and paddy should be increased. Sugarcane requires more water than paddy results in less net benefits. Area of grass should also be increased for lesser requirement of water. Thus one can increase the area under paddy and grass and decrease the area under sugarcane and desist from cultivation of banana, mango etc.

Optimal cropping pattern for all the three strategies for all the minors of Amalsad branch canal are given in table 7.445,enclosed in CD.

Optimal cropping pattern for all the three strategies for all the minors of Valsad branch canal are given in table 7.446,enclosed in CD.

7.5 CONCLUSIONS

In Dumas distributary of Surat branch canal the existing irrigation intensity is 420%. By following the space – time integration strategy the same optimal irrigation intensity can be attained to obtain maximum benefits.

In Surat branch canal, the existing irrigation intensities are around 60% to 420% which can be optimized upto 130% by general strategy to 420% by space – time integration strategy to attain maximum benefits.

In Bardoli branch canal, the existing irrigation intensities are around 40% to 180% which can be optimized upto 100% to 240% by general strategy to attain maximum benefits.

In Chalthan branch canal, the existing irrigation intensities are around 70% to 160% which can be optimized upto 90% by space integration strategy to 230% by space – time strategy to attain maximum benefits.

In Umbhrat branch canal upto 58 R.D., the existing irrigation intensities are around 10% to 250% which can be optimized upto 130% to 270% by general strategy to attain maximum benefits.

In Umbhrat branch canal beyond 58 R.D., the existing irrigation intensities are around 10% to 250% which can be optimized upto 10% to 230% by space – time strategy to attain maximum benefits.

In Navsari branch canal, the existing irrigation intensities are around 10% to 320% which can be optimized upto 20% to 310% by general strategy to attain maximum benefits.

In Amalsad branch canal, the existing irrigation intensities are around 40% to 220% which can be optimized upto 70% by space integration strategy to 280% by general strategy to attain maximum benefits.

In Valsad branch canal, the existing irrigation intensities are around 40% to 290% which can be optimized upto 80% by general strategy to 270% by space integration strategy to attain maximum benefits.

In Umbhel Minor of Surat branch canal the existing irrigation intensity is 331%. By following the general or space integration strategy, one can achieve the same optimum irrigation intensity.

In majority of minors, out of the three strategies the strategy resulting in more area irrigated by more surface water, costing at cheaper rate of 360 Rs./ha.m results in more optimal net benefits.

By sensitivity analysis using various unit costs of surface water it is concluded that the unit cost of surface water charged to the farmer by N.W.R.W.S. & K department, Government of Gujarat that is 360 Rs./ha.m gives the maximum net benefits. But when compared with average of last 10 years unit cost that is 385 Rs./ha.m which gives optimal net benefits less than around 10% to that of above said unit cost. Therefore the 385 Rs./ha.m can be charged to the farmers which is nominal.

Evapotranspiration rate for the crops play major role in determining the net benefits.

Area under sugarcane shall be reduced and the same under paddy and grass should be increased to achieve maximum net benefits, because sugarcane consumes more water resulting in decrease of net benefits. Similarly crops like banana and mango can be nullified.

In sensitivity analysis using surface water restriction method in Chalthan branch canal due to restriction of surface water, ground water is used completely. It can be concluded that by introduction of use of only ground water, the maximum net benefits are improved and moreover the problem of waterlogging can be minimized. The third strategy i.e. space - time integration strategy shows more optimal net benefits with this method.

In sensitivity analysis using originally practiced cropping pattern before the project was started in Umbhrat branch canal rather than growing crops like sugarcane and most dominantly paddy, due to salinity problems, they can be replaced with salt tolerant crops.

In fuzzy linear programming, the majority of minors get marginally higher optimal net benefits, therefore one can go for fuzzy linear programming modeled conjunctive use to attain more optimal net benefits.

7.6 RECOMMENDATIONS

In the command area majority of farmers are not having financial problem so they should not depend on the surface water and go for ground water having own private tube wells, whereas some poor farmers may not be able to afford the same. Therefore, in the command area to have both the surface water and ground water to be utilized, farmers should have strong co-operation among themselves. Proper irrigation management committees of government, socio – economists, local farmers' co-operative societies, can achieve this.

Atleast 1,00,000 ha.m of surplus water can be transferred to Gangamati project.

The same type of study carried out over here can be tested for time integration strategy and the results may be compared with respect to optimal net benefits obtained.

The strategies referred in this study can also be modeled using different tools like Artificial Neural Network, Genetic Algorithm or Pattern Search and the optimal benefits may be compared.

The study carried out over here can be worked out for entire Ukai Kakrapar project consisting of Ukai Left Bank Main Canal, Ukai Right Bank Main Canal and kakrapar Right Bank Main Canal, to get complete idea of the best strategy which can be implemented in entire Ukai Kakrapar Project.