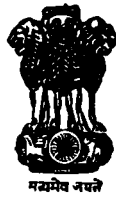


**REPORT OF THE
IRRIGATION COMMISSION**

**REPORT OF THE
IRRIGATION COMMISSION
1972**

VOLUME II



**Ministry of Irrigation and Power
NEW DELHI**

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PREFACE

In response to our Questionnaire most of the State Governments sent us data giving valuable information on the present status of development of irrigation in their States, their future aspirations and views on policy questions. We thought that the information received from the States should be made available to the Central Government and the other States in a standard form to give them a picture of the irrigation development, present and future. This Volume is the outcome of that effort.

2. The replies from the States were very exhaustive. We toured most of the States and some States more than once. This Volume contains our impression of tours also. We have drawn freely upon the material available in the various departments of the Central Government, the Planning Commission and research institutions. In view of the limitation of space, we have had to restrict our presentation only to essential matter.

3. Chapters in this Volume have been arranged in alphabetical order of the names of States. Meghalaya has been clubbed with Assam as separate statistics for the new State were not readily available. Information about some of the States such as Nagaland, Manipur and Tripura was limited and the Chapters dealing with these States have to be somewhat brief.

4. Our programme of tours was affected by the General Elections to the Lok Sabha in 1971 and to the State Assemblies in 1972. In some cases we could not plan our visits, as replies were received late or were incomplete. We have, however, done our best.

5. We have dealt with the financial aspects of irrigation development in detail in Chapter XI of Volume I of our Report. Once again we would like to stress the need for an early revision of water rates and recovery of betterment levy. The general tax-payer should not, in our opinion, be called upon to bear burden of irrigation development, except in the backward, arid and semi-arid areas. With the growing tempo of irrigation and rising investments from year to year, there has been an increasing loss from irrigation works. There is no reason, as we have pointed out in Volume I, why irrigated agriculture should not pay for a basic input like water. We trust, the State Governments will give immediate attention to the problem and take firm decisions.

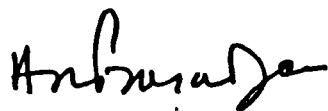
6. Another important aspect of irrigation development, which should receive early attention, is the streamlining of the administrative machinery and procedure for ground water development. The States of Haryana and Punjab have set up Tubewell Corporations and have made appreciable progress during the last few years. Some other States have started organising their set up for ground water investigations but wherever preliminary studies promise the possibilities of appreciable ground water resources, early steps should be taken to formulate a sound administrative system for the exploitation of ground water.

7. With the rapid expansion of rural electrification, there would be increased opportunities for providing lift irrigation facilities. Some of the States have already made remarkable progress in this direction. We would suggest that other States should profit from their experience and investigate lift irrigation schemes both from the surface and ground water. This is specially relevant to States which have plentiful ground water resources and to scarcity areas. The States should therefore carry out an assessment of their lift irrigation possibilities.

8. My colleagues and I once again take this opportunity to thank the various State Governments and the departments of the Central Government for the valuable assistance and cooperation given in our task. But for such help it would not have been possible for us to complete our task within the time at our disposal.

9. From 1st April, 1972 all the Members of the Commission except the Chairman, the Vice-Chairman and the Member-Secretary ceased to be in office. The staff of the Commission was also considerably reduced. Therefore my two colleagues, the Vice-Chairman and the Member-Secretary had to carry an extraordinary heavy burden in completing the remaining work of the Commission and I have pleasure in recording appreciation of their services. The Members of the Commission, Shri O. P. Gupta, Shri K. V. Ekambaram and Shri D. V. Reddy deserve special thanks for readily responding to my invitation to help in the deliberations of the Commission after ceasing to be its Members. The Director, the Deputy Directors and other officers of the Commission have worked ungrudgingly in the preparation of this Volume and deserve our thanks for their untiring labours.

New Delhi
30th June, 1972


(AJIT PRASAD JAIN)

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*Included in Chapter II

APPENDIX 1.1

Salient Features of Projects Irrigating 4,045 Hectares and Above—Andhra Pradesh

Sl. No.	Name of Project	Source of water	Storage/ Non-storage	Capital cost (Rs. million)	Year of completion	Type	Max. height (metres)	Length (metres)	Storage capacity (m.cu.m.)		Full Supply Dis-charge (Cumeecs)	C.C.A. (hec-tares)	Gross area to be irrigated (hec-tares)	Remarks
									Gross	Live				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Nizam Sagar	Manjira	Storage	39.18	1931	Masonry	48	3,901	841	725	97.1	217,126	111,287	
2.	Pocharam	Aleru	"	3.21	1938-39	"	30	640	NA	53	6.4	9,712	6,070	
3.	Pakhal	NA	"	0.39	—	—	—	NA	NA	—	—	—	5,059	
4.	Palair	Palair	"	2.18	1940-41	Earthen	20	618	NA	66	9.1	7,973	7,589	
5.	Wyra	Wyra	"	3.08	1929	Composite	19	2,369	NA	59	5.9	7,042	7,037	
6.	Godavari Delta System	Godavari	Weir	29.55	1890	—	—	2,136	—	—	212.4	473,461	558,458	
7.	Yeluru Canal System	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15,378	
8.	Nagavali	Nagavali	Weir	1.95	1913	—	—	—	—	—	—	12,626	10,910	
9.	Srikakulam Minor River System			0.29				NA					27,443	
10.	Krishna Delta	Krishna	Weir/ Barrage	74.09 29.16	1898 1958	—	—	1,051	—	—	Lt.313.55 Rt.183.5	66,583	556,435	Since built as a barrage
11.	Dindi	Dindi	Storage	3.89	1943	NA	25	1,859	NA	68	8.50	15,783	7,891	
12.	K. C. Canal	Tunga-bhadra	Weir/ Remodelling	76.47 75.77	1870 1962	—	—	1,328	—	—	85.0		122,213	Area irrigated after remodelling
13.	Penner Canal System	Penner	Weir	70.70	1894	—	—	NA	—	—	NA	76,000	74,343	
14.	Romperu Drainage	NA	NA	12.80	NA	NA	NA	NA	NA	NA	NA	NA	4,168	
15.	Koil Sagar	Peddavugu	Storage	9.12	1955-56	NA	26	1,328	NA	45	5.1	23,351	5,868	
16.	Rallapad	Muneru	"	10.58	1957	Earthen	15	2,952	NA	420	4.6	4,455	4,451	

Appendix 1.1—contd.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
17.	Tungabhadra	Tunga- bhadra	Storage	1956	Masonry	49	2,440	3,690	3,341					
	i) Low level Canal			128.13	1957	—	—	—	—	—	70.8	198,709	60,245	
	ii) High Level Canal Stage I			188.66	1970-71	—	—	—	—	—	65.1	260,021	55,615	
	iii) High Level Canal Stage II			112.60	V Plan	—	—	—	—	—	113.3			
18.	Bhairavanitippa	Hagari/ Vedavali	Storage	14.58	1961-62	Earthen	16	2,239	NA	65	5.1	4,856	6,880	
19.	Narayanapuram Anicut	Nagavali	Weir	9.69	1963-64	Masonry	—	NA	—	—	12.8	19,873	14,904	
20.	Kaddam	Kaddam	Storage	79.85	1965-66	Composite	41	2,102	221	137	31.1	53,013	34,398	
21.	Nagarjunasagar Stage I	Krishna	"	1648.90	V Plan	Masonry Earthen	125	1,450 3,414	11,553	6,796	Rt.311.5† Lt.311.5†	807,984 35,612	831,213	+Capacity of un- lined Rt. Bank canal is 311.5 cumecs. Masonry works are construc- ted for 594.7 cumecs Lt. Bank Canal capacity is also 311.5 cumecs. Ma- sonry works are constructed for 424.8 cumecs (Re- port of the Krishna Godavari Commis- sion, Annexure X.)
22.	Musi	Musi	"	40.90	IV Plan	Composite	21	4,129	NA	136	9.3	23,351	16,916	
23.	Rajolibanda Diversion	Tunga- bhadra	Weir	38.30	1969-70	Masonry	9	820	NA	48	21.8	47,620	36,612	
24.	Torigeddu Pumping Scheme	Godavari	"	7.71	IV Plan	Pumping	—	—	—	—	5.0	6,880	5,516	
25.	Tandava	Tandava	Storage	9.84	IV Plan	Earthen	32	201	NA	168	NA	NA	18,575	
26.	Pochampad	Godavari	"	401.00	IV Plan	Composite	42	765	3,186	2,305	NA	NA	230,668	
27.	Penner Canal	Penner	"	21.32	IV Plan	Masonry	—	12,588	—	—	NA	NA	6,880	
28.	Pampa Reservoir	Pampa	"	6.00	1969-70	Composite	11	NA	NA	NA	NA	NA	5,261	
29.	Vottigedda	Vottigedda	"	13.57	NA	"	NA	2,908	NA	23	Rt.6.5 Lt.1.8	NA	6,747	
30.	Gajuladinne	Hindri	"	9.64	NA	NA	NA	NA	NA	NA	NA	NA	5,059	
31.	Guntur Channel	Krishna	Non- storage	17.00	IV Plan	Canal	—	—	—	—	17.0	—	10,926	
32.	Gandipalem	Pillaperu	Storage	9.70	"	NA	NA	NA	NA	NA	NA	NA	4,047	

Source: (1) Irrigation Statistics of India 1960-61—CW&PC

(2) Note—Volume of Irrigation Chapter of Andhra Pradesh—CW&PC (July, 1969)

(3) India—Irrigation and Power Projects—CW&PC (1970)

APPENDIX 3.1

Salient Features of Projects Irrigating 4,000 Hectares and Above

Name of Project	Source of water/ name of river	Storage/ non- storage	Capital cost (Rs. million)	Year of comple- tion	Type	Max. height (metres)	Length (metres)	Storage capacity (m.cu.m.) <u>Gross Live</u>	Full supply dis- charge (cumec)	C.C.A. (hec- tares)	Gross area to be irrigated (hec- tares)	
1	2	3	4	5	6	7	8	9	10	11	12	13
Son Canals	Son	Non- storage	26.82	1875						5.09		347,230
Tribeni Canal	Gandak	-do-	8.16	1914						2.32		48,180
Dhaka Canal	Lalbakeya	-do-	0.63	1901								6,480
Sakri Lower Valley	Sakrinadi	-do-	3.38	1952								20,240
Tribeni Canal Expansion	Gandak	-do-	2.98	1956								11,330
Botane Irrigation	Botane	-do-	1.85	1950								6,680
Upper Morhar Irrigation Scheme	Morhar	-do-	5.61	1961								14,570
Lilajan Irrigation Scheme	Lilajan	-do-	6.50	1958								22,660
Durgawati	Durgawati	-do-	3.66	1957								10,520
Kaurihari	Natra Baghel & Kaurihari	-do-	5.65	1960								11,660
Dhawan Irrigation Scheme		-do-	1.55	1961								4,250
Lower Morhar		-do-	5.68	1962								19,970
Mayurakshi L.B.C.	Mayu- rakshi	Storage	8.11	1957								10,120
Adri		Non- Storage	1.53	1959								4,250

Appendix 3.1—contd.

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1	2	3	4	5	6	7	8	9	10	11	12	13
Tribeni Canal Extension	Gandak	-do-	11.20	1962								25,130
Kamla Canal	Kamla	-do-	3.09	1958								15,380
Lower Kiul	Kiul	-do-	8.77	1959						0.31	21,853	25,900
Khajia Phase II including Chandan Phase I			2.21	1959							25,293	19,000
Panchane Phase II	Lachani	Non-storage	4.41	1963								12,550
Sakri Canal Phase II		-do-	3.79	1961								5,060
Kohira	Kohira	Storage	5.68	1961	Masonry dam	12.80	134		25			10,320
Badua Reservoir Project	Badua	-do-	62.80	1969	Earth dam	40.23	472	128.3		109.78		42,490
Sunder River Scheme	Sunder	Non-storage	1.47	1958							7,851	5,261
Irrigation of chaurs			3.86	1956								39,940
Small dams in hilly districts			3.11	1956								15,010
Roro Irrigation	Roro	Non-storage	13.61	1970						0.23	11,331	10,927
Emergency River Pumping Scheme			3.90	1956								5,260

APPENDIX

- Source: 1. Irrigation Statistics of India (1960-61)—CW&PC—March, 1968
 2. India—Irrigation and Power Projects—CW&PC—April, 1970
 3. Note Volume of Irrigation Chapter of Bihar (Unpublished)—CW&PC, March, 1970.

APPENDIX 4.1

Classification of Area in Gujarat—1967-68

(Thousand hectares)

District	Report- ing area	Area under forests	Not available for culti- vation	Other un- cultivated land ex- cluding fallow lands	Fallow lands	Net sown area	Total cropped area
1	2	3	4	5	6	7	8
Ahmadabad	852	2	163	40	33	614	635
Banaskantha	1,204	154	43	107	69	831	931
Baroda	780	64	79	87	7	543	559
Broach	773	158	100	38	18	459	462
Dangs	179	96	21	3	10	48	48
Kaira	692	27	98	34	10	523	582
Mehsana	906	7	64	127	11	698	769
Panchmahals	894	233	76	74	38	473	545
Sabarkantha	708	132	37	52	37	450	498
Surat	738	168	63	45	15	447	472
Bulsar	525	128	57	54	11	295	322
Amreli	642	29	25	60	26	502	514
Bhavnagar	926	27	107	129	39	624	638
Jamnagar	1,041	76	224	106	39	597	633
Junagadh	1,062	181	113	147	36	585	642
Kutch	4,420	95	3,216	254	207	649	665
Rajkot	1,106	55	196	117	21	738	768
Surendranagar	1,017	13	193	79	7	674	681
Gandhinagar	68	—	6	8	1	52	57
Total:	18,533	1,627	4,878	1,541	685	9,802	10,420

APPENDIX 4.2

Area under Different Crops and Area Irrigated in Gujarat—1967-68

(Thousand hectares)

Crop	Total cropped area	% to total cropped area	Total irrigated area
1	2	3	4
Rice	507	4.86	138
Jowar	1,343	12.89	36
Bajra	1,867	17.92	47
Maize	268	2.57	11
Wheat	554	5.32	353
Other cereals and millets	282	2.71	14
Total cereals & millets	4,821	46.27	599
Pulses	529	5.08	6
Total food grains	5,350	51.35	605
Sugarcane	28	0.27	28
Condiments & spices	89	0.85	23
Fruits, vegetables & other food crops	85	0.81	129
Total food crops	5,552	53.28	785
Groundnut	1,942	18.64	19
Total oilseeds	2,194	21.06	53
Cotton	1,640	15.74	208
Total fibres	1,648	15.82	208
Tobacco	94	0.90	23
Total narcotics	114	1.09	—
Fodder crops etc.	912	8.75	97
Total non-food crops	4,868	46.72	381
Gross area sown	10,420	100.00	1,166

APPENDIX 4.3

Major and Medium Irrigation Schemes Cost and Ultimate Benefits

S. No.	Name of project	Esti- mated cost (Rs. million)	Ulti- mate benefit (000 hect.)	S. No.	Name of project	Esti- mated cost (Rs. million)	Ulti- mate benefit (000 hect.)
MAJOR PROJECTS				18.	Rangola	6.64	3.50
1.	Kakrapar	180.50	227.5	19.	Rawal	1.73	0.45
2.	Mahi Stage I	245.70	186.2	20.	Sunandro	1.16	0.67
3.	Shetrunji (Palitana)	69.60	34.8	21.	Sasoi	7.70	3.06
4.	Banas (Dantiwada)	108.80	44.5	22.	Surajwadi	3.43	1.04
5.	Hathmati Reservoir	54.40	37.6	23.	Vir	0.90	1.38
6.	Mahi Stage II (Kadana)	210.00	16.6	24.	Aji	6.88	1.71
7.	Narmada (Broach)	1,097.00	403.7	25.	Bhogavo-I	6.81	1.54
8.	Ukai	1,044.00	152.4	26.	Harnev	5.11	2.67
MEDIUM PROJECTS				27.	Hiran	8.99	2.63
1.	Bhimdad	2.26	1.15	28.	Karol	1.21	1.21
2.	Brahmani	9.09	3.85	29.	Machundri	2.30	0.45
3.	Daswada Tank	0.64	0.92	30.	Ozat	6.92	2.39
4.	Gajod	1.26	1.15	31.	Demi	5.30	1.58
5.	Ghee	2.03	0.83	32.	Fulzar	4.45	1.21
6.	Gomdli	2.15	0.93	33.	Limdi	5.81	3.20
7.	Hiran	1.81	2.10	34.	Rojki	2.70	1.54
8.	Kankawati	1.72	1.56	35.	Sakroli	2.42	1.22
9.	Karad Tank	9.99	4.53	36.	Suvi	2.96	1.34
10.	Kaila	2.69	0.87	37.	Wadhwan	6.67	0.61
11.	Machhu-I	15.90	6.76	38.	Bhadar	43.30	17.16
12.	Malan	4.19	2.33	39.	Ghelo	4.42	3.14
13.	Moj	9.65	4.81	40.	Meshwa	31.43	23.90
14.	Moti Fatehwadi	7.23	12.92	41.	Niruna	5.01	5.67
15.	Munjisar	5.38	1.34	42.	Sapada	1.91	1.01
16.	Puna	2.21	1.01	43.	Shetrunji (Khodiar)	16.32	7.69
17.	Patadungri	7.72	3.08	44.	Wartu	4.98	3.17
				45.	Rudramata	10.60	7.20
				46.	Dhatrawadi	10.50	2.43
				47.	Gajansar	2.00	1.62
				48.	Goma	8.70	2.19
				49.	Kalindri	4.30	0.91
				50.	Machhu-II	21.39	7.69
				51.	Saraswati	21.20	8.74

APPENDIX 4.4

Drought Areas in Gujarat

District	Taluk	District	Taluk
(i) Banaskantha	1. Santhalpur 2. Radhanpur 3. Wao 4. Tharad 5. Dhanera	(vii) Surendranagar	10. Mandvi 11. Bhuj 1. Dusada 2. Wadhwan 3. Muli 4. Dhrangodhra 5. Halvad 6. Limbdi 7. Sayla 8. Lakhhar
(ii) Mehsana	1. Harij Mahal 2. Sami 3. Chanasma 4. Patan 5. Kadi 6. Kalol	(viii) Jamnagar	1. Okhamandal 2. Kalyanpur 3. Jodia 4. Kalavad
(iii) Ahmadabad	1. Viramgam 2. Dhanduka 3. Dholka 4. Sanand	(ix) Rajkot	1. Malia 2. Morvi 3. Wankaner
(iv) Kaira	1. Cambay 2. Matar 3. Mohmedabad	(x) Bhavnagar	1. Bhavnagar 2. Gadhada 3. Vallabhipur 4. Botad 5. Gariadhar 6. Kandla
(v) Broach	1. Jambusar 2. Waghra 3. Hansot	(xi) Amreli	1. Amreli 2. Khamba 3. Jafrabad 4. Rajula 5. Babra 6. Lilia 7. Lathi
(vi) Kutch	1. Anjar 2. Nakhtrana 3. Abdasa 4. Lakhpatt 5. Rahpur 6. Khavda 7. Khadir 8. Mundra 9. Bachau		

APPENDIX 4.5

Structure of Water Rates in Force in Gujarat with Effect from 15.6.1968

Name of the season or crop and other details	Rate (Rs. per acre)
<i>Kharif Season</i>	
(1) Short term paddy (requiring watering up to 14th October)	18.00
(2) Long term paddy (requiring watering up to 15th November)	25.00
(3) Paddy in reclaimed Kharlands	
1st year } 2nd year } 3rd year } 4th year }	5.00
From 5th year onwards	18.00 to 25.00
(4) Bajri, jowar & maize etc.	7.00
(5) Late kharif jowar	
Kharif	7.00
Rabi	3.00
(with every additional watering)	
(6) Other food crops, vegetables & grass	11.00
(7) Groundnut & kharif crops	15.00
<i>Rabi Season</i>	
1. Short-term wheat (requiring watering upto 14th Feb.)	18.00
2. Long-term wheat (requiring water upto 14th March)	25.00
3. Bengal gram	10.00
4. Jeeru (cumin seeds)	25.00
5. Fennel seeds	30.00
6. Vegetable & grass	18.00
7. Other crops	30.00
<i>Hot Weather Crops</i>	
8. Grass, food crops, bajri & jowar (15th January to 14th May)	18.00
9. Groundnut and others (15th January to 14th May)	30/-
<i>Two Seasonal Crops</i>	
10. Cotton	
Kharif	10/-
Rabi	18/-
	28/-
11. Bidi tobacco	
Kharif	8/-
Rabi	12/-
	20/-
12. Other varieties of tobacco	
Kharif	10/-
Rabi	25/-
	35/-

Appendix 4.5—*contd.*

Name of the season or crop and other details	Rate (Rs. per acre)
<i>Perennial Crops</i>	
13. Sugarcane	
Pickup weir schemes	140/-
Storage schemes	150/-
14. Plantains	
Pickup weir	160/-
Storage	170/-
15. Other Perennial Crops	
Pick up weir	100/-

APPENDIX 5.1

SCHEDULE OF OCCUPIERS' RATES

Statement Showing Occupiers' Rates in Force on the Canals in the Punjab (India)

Authority	Class	Nature of Crops	Rate per acre						per
			Flow			Lift			
			Rs.	A.	P.	Rs.	A.	P.	
1	2	3	4	5	6	7	8	9	10
Western Yamuna Canal (including Sirsa and Sunder Branches), Sirhind Canal and Bhakra Canals (including Ghaggar, Sarusati and Bist Doab Canals Sidhwan Branch)									
	I	Sugarcane (except on kharif channels)	16	8	0	8	4	0	Crop
	II	Sugarcane on kharif channels	13	8	0	6	12	0	-do-
Irrigation Branch	III	Waternuts	11	4	0	5	10	0	Crop
	III-A	Rice	9	12	0	4	14	0	-do-
	IV	Indigo and other dyes, tobacco, poppy spices and drugs	8	4	0	4	2	0	-do-
Notification No. 36842/Rev./1397/42 dated 10.11.1949	IV-A	Cotton	6	12	0	3	6	0	-do-

Appendix 5.1—contd.

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Authority	Class	Nature of crops.	Rate per acre				per		
			Flow		Lift				
			Rs.	A.P.	Rs.	A.P.			
1	2	3	4	5	6				
No. 4432/Rev./1397/48 dated 13.11.1953	V	Gardens and orchards and vegetables except turnips	8	4	0	4	2	0	Gardens and Orchards per half year, the rest per crop.
No. 36828/Rev./1397/48 dated 10.11.1949	VI	Deleted.							
	VI-A	Barley and oats (except on kharif channels)	6	6	0	3	3	0	Crop
No. 4417-Rev./1397/48 dated 13.11.1953	VI-B	Wheat (except on kharif channels).	5	13	6	2	14	9	-do-
No. 591/Rev./364/1951 dated 28.7.1951	VII	Melons, fibres (other than cotton) and all crops not otherwise specified.	7	8	0	3	12	0	-do-
No. 4422/Rev./1397/48 dated 13.11.1953	VII-A	Maize	6	6	0	3	3	0	-do-
No. 24417/Rev./1397/48 dated 13.11.1953	VIII	Oilseeds (except rabi oilseeds on kharif channels)	6	6	0	3	3	0	-do-
No. 2151/Rev. dated 12.11.1951	IX	All rabi crops (except wheat and gram on kharif channels) including gardens, orchards, vegetables & fodder.	3	0	0	1	8	0	Garden orchards per half year, the rest per crop.

APPENDIX

Appendix 5.1—contd.

1	2	3	4	5	6
No. 1848/Rev./1275/52 dated 14.5.1966	IX-A	Wheat and gram on kharif channels.	2 12 0	1 6 0	Crop
No. 24417/Rev./1397/48 dated 13.11.1953	X	Bajra, masur and pulses	4 14 0	2 7 0	-do-
	X-A	Gram	4 7 6	2 3 9	-do-
	XI	Jowar, cheena, grass which has received two or more waterings and all fodder crop including turnips.	3 12 0	1 14 0	Grass per half year, the rest per crop.
	XII (a)	Watering for ploughing not followed by a crop in the same or succeeding harvest.	1 8 0	0 12 0	Acre
	(b)	Village and District Board Plantations			
	(i)	Any number of waterings in kharif	1 8 0	0 12 0	Half year
	(ii)	One watering in rabi	1 8 0	0 12 0	-do-
	(iii)	Two or more waterings in rabi	3 0 0	1 8 0	-do-
	(c)	Grass—single watering in kharif or rabi	1 8 0	0 12 0	-do-

Note: Grass given two or more waterings, falls under Class XI.

Hemp, Indigo, Guara, Jantar and Arhar ploughed in as green manure before 15th September are not assessed to water rates.

APPENDIX 8.1

450

Salient Features of Projects Irrigating 4,000 Hectares and Above**

Sl. No.	Name of Project	Source of water	Storage/ non-storage	Capital cost Rs. million	Year of completion	Type	Max. ht. (metres)	Length (metres)	Storage capacity (m.cu.m.)		Full supply discharge (cumecs)	C.C.A. (hectares)	Gross area to be irrigated (hectares)	Remarks
									Gross	Live				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

A. COMPLETED PROJECTS (BY MARCH 1969)

I. Preplan Projects

NIL

II. First Plan Projects

1.	Chalakydy Stage I Stage II	R. Chalakydy	Diversion	15.33 6.00	1955-56 1965-66	Weir Extension of canals	—	195	—	—	L 8.0 R 8.0	11,500 8,195	22,990 16,390	
2.	Mangalam	R. Mangalam	Storage	10.60	1967-68	Composite	19	1060	n.a.	28	4.5	3,238	6,480	
3.	Malampuzha	R. Malampuzha	Storage	58.00	1965-66	Composite	38	1849	236	227	21.2	19,326	38,530	
4.	Peechi	R. Manali	Storage	23.50	„	Masonry	40	225	n.a.	108	R 7.1 L 3.5	18,616	28,080	
5.	Walayar	R. Walayar	Storage	13.17	„	Composite	31	1479	n.a.	24	3.9	3,238	6,480	
6.	Wadakkancherry	R. Wadakkan- cherry	Storage	10.76	„	Earthen	26	793	n.a.	18	3.3	3,247	7,130	

APPENDIX

Appendix 8.1—contd.

Sl. No.	Name of Project	Source of water	Storage/ non-storage	Capital cost Rs. million	Year of completion	Type	Max. ht. (metres)	Length (metres)	Storage capacity (m.cu.m.)		Full supply discharge (cumecs)	C.C.A. (hectares)	Gross area to be irrigated (hectares)	Remarks
									Gross	Live				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
7.	Neyyar Stage I Stage II	R. Neyyar	Storage	22.60 17.00	1969 ,,	Ma- sonry	39	300	n.a.	97	7.0	11,734	15,380 8,090	
III. Second Plan Projects														
8.	Meenkara including Chulliar	R. Meenkara	Storage	22.00	1969	Earthen	19	963	n.a.	11	10.0	n.a.	10,930	
9.	Pothundy	R. Ayalurpuzha	Storage	23.43	1969	Earthen	33	1567	n.a.	37	L 3.6 R 3.1	5,463	8,900	
IV. Third Plan Projects														
B. PROJECTS UNDER CONSTRUCTION														
I. First Plan Projects														
NIL														
II. Second Plan Projects														
1.	Periyar Valley Scheme (Bhoothathankettu)	R. Periyar	Diversion	64.94	IV Plan	Masonry	—	211	—	—	n.a.	n.a.	40,996	

Appendix 8.1—contd.

Sl. No.	Name of Project	Source of water	Storage/ non-storage	Capital cost Rs. million	Year of completion	Type	Max. ht. (metres)	Length (metres)	Storage capacity (m.cu.m.)		Full supply discharge (cumecs)	C.C.A. (hectares)	Gross area to be irrigated (hectares)	Remarks
									Gross	Live				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>III. Third Plan Projects</i>														
2.	Pamba	R. Kakkad	Diversion	92.05	IV Plan	Masonry	—	79	—	—	n.a.	n.a.	33,995	
3.	Kuttiyadi	R. Kuttiyadi	Storage	52.42	„	Masonry with earthen flanks	35	171	121	113	n.a.	n.a.	31,162	
4.	Chitturpuzha	n.a.	Remodelling	10.93	„	Remodelling	—	—	—	—	—	—	22,501**	includes existing irrigation
5.	Kanhirapuzha	n.a.	Storage	39.18	„	Masonry	28	178	n.a.	n.a.	11.3	n.a.	19,425	
6.	Pashassi	Vallapattnam	Diversion	47.60	„	Barrage	—	230	—	—	n.a.	n.a.	28,328	
<i>IV. Annual Plan Projects (1966-69)</i>														
7.	Kallada	R. Kallada	Storage	144.91	V Plan	Masonry	73	335	525	510	n.a.	n.a.	105,220	

**Source: (1) Irrigation statistics of India (1960-61)—CW&PC, Ministry of Irrigation & Power, New Delhi.

(2) Note volume of Irrigation Chapter, Kerala (3/1970)—CW&PC, Ministry of Irrigation and Power, New Delhi.

(3) India: Irrigation and Power Projects (4/1970)—CW&PC, Ministry of Irrigation & Power, New Delhi.

Note: n.a.—Not available.

APPENDIX 9.1

Salient Features of Projects Irrigating 4,000 Hectares and Above

Sl. No.	Name of Project	Source of water/ Name of river	Storage/ non-storage	Capital cost (Rs. million)	Year of completion	Type	Max. height (meters)	Length (meters)	Storage capacity		Full supply discharge (cumecs)	C.C.A. (thousand hectares)	Gross area to be irrigated (thousand hectares)	Remarks
									Gross	Live				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

A. COMPLETED PROJECTS (BY MARCH 1969)

I. Preplan Projects

1.	Tandula Reservoir	Tandula and Sukhonala	Dam	10.63	1921	Earthen	25.02	4,423	275	62.27	246.45	66.77	
2.	Mahanadi Canal & Murramsilli Reservoir	Mahanadi & Silanrianala	Dam and anicut	15.66	1923	Earthen	25.53	2,998	164	84.89	324.80	84.98	
3.	Wainganga Canal and Sarathi Reservoir	Sarathi nala	Dam	5.13	1923	-do-	17.68	504	NA	16	22.23	50.00	31.66

Appendix 9.1—contd.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
4.	Bhind Canals (Pagra dam and Kotwal and Pillowa Weirs)	Sank	Dam	11.63	1927	Com- posite	24.09	1,354		124	14.16	55.89	26.57	
5.	Kharung Tank	Kharung	Tank	6.56	1931	Earthen	21.11	1,924		192	43.61	50.18	37.94	
6.	Maniari Tank	Maniari	Tank	6.23	1933	Earthen	28.97	2,102		148	32.68	65.52	30.35	
7.	Parvati Project (Harsi & Kaketo Dam)	Parvati "	Dam "	1.75 8.37	1934	Kaketo Masonry Harsi Earthen	12.20	854		79	Under Harsi	55.90	29.64	
					1937		31.79	2,135		191	16.96			
8.	Adda Dam	NA	"	2.43	1934	Masonry and Earthen	7.32	4,831		21	4.53	6.89	4.31	
<i>II. First Plan Projects</i>														
9.	Ari Tank	Hirri	Tank	2.78	1952	Earthen	19.51	1,338		13	4.33	8.88	4.25	
10.	Saroda Tank		Tank	16.67	1966	"	NA	NA		NA	NA	NA	7.35	
<i>III. Second Plan Projects</i>														
11.	Nehlesara			21.42	1968	"	NA	NA		NA	NA	NA	4.51	
12.	Kedarnala			8.47	1969	"	NA	NA		NA	NA	NA	4.65	
13.	Development of Maniari			3.71	1969	"	NA	NA		NA	NA	NA	9.71	
14.	Beniganj			6.42	1969	"	NA	NA		NA	NA	NA	4.05	
15.	Chillar			14.18	1969	"	NA	NA		NA	NA	NA	5.26	

Appendix 9.1—contd.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
IV. Third Plan Projects														
NIL														
B. PROJECTS UNDER CONSTRUCTION														
I. First Plan Projects														
1.	Chambal St. I & II	Chambal	Storage	406.70 94.00	IV Plan ,,	Masonry ,,	63.70 53.95	514 1,143	7,746 2,899	6,920 1,850	188.48	462.9 }	222.57 60.70	St. I- Gandhi- sagar. St. II- Rana- Pratap Sagar
2.	Dudhwa	Mahanadi	,,	38.89	1971	NA	24.54	2,907		NA	—	Benefits under Mahanadi Canals remodelling		
3.	Borad (Satak and Segwal)	Borad and Sonsar	Tank/pick up weir	11.35	1968-1971	NA	7.32	1,740		8	NA	NA	5.87	
4.	Gurmanala	Gurmanala	Dam	9.29	IV Plan	Masonry	—	—	NA	—	—	—	7.69	
II. Second Plan Projects														
5.	Tawa	Tawa	Storage	275.00	V Plan	Com- posite	50.90	1,822	2,312	2,087	NA	NA	303.51	

Appendix 9.1—contd.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
6. Barna	Barna	Storage	47.67	1973	Earthen	46.63	396	490	407	NA	87.41	66.41		
7. Bila	Bila	"	26.77	IV Plan	Com- posite	30.18	NA	—	30	NA	NA	12.95		
8. Chandrakeshar	Chandrakeshar	"	16.31	IV Plan	Earthen	19.20	2,438	—	30	NA	NA	4.86		
9. Removing shortage in Harsi		Feeder canal and augmenting storage	46.73	V Plan	—	—	—	—	—	—	—	23.88		
10. Remodelling Mahanadi Canals	Mahanadi	Remodelling	28.27	IV Plan	—	—	—	—	—	—	—	56.66		
III. Third Plan Projects														
NIL														
IV. Annual Plan Projects (1966-69)														
11. Hasdeo Right Bank Canal	Hasdeo	Barrage/ canal	49.80	1972	—	—	—	—	—	—	—	47.46		
12. Bagh R.B.C.	Bagh	Canal	37.60	1973	—	—	—	—	—	—	—	21.37		

Source: (1) Irrigation Statistics of India, CW&PC (1960-61)
(2) Note Volume of Irrigation Chapter, Madhya Pradesh, CW&PC (August 1969).
(3) India—Irrigation and Power Projects, CW&PC (Dec., 1967).

APPENDIX 10.1

Drought Affected Areas of Maharashtra

(As identified by the Commission)

District	Name of Taluk	District	Name of Taluk
1	2	1	2
Poona	(i) Dhond (ii) Sirur (iii) Indrapur (iv) Purandhar (v) Haweli	Satara	(i) Kandala (ii) Man (iii) Khatava
Ahmednagar	(i) Shrigonda (ii) Karjat (iii) Sangamner (iv) Pathardi (v) Parner (vi) Ahmednagar (vii) Jamkhed	Aurangabad	(i) Vaijapur (ii) Gangapur
		Bhir	(i) Ashti (ii) Patoda (iii) Bhir (iv) Georai
Sangli	(i) Jath (ii) Khanepur	Osmanabad	(i) Parendia (ii) Bhoom (iii) Kalam (iv) Osmanabad
Sholapur	(i) Pandharpur (ii) Nadha (iii) Mangalwedha (iv) North Sholapur (v) South Sholapur (vi) Sangola (vii) Karmala (viii) Mohol (ix) Akkalkot (x) Barshi	Nasik	(i) Baglan (ii) Malegaon (iii) Kalwan (iv) Chandor (v) Nandgaon (vi) Niphad (vii) Yeola (viii) Sinnar

APPENDIX 10.2

Irrigation Works under Construction in or Proposed for Drought Areas

A. Schemes under construction

Project	District(s) benefited	When taken up	Irrigation benefits (Thousand hectares)
1	2	3	4
Mula	Ahmednagar	II Plan	65.56
Adula	Ahmednagar	Annual Plans	5.75
Kukadi Stage I	Ahmednagar & Poona	"	42.70
Khadakwasla Stage I	Poona	II Plan	22.30
Bhima Irrigation	Poona & Sholapur	Annual Plans	172.89
Padwal-Karwadi	Sholapur	"	0.83
Upper Godavari	Nasik	"	44.27
Chankapur Dam	Nasik	"	12.04
Jayakwadi Stage I	Aurangabad & Bhir	"	141.65
Warna	Sangli	"	99.06
Kadi	Bhir	"	1.10
Krishna Irrigation	Satara & Sangli	"	106.29

B. Irrigation Works Proposed

Project	Drought district benefited	Irrigation benefit (Thousand hectares)
1	2	3
Khadakwasla Stage II	Poona	40.21
Pangaon Hingni	Sholapur	10.10
Nazare	Poona	3.37
Ulup	Osmanabad	0.88
Mhaladevi	Ahmednagar	16.84
Tawarja	Osmanabad	3.38
Ghatshil	Ahmednagar	2.38
Koyna Irrigation Scheme Stage I	Satara & Sangli	42.17
Koyna Irrigation Scheme Stage II	Satara/Sangli	58.52
Bhima Lift Irrigation Stage I	Sholapur	40.47
Umrodi	Satara	9.79

Appendix 10.2—*Contd.*

Project	Drought district benefited	Irrigation benefit (Thousand hectares)
1	2	3
Wang	Satara & Sangli	28.13
Yeralwandi	Sangli & Satara	5.06
Chaskaman	Poona	46.54
Bhima Lift Irrigation Stage II	Poona/Sholapur	101.98
Kukadi Stage II	Poona/Sholapur	74.70
Nira Valley Project	Ahmednagar	
	Poona, Satara & Sholapur	101.05
Nimgaon-Ganguard Tank	Ahmednagar	7.69
Sina Project	Sholapur & Osmanabad	18.21
Bharvir	Nasik	11.00
Pravara River Project	Ahmednagar	58.00
Dhanegaon	Osmanabad & Bhir	20.60
Lower Tirna Project	Osmanabad	29.90
Kundlika Project	Bhir	4.96
Tarali	Satara	10.56
Begampur Lift Scheme	Sholapur	129.50
Burhanpur	Poona	5.79
Hatiz Hingni	Sholapur	5.34

APPENDIX 10.3

Water Rates Prevailing in Western Maharashtra

Crops	Water rates on major irrigation projects	Water rates on medium and minor irrigation projects
1	2	3
	Rs.	Rs.
Sugarcane and plantains	180.00 per acre per year	120.00 per acre per year
Pan gardens	190.80 -do-	— —
Other perennials	120.00 -do-	70.00 -do-
Two seasonal crops	15.00 per acre	15.00 per acre
Kharif seasonal crops	6.00 -do-	6.00 -do-
Rabi seasonal crops	9.00 -do-	9.00 -do-
Hot weather seasonal crops	18.00 -do-	18.00 -do-
Pre-seasonal watering	9.00 -do-	9.00 -do-
Post seasonal watering	4.00 -do-	3.00 for kharif crops in rabi season. 4.00 for rabi crops in hot weather season.
Cotton and groundnut	Double the seasonal rates (ad hoc rate of Rs. 37/- per acre inclusive of irrigation cess is charged from 1964 as a concession upto 15.2.69. Half of this ad hoc rate is charged on new irrigation project).	Same as in Col. No. 2.

APPENDIX 10.4

Water Rates Prevailing in the Vidarbha From
1.7.1967

Crop	Water Rate Rs.		
1	2		
Rice	1st year		Nil
	2nd year		3.00
	3rd year		6.00
	4th year		9.00
			} *
Wheat*	1st year		Nil
	2nd year		2.06
	3rd year		5.53
	4th year		8.00
Kharif seasonal crops other than rice	1st year		Nil
	2nd year		2.00
	3rd year		4.00
	4th year		6.00
Rabi seasonal crops other than wheat	1st year		Nil
	2nd year		2.66
	3rd year		5.33
	4th year		8.00
Hot weather seasonal crops such as sann-hemp clover, bursem lucern and other fodder crops	1st year		Nil
	2nd year		5.33
	3rd year		5.33
	4th year		5.33
	5th year		10.66
	6th year		10.66
	7th year		10.66
	8th year		16.00
		Major projects	Other projects (i.e. minor and medium projects). Two third rates of major projects
Garden crop & vegetables and any other fruit crop	1st year	13.33	8.88
	2nd year	20.00	13.33
	3rd year	26.66	17.77
	4th year	33.33	22.22

Appendix 10.4—Contd.

Crop		Major Projects	Other projects (i.e. minor and medium projects Two third rates of major projects
		Rs.	Rs.
	5th year	40.00	26.66
	6th year	53.33	35.35
	7th year	66.66	44.44
	8th year	80.00	53.53
	9th year	93.33	62.22
	10th year	106.66	70.77
	11th year	120.00	80.00
Sugarcane	1st year	20.00	13.33
	2nd year	30.00	20.00
	3rd year	40.00	26.66
Pan, plantains & mulberry	4th year	50.00	33.33
	5th year	60.00	40.00
	6th year	80.00	53.33
	7th year	100.00	66.66
	8th year	120.00	80.00
	9th year	140.00	93.33
	10th year	160.00	106.66
	11th year	180.00	120.00
L.S. Cotton	1st year		Nil
	2nd year		7.33
	3rd year		9.33
	4th year		14.33
	5th year		16.66
	6th year		16.66
	7th year		16.66
	8th year		22.00
Groundnut (hot weather)	1st year		Nil
	2nd year		5.33
	3rd year		5.33
	4th year		10.66
	5th year		10.66
	6th year		10.66
	7th year		10.66
	8th year		16.00
Groundnut (kharif)	1st year		Nil
	2nd year		2.00
	3rd year		4.00
	4th year		6.00

Note: First year referred to relates to the Irrigation year 1967-68.

* The rate is applicable to agreement areas while for demand it should be double the rate applicable for agreement areas.

APPENDIX 10.5

Water Rates Prevailing in the Marathwada From
1.7.1967

Crop		Rate	
1		2	
		Major project (i.e. project costing Rs. 20 million and above)	Other project (i.e. medium & minor project). (2/3rd of rates for major project)
		Rs.	Rs.
Heavy perennials	1st year	20.00	13.33
	2nd year	30.00	20.00
	3rd year	40.00	26.66
	4th year	50.00	33.33
	5th year	60.00	40.00
	6th year	80.00	53.33
	7th year	100.00	66.66
	8th year	120.00	80.00
	9th year	140.00	93.00
	10th year	160.00	106.66
	11th year	180.00	120.00
Light perennials	1st year	13.33	8.88
	2nd year	20.00	13.33
	3rd year	26.66	17.77
	4th year	33.33	22.22
	5th year	40.00	26.66
	6th year	53.33	35.35
	7th year	66.66	44.44
	8th year	80.00	53.53
	9th year	93.33	62.22
	10th year	106.66	70.77
	11th year	120.00	80.00
<i>Major, medium and minor project</i>			
Kharif		Rabi	
Rs.		Rs.	
Nil	1st year	Nil	
2.00	2nd year	2.66	
4.00	3rd year	5.33	
6.00	4th year	8.00	

Appendix 10.5—Contd.

Major project (i.e. project costing Rs. 20 million and above)

Hot weather		Pre-seasonal		Post-seasonal		Two-seasonal	
1st year	Nil	1st year	Nil	1st year	Nil	1st year	Nil
2nd year	5.33	2nd year		2nd, 3rd		2nd year	5.00
3rd & 4th yr.		3rd yr. &	2.66	& 4th yr.	1.00	3rd year	10.00
5th, 6th &		4th yr.		5th, 6th		4th year	15.00
7th year	10.66	5th, 6th		& 7th yr.	2.00		
8th year	16.00	& 7th yr.	5.33	8th yr.	3.00		
		8th yr.	8.00				

(Note: First year referred to relates to the irrigation year 1967-68.)

APPENDIX 10.6

Water Rates on Lift Irrigation on Canal, Notified Rivers, Nallas, Tubewells etc.

	On Notified Nallas, Rivers etc.		On lift on canal	On Tubewells
(1) By flow	Full canal flow rate		Full canal flow rate	Re. 1/- for 10,500 gallons of water for food and cash crops. An additional slab rate of Rs. 20/- per acre for cotton.
(2) By lift	Up to 45' ft. height	Above 45' height	Lift irrigation between Dam and pick-up weir	
(1) Cane	Rs. 60/- per acre per year	Rs. 40/- per acre per year	Half the flow rate	
(2) Other perennials	Rs. 30/-	Rs. 25/-	Beyond back water zone on the main river and its tributaries up-stream of the dam and pick up weir.	An additional slab rate of Rs. 25/- per acre for fruit garden and all other cash crops which require more than 5 waterings. An additional slab rate of Rs. 8/- per acre for individual vegetable crops. Perennials i.e. sugarcane, plantains and pan garden and also paddy is not to be allowed on tube-wells.
(3) Two seasonals	Rs. 6/-	Rs. 6/-		
(4) Food and fodder crops	Free of charge if prior permission of the Deptt. is obtained.		(1) Cane : 25 per cent of the canal flow rate.	
			(2) o.p. : -do-	
			(3) T.S. crops : 50 per cent of the canal flow rate.	
			(4) Food and fodder crops/kharif & rabi : Free of charge if permission is obtained.	

APPENDIX 10.7

Rate of Irrigation Cess Adopted in Western Maharashtra

(Rs. per acre per annum)

	Rates of irrigation cess levied on various crops since 1954 to 15.2.1961	Rates of irrigation cess levied on various crops since 15.2.1961 and con- tinued 30.6.1970
Sugarcane and equivalent crops	22.50	30.00
Other Perennial crops	11.25	15.00
Sugarcane (for 1 or 2 seasons)	7.50	10.00
Other Perennials (for 1 or 2 seasons)	4.00	5.00
Eight months blocks	2.50	3.00
Crops other than those mentioned above	2.50	3.00

APPENDIX 13.1

Drought Affected Taluks in Mysore

(I) *Chitradurga District*

- (1) Challakere
- (2) Hiriyr
- (3) Davangere
- (4) Molakalmuru
- (5) Jagalur
- (6) Hosadurga
- (7) Chitradurga
- (8) Holalkere

(II) *Dharwar District*

- (9) Ron
- (10) Gadag
- (11) Ranibennur
- (12) Mundargi

(III) *Bangalore District*

- (13) Hoskote
- (14) Dod Ballapur
- (15) Nelamangala
- (16) Kanakapura
- (17) Magadi
- (18) Ramanagaram
- (19) Anekal
- (20) Devanahally
- (21) Channapatna

(IV) *Hassan District*

- (22) Channarayapatna
- (23) Arsikere
- (24) Holenarsipur

(V) *Gulbarga District*

- (25) Shahapur
- (26) Yadgir
- (27) Chincholi
- (28) Sedam
- (29) Gulbarga
- (30) Aland
- (31) Afzalpur
- (32) Chitapur
- (33) Jeevargi
- (34) Shorapur

(VI) *Kolar District*

- (35) Srinivaspur
- (36) Gudibanda

(37) Chickaballapur

- (38) Gauribidanur
- (39) Bagepally
- (40) Kolar
- (41) Bangarpet
- (42) Chintamani
- (43) Mulbagal
- (44) Malur

(VII) *Raichur District*

- (45) Lingasugur
- (46) Deodurga
- (47) Yelburga
- (48) Kustagi
- (49) Koppal

(VIII) *Tumkur District*

- (50) Madhugiri
- (51) Sira
- (52) Turuvekere
- (53) Tiptur
- (54) Kunigal
- (55) Pavagada
- (56) Chiknayakanhalli
- (57) Koratagere
- (58) Gubbi

(IX) *Bellary District*

- (59) Bellary
- (60) Siruguppa
- (61) Hadagali
- (62) Kudligi
- (63) Harapanahalli
- (64) Mallapuram
- (65) Hospet
- (66) Sandur

(X) *Mysore District*

- (67) Chamarajanagar
- (68) Hunsur
- (69) Gundulupet
- (70) Nanjangud
- (71) T. Narsipur
- (72) Periyapatna
- (73) Kollegal

Appendix 13.1—*contd.***(XI) Mandya District**

- (74) Malavalli
- (75) K. R. Pet
- (76) Nagamangala
- (77) Pandavapura

(XII) Bijapur District

- (78) Bijapur
- (79) Indi

- (80) Sindgi
- (81) Bagewadi
- (82) Jamakhandi
- (83) Bilgi
- (84) Muddebihal
- (85) Mudhol
- (86) Bagalkot
- (87) Hungund
- (88) Badami

APPENDIX 13.2

Irrigation Works under Construction in Drought Areas

Project	Districts benefited	Continuing from	Irrigation benefits (Thousand hectares)
1	2	3	4
Hathikoni Dam	Gulbarga	I Plan	2.14
Upper Krishna Stage I	Bijapur, Raichur & Gulbarga	III Plan	242.82
Rajolibanda Diversion	Raichur	I Plan	2.38
Kanakanala	Raichur	II Plan	2.06
Tungabhadra High Level Canal Stage I & II	Bellary	I Plan/ Annual Plan	80.94
Hagaribommanahalli	Bellary	II Plan	2.97
Kabini	Mysore	II Plan	50.99
Chickhole	Mysore	II Plan	1.60
Hebbahalla	Mysore	II Plan	1.21
Arakavathi	Bangalore	Annual Plan	2.83
Hemavathi	Hassan & Mandya	—	—
Chandrapalli	Gulbarga	—	5.00

APPENDIX 13.3

Irrigation Works Proposed by Mysore State Government which will benefit the Drought Areas

Name of project	Drought-district benefited	Irrigation benefits (Thousand hectares)
1	2	3
Lower Mullamari	Gulbarga	12.95
Gandhorinalla	"	9.31
Amarja Dam	"	7.28
Bhima Lift Irrigation	"	83.97
Bhima Irrigation	"	81.54
Kagna	"	25.90
Bennithore	"	20.23
Balkundi	Bijapur	1.28
Bijapur Lift Irrigation	"	242.81
Don	"	8.09
Ranga Samudra	"	1.00
Ramthal Irrigation	"	27.32
Arjanala	"	1.72
Almol	"	1.44
Upper Krishna Stage II	Gulbarga, Bijapur & Raichur	269.92
Maskinala	Raichur	2.43
Tungabhadra Foreshore lift irrigation	Raichur & Bellary	23.62
Hirehalla	Raichur	2.49
Tungabhadra Diversion	Raichur & Bellary	60.70
Nari Halla	Bellary	4.59
Feeder Canal to Dharampur Tank	Chitradurga	2.02
Feeder Canal to Ranikere Tank	"	4.35
Jinegehalla	"	1.21
Madagamasur Dam	Dharwar	8.50
Mundwad	"	1.46
Hulikere	"	1.17
Veerapur Anicut	"	1.36
Upper Bhadra Dam	Chitradurga & Bellary	105.22
Changavadi	Mysore	2.63
Sagore Doddakere	"	0.81
Belthur	"	1.42
Survarnavathy	"	6.76
Doddihalla	"	1.21
Gundal	"	4.05
Taraka	"	7.35
Kuduregundihalla	"	0.89
Minnathuhalla	"	1.21

Appendix 13.3—*contd.*

1	2	3
Uduthorehalla	Mysore	62.73
KRS Right Bank H. L. C.	Mysore & Mandya	20.23
Hemavathi Stage II	Mandya, Hassan & Tumkur	141.64
Iggulur Anicut	Mandya & Bangalore	3.24
Manchanabele	Bangalore	2.83
Votehole	Hassan	5.26
Yagachi	"	12.95
Uttarapinakini	Tumkur	1.46
Marconahalli Extension	"	2.02

APPENDIX

Salient Features of Projects Irrigating

Sl. No.	Name of Project	Source of water	Storage/ non-storage	Capital cost (Rs. million)	Year of completion	Type
1	2	3	4	5	6	7

A. COMPLETED PROJECTS (BY MARCH, 1969)

I. Pre-plan Projects

1.	Orissa Canals System	Mahanadi Brahmani Baitarani	Diversion	27.66	1895	Anicut
2.	Rushikulya Canal System	Padma Rushikulya	Diversion +Storage	5.61	1901	N.A.
3.	Mehendratnaya System	N.A.	N.A.	1.09	N.A.	N.A.

II. First, Second and Third Plan Projects

B. PROJECTS UNDER CONSTRUCTION

I. First Plan Projects

1.	Hirakud Project	Mahanadi	Storage St. I St. II	678.10 148.50	IV Plan	Earth Masonry Concrete
2.	Mahanadi Delta Irrigation	Mahanadi	Diversion	683.81	IV Plan	Weir

II. Second Plan Projects

3.	Salandi	Salandi	Storage/ Diversion	129.77	IV Plan	Compo- site dam
4.	Salia	Salia	Storage	29.40	IV Plan	Earthen
5.	Salki	Salki	Diversion	16.60	„	Anicut
6.	Godahado	Godahado	Storage	19.85	„	Earthen
7.	Dhanai	Dhanai	Storage	13.21	„	„

15.1

4,050 hectares and Above*

Max. ht. (metres)	Length (metres)	Storage capacity m.cu.m.		Full supply discharge (cumecs)	C.C.A. (hecs.)	Gross area to be irrigated (hecs.)	Remarks
		Gross	Live				
8	9	10	11	12	13	14	15
—	—	—	—	—	—	111,351	
—	—	—	—	—	—	48,000	
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	4,047	
—NIL—							
61	Earth 3,852 Masonry & Concrete 1,148 20,656 .. Dykes 1,332	8,141	5,822	Bargarh Canal 136 Sason Canal 18 Sambalpur Disty. 3.6 Main Puri Canal 170	153,780	242,810	
—	—	—	—	—	408,730	679,870	Includes existing irrigation
52	817	566	557	N.A.	—	61,917	
28	445	51	N.A.	N.A.	—	10,830	
—	129	—	—	N.A.	—	21,850	
24	1,667	N.A.	N.A.	N.A.	N.A.	6,475	
16	N.A.	N.A.	8	N.A.	N.A.	5,261	

Appendix

Sl. No.	Name of Project	Source of water	Storage/ non-storage	Capital cost (Rs. million)	Year of completion	Type
1	2	3	4	5	6	7
8.	Darjang	Nisgra & Matalia	Storage	37.24	IV Plan	Earthen
<i>III. Third Plan Projects</i>						
9.	Pitamahal	Pitamahal	„	8.30	„	„
10.	Bahuda St. I	Bahuda Poichodia Bartada Baginala	Storage/ Diversion	15.89	N.A.	N.A.
11.	Hiradharbatti	Rushikulya	„	3.40	IV Plan	Anicut
<i>IV. Annual Plan Projects (1966-69)</i>						
12.	Uttai	Uttai	Diversion	9.02	IV Plan	Weir
13.	Baghna	Baghna	„	6.56	„	„
14.	Dahuka	Dahuka	„	5.61	„	„

15.1—*contd.*

Max. ht. (metres)	Length (metres)	Storage capacity m.cu.m.		Full supply discharge (cumec)	C.C.A. (hecs.)	Gross area to be irrigated (hecs.)	Remarks
		Gross	Live				
8	9	10	11	12	13	14	15
27	N.A.	48	N.A.	N.A.	N.A.	8,712	
23	703	N.A.	N.A.	N.A.	N.A.	4,856	
N.A.	N.A.	Bahuda 71	45	N.A.	N.A.	10,562	
		Poichodia	29				
		Bartada	13				
		Baginala	38				
N.A.	N.A.	—	—	N.A.	N.A.	5,858	
—	53	N.A.	N.A.	N.A.	N.A.	11,331	
—	99	—	—	N.A.	N.A.	4,047	
—	152	—	—	N.A.	N.A.	4,654	

*Source: (1) State Replies to Irrigation Commission.

(2) Irrigation Statistics of India (1960-61)—CW&PC

(3) Irrigation & Power Projects (1970)—CW&PC

(4) Note Volume of Irrigation Chapter—Orissa (July 1969)—CW&PC

Note NA—Not Available.

APPENDIX

Salient Features of Projects Irrigating

Sl. No.	Name of project	Source of water/ Name of river	Storage/ non-storage	Capital cost (Rs. million)	Year of completion	Type
1	2	3	4	5	6	7
1.	Upper Bari Doab Canal	Ravi	Non-storage	25.38	1878-79	Canal
2.	Sirhind Canal	Sutlej	"	27.53	1886-87	Canal
3.	Eastern Canal	"	"	24.98	1933	Canal
4.	Shah Nahar Canal	Beas	"	3.32	1951	Canal
5.	Kiran Nallah	N.A.	"	1.48	1955-56	Canal
6.	Extension of irrigation to arid areas of Jandiala and Gurdaspur Dn. of UBDC	Ravi	"	1.33	1955-56	Canal
7.	Raising and strengthening of banks of channels	—	"	11.49*	1955-56	Canal
8.	Harike Project	Sutlej	"	91.45	1957-58	Barrage
9.	Extension of distributaries of Kasur Branch	Ravi	"	2.33	1959-60	Canal
10.	Bhakra Nangal Project	Sutlej	Storage	805.87	1963-64	R.C.C. Dam

- Source* (1) Irrigation Statistics of India 1960-61, CW&PC—March, 1968
 (2) India—Irrigation and Power Projects, CW&PC—April, 1970
 (3) Note Volume of Irrigation Chapter on Punjab, CW&PC—March, 1970.

16.1

4,000 Hectares and Above

Max. height (metres)	Length (metres)	Storage capacity m.cu.m.		Full supply discharge (cumecs)	C.C.A. (hectares)	Gross area to be irrigated (hectares)	Remarks
		Gross	Live				
8	9	10	11	12	13	14	15
—	—	—	—	254	490,091	367,921	
—	—	—	—	357	1,507,504	1,031,001	
—	—	—	—	94	147,536	107,826	
—	—	—	—	15	20,639	21,788	
—	—	—	—	N.A.	N.A.	7,040	
—	—	—	—	N.A.	N.A.	6,780	
—	—	—	—	N.A.	N.A.	7,280	*Including Haryana
—	—	—	—	N.A.	N.A.	27,400	
—	—	—	—	N.A.	N.A.	13,800	
—	—	—	—	N.A.	N.A.	37,480	
226	518	9,867.8	7,770.9	354	N.A.	532,250	

APPENDIX 17.1

Average Annual flows of Rivers of Rajasthan

River	Average flow in	
	m.cft.	m.cum.
- 1	2	3
I. BANAS RIVER VALLEY		
Banas I (from its source to Khakhunda)		
1. Kothari river basin	6,644	188.03
2. Banas up to Khakhunda	20,203	571.74
3. Berach river basin	30,589	865.67
Total	57,436	1,625.44
Banas II (from Khakhunda to its confluence with Chambal)		
1. Khari river	16,478	466.33
2. Dai river	4,719	133.55
3. Mashri river	7,666	216.95
4. Shodra river	4,715	133.43
5. Dhill river	1,511	42.76
6. Morel river	14,045	397.47
7. Kalisil river	2,174	61.52
8. Main Banas river	32,433	917.85
Total	83,741	2,369.86
II. MAHI RIVER VALLEY		
1. Jakhm river	27,378	774.80
2. Som river	73,655	2,084.44
3. Moran river	3,956	111.95
4. Anas river	69,370	1,963.17
5. Mahi river	123,089	3,483.42
6. Bhadar & Vatrak river	5,384	152.37
Total	3,02,839	8,570.15
III. CHAMBAL RIVER VALLEY		
1. Chambal river	18,433	521.65
2. Chakhan river	1,822	51.56
3. Mej river	22,833	646.17
4. Eru river	2,233	63.19
5. Alnia river	3,590	101.60
6. Parbati river	35,310	999.27
7. Kunu river	4,350	123.10
8. Parwan river	20,478	579.53
9. Kalisindh river	42,760	1,210.11
ABOVE KOTA BARRAGE		
1. Chambal river	—	—
2. Choti Kalisindh	1,796	50.83
Total	1,53,605	43,47.01

Appendix 17.1—Contd.

River	Average flow in	
	m.cft.	m.cum.
1	2	3
IV. SABARMATI RIVER VALLEY		
1. Wakal river	15,683	443.83
2. Sabarmati river	2,036	57.62
3. Sei river	6,592	186.55
Total	24,311	688.00
V. MISC. RIVERS		
1. Sabi river valley	6,100	172.63
2. Baran river valley	5,770	163.29
3. Banganga river valley	16,472	466.16
4. Gambhir river valley	15,566	440.52
5. Parbati river valley	7,780	220.17
6. West Banas river valley	8,860	250.74
7. Sukli river valley	2,274	64.35
8. Other Nallah of Jalore	493	13.95
Total	63,315	1,791.81
VI. LUNI RIVER VALLEY		
1. Jojri river	2,004	56.71
2. Luni (origin to Jaswant Sagar)	3,750	106.12
3. Luni (Jaswant Sagar to Nakoda)	2,974	84.16
4. Luni (Nakoda to Chitalwana)	494	13.98
5. Guniya river	3,352	94.86
6. Sukri Hemawas	1,541	43.61
7. Bandi Hemawas	1,579	44.69
8. Sukri (Bankli to Luni)	1,181	33.42
9. Sukri (Up to Bankli)	351	9.93
10. Mithri river	1,373	38.86
11. Jawai river	6,338	179.36
12. Sukri (Up to Luni)	317	8.97
13. Khari (Up to Luni)	2,834	80.20
14. Bandi river	959	27.14
15. Sagi river	351	9.93
Total	29,398	831.94
VII. RIVERS OF SHEKHAWATI AREA		
1. Kantli river	2,987	84.53
2. Dohan river	1,239	35.06
3. Nawalgarh Nallah	167	4.73
4. Krishnawati river	378	10.70
5. Ranoli river	483	13.67
6. Mehdha river	4,672	132.22
Total	9,926	280.91
Grand Total	7,24,571	20,505.12

APPENDIX 17.2

Salient Features of Projects Irrigating 4,000 Hectares and Above

Sl. No.	Name of Project	Source of water/ Name of river	Storage/ non-storage	Capital cost (Rs. million)	Year of completion	Type	Length (metres)	Maximum height (metres)	Storage capacity (m.cu.m.)		Full Supply Discharge (cumecs)	C.C.A. (hectares)	Gross area irrigated annually (average in hectares)	Remarks
									Gross	Live				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Jai Samand Tank	Gumti & Jamari	Storage	6.00	1910	Tank	122	7.6	—	566	0.25	5,058	4,050	Canal extended in 1953
2.	Gang Canal	Sutlej	Non-storage	33.20	1927	Canal	—	—	—	—	73.44	307,660	257,500	
3.	Jaswant Sagar	Luni	Storage	0.95	—	Tank	—	—	—	—	—	6,475	5,000	
4.	Parvati Pick-up weir	Parvati	Non-storage	—	—	Weir	—	—	—	—	—	9,270	7,990	
5.	Jawai	Jawai	Storage	25.00	1951	Masonry	871	34	—	182	10.80	41,274	7,690	
6.	Morel	Morel	"	5.00	1954	Earth dam with masonry core wall	4,200	15.60	—	70	51.30	19,233	7,452	
7.	Meja	Kothari	"	9.70	1956	Earthen	4,500	18	—	90	8.10	16,370	8,400	
8.	Sareri	Mashi	"	3.90	1957	"	5,160	11.89	—	54	48.60	6,200	5,400	
9.	Khari	Khari	"	3.70	1957	"	1,515	17.40	—	29	29.70	8,200	4,900	
10.	Namona	Banas	"	5.80	1957	Earth dam with masonry over flow	1,350	18.90	—	21	32.40	8,084	4,099	
11.	Gudha	Mej	"	7.20	1957	Earthen	2,760	25	—	120	5.40	12,141	6,070	
12.	Parvati	Parvati	"	12.20	1959	Masonry	7,515	32	—	114	9.46	24,000	12,000	
13.	Galwa	Banas	"	4.10	1960	Earth dam with masonry over-flow	4,700	16.50	—	47	43.20	10,805	4,451	
14.	West Banas	West Banas	"	6.50	1968	Earthen	4,084	—	—	—	—	5,188	4,470	
15.	Bharatpur Feeder	Yamuna	Non-storage	1.70	1970	Canal	—	—	—	—	—	10,600	6,000	
16.	Bhakra Canals (Rajasthan portion)	Sutlej	Storage	234.00	1964	Gravity dam in Himachal Pradesh	—	—	—	—	68.31	370,000	150,700	
17.	Chambal Stage I & II	Chambal	Storage	192.90*	1967	—	600.54	37	—	—	214	373,000	74,000	*Rajasthan share
18.	Rajasthan Canal	Sutlej and Beas	Storage	1,102.00	—	—	—	—	—	—	523.55	1,150,000	37,700	Under construction

Source: (1) Irrigation Statistics of India 1960-61, CW&PC—March, 1968.

(2) Note volume of Irrigation Chapter—Rajasthan, CW&PC—March, 1970.

(3) Draft Replies to the Irrigation Commission Questionnaire—Rajasthan Government, Feb., 1970.

APPENDIX 17.3

Water Rates in Different Projects in Rajasthan

1. Ganga Nagar Project (Perennial & Non-perennial Channels)

	Rs. per hec. (acre)
(a) <i>Kharif</i>	
(i) Rice	21.00 (8.50)
(ii) Waternuts	24.09 (9.75)
(iii) Cotton	15.44 (6.25)
(iv) Indigo & other dyes, tobacco, spices & drugs orchards; vegetables other than turnips (except zeera)	16.68 (6.75)
(v) Maize, melon, fibres other than cotton	14.83 (6.00)
(vi) Bajra, jowar, guara, pulses, fodder, crops chana & grass with two or more waterings	9.88 (4.00)
(b) (i) Wheat	12.97 (5.25)
(ii) Barley, oats, bajra and gochani	14.83 (6.00)
(iii) Gram	9.88 (4.00)
(iv) All other rabi crops not otherwise specified including oilseeds	12.97 (5.25)
(v) Watering for ploughing not followed by a crop (Pelwar & single watering for grass)	3.71 (1.50)
(vi) All rabi crops, 1st watering 2nd watering 3rd watering or more waterings	7.41 (3.00)
(vii) Watering for ploughing not followed by a crop (Pelwar)	3.71 (1.50)
(viii) Zeera	19.15 (7.75)
(c) <i>Perennial</i>	
(i) Sugarcane	40.16 (16.25)
(ii) Gardens	20.39 (8.25)

Remarks: The rate for lift & seepage irrigation is half the rate of flow irrigation.

2. Bhakra Project & Ghaggar Canal Areas (Perennial and non-perennial)

	Rs. per hec. (acre)
(a) <i>Kharif</i>	
(i) Rice	22.24 (9.00)
(ii) Maize	16.06 (6.50)
(iii) Cotton	19.15 (7.75)
(iv) Jowar, gowar and other fodder crops	9.88 (4.00)
(v) Vegetables & spices (except zeera)	20.39 (8.25)
(vi) Hemp and Grass	9.88 (4.00)
(vii) All other kharif	15.74 (6.37)
(viii) Zeera	22.86 (9.25)

Appendix 17.3—Contd.

(b) Rabi	
(i) Wheat, barley	14.83 (6.00)
(ii) Gram	9.88 (4.00)
(iii) Rabi oil crops	15.74 (6.37)
(iv) For rabi crops (non-perennial irrigation)	
1st watering	7.41 (3.00)
2nd watering	7.41 (3.00)
3rd watering	Perennial rates
(v) For irrigation water taken for ploughing and not followed by any crop	
1st watering	7.41 (3.00)
2nd watering	12.36 (5.00)
3rd watering	Perennial rates
(c) Perennial	
(i) Sugarcane	40.77 (16.50)
(ii) Gardens	20.39 (8.25)

General Remarks: The rate for lift irrigation is half the rate for flow irrigation.

3. Rates chargeable on all irrigation done from (a) all works which have been constructed after the 1st Jan. 1952 other than from Gang Canal, Bhakra supplies and (b) from all works in the area of the former States of Banswara, Dungarpur and Pratap Garh.

	Rs. per hec. (acre)
1. Sugarcane	54.36 (22.00) per year
2. Vegetable singhara	29.65 (12.00) per crop
3. Gardens	29.65 (12.00) per half year
4. Lucerne, tobacco and poppy	24.71 (10.00) per crop
5. Rice	21.00 (8.50) per crop
6. All other crops except zeera	17.30 (7.00) per crop
7. Palewa not followed by crop	9.88 (4.00) for all crop
8. Wheat	24.71 (10.00) per crop
9. Zeera	19.27 (8.00) per crop
10. Cotton	19.27 (8.00) per crop
4. Gang Canal	
Kharif & rabi	13.98 (5.66)
5. Bhakra	
Kharif & rabi	21.00 (8.50)
6. Chambal	
Kharif & rabi	21.00 (8.50)
7. Jawai	
Rabi	21.62 (8.75)
8. Meja	
Rabi	21.62 (8.75)
9. Parbati	
Rabi	21.62 (8.75)
10. Gudha	
Rabi	21.62 (8.75)
11. Gambheri	
Rabi	21.62 (8.75)

APPENDIX 18.1

Salient Features of Projects Irrigating 4,050 Hectares and Above

Sl. No.	Name of project	Source of water/ Name of river	Storage/ Diveraion	Type	Capital cost (Rs. million)	Year of completion	Length (Metres)	Max. height (Metres)	Storage capacity		Full supply discharge (cumecs)	C.C.A. (Hectares)	Gross area to be irrigated (Hectares)	Remarks
									Gross (m.cu.m.)	Live				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A. COMPLETED PROJECTS (BY MARCH, 1969):														
I. Pre-Plan Projects :														
1.	Cauvery Delta ¹ System	Cauvery	Weir	NA	10.33	1889	293	—	—	—	566.3	367,877	366,000	
2.	Lower Coleroon Anicut	Coleroon	Weir	NA	3.43	1903	711	—	—	—	37.6	44,473	44,450	
3.	Cauvery-Mettur Project	Cauvery	Dam	Masonry	66.36	1934	1,615	65	2,925 (including flood storage)	2,648	104.3	201,212	134,000	
4.	Periyar System	Periyar & Vagai	Dam	„	10.84	1897	378	54	—	300	45.3	57,870	57,700	
5.	Palar Anicut	Palar	Weir	NA	2.58	1896	801	—	—	—	68.6	42,505	33,600	
6.	Sriwalkuntam Anicut	Tambraparni	Weir	NA	1.78	1889	116	—	—	—	9.4	13,557	10,500	
7.	Tadepalli Channel System	NA	NA	—	0.19	NA	NA	—	—	—	NA	NA	7,670	
8.	Kalingarayan Channel System	Cauvery	Diversion	—	0.18	NA	NA	—	—	—	NA	NA	5,660	
9.	Chembrampakkam Tank	Palar basin	Storage	NA	0.76	NA	NA	NA	NA	NA	NA	NA	6,050	
10.	Poincy Anicut	Poincy	Weir	NA	0.30	NA	NA	—	NA	NA	NA	NA	9,690	
11.	Cheyyar Anicut	Cheyyar	Weir	NA	1.04	1896	71	—	—	—	43.9	11,922	9,690	

Appendix 18.1—contd.

Sl. No.	Name of Project	Source of water	Storage/ Non-storage	Capital cost (Rs. million)	Year of completion	Type	Max. height (metres)	Length (metres)	Storage capacity (m.cu.m.)		Full Supply Discharge (Cumecs)	C.C.A. (hectares)	Gross area to be irrigated (hectares)	Remarks
									Gross	Live				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
12.	Tirukoibur Anicut	Ponnaiyar	Weir	NA	0.42	NA	NA	—	—	—	NA	NA	11,300	
13.	Shatiatope Anicut	Vellar	Weir	NA	1.09	1895	161	—	—	—	24.1	17,792	13,720	
14.	Vridhachalam Anicut	Manimuktanadi	Weir	NA	0.11	NA	NA	—	—	—	NA	NA	4,050	
15.	Marudur Anicut	Tambra- parni	Weir	NA	0.06	NA	—	—	—	NA	NA	—	8,480	
16.	Kattalai Scheme	Cauvery	Diversion	NA	0.42	1926	1,288	—	—	—	46.4	30,341	29,100	
17.	Wellington Reservoir	NA	NA	„	0.26	NA	NA	NA	NA	NA	NA	NA	11,300	
18.	Palandorai Anicut	Vellar	Weir	„	0.69	NA	NA	NA	—	—	NA	NA	6,450	
19.	Tholudur Reservoir	Vellar	Weir/tank	„	0.62	1925	NA	NA	—	73	11.9	11,655	NA	
<i>II. First, second and third plan projects</i>														
1.	Lower Bhavani	Bhavani	Storage	Composite	103.40	1956	8,799	62	925	900	65.1	131,525	78,920	
2.	Kodayar Extension (Perinchane) Kodayar Weir	Kodayar	Dam	Masonry	4.37	„	NA	—	—	—	NA	NA	47,530	
3.			Weir		2.29	„								
4.	Manimuthar	Mani- Muthar	Dam	Composite	50.50	1958	3,398	46	155	155	12.6	NA	41,690	
5.	Amaravathy	Amravathy	„	„	33.41	1959	1,095	50	NA	115	8.5	17,000	21,650	
6.	Sathanur I	Penniar	Dam	„	25.80	1958	786	41	NA	130	11.5	8,505	8,500	2,020
	II	„	„	„	6.00	1966								

Appendix 18.1—contd.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
7.	Methur Canals	Cauvery	Canal	Canal	19.29	1957	—	—	—	—	11.5	18,225	18,250	
8.	Vaigai Project	Periyar & Vaigai	Dam	NA	33.00	1959	3,559	37	NA	193	5.9	16,243	9,240	
9.	New Kattalai H.L. Canal	Cauvery	Canal	Canal	22.46	1960	—	—	—	—	31.4	8,340	8,340	
10.	Pullambadi Canal	"	"	"	20.59	1960	—	—	—	—	32.0	8,950	8,950	
B. PROJECTS UNDER CONSTRUCTION														
I. First plan projects														
NIL														
II. Second plan projects:														
1.	Parambikulam Aliyar Project	Nirar, Sholayar, Parambikulam, Tunac-adavu, Peru-varipallam, Aliyar, Palar	Storage		675.3		IV Plan (anticipated)			Details given elsewhere in the text		NA	97,130	
III. Third plan projects														
2.	Chittar Pattanam kal.		Dam	Earthen	73.3		IV plan	762	22	16	11	NA	NA	19,020
IV. Annual plan projects (1966-69) and IV plan projects														
3.	Modernising Vaigai Channels	Vaigai	Diversion		39.4		IV plan (Probable)	—	—	—	—	—	—	4,445
4.	Modernising Tanjavor Canals	Cauvery	Improvement to existing works		225.0		V Plan (Probable)	—	—	—	—	—	—	57,895 (not yet approved by Planning Commission)

*Source: CW&PC—Irrigation Statistics of India (1960-61)
 CW&PC—Irrigation and Power Projects (1970)
 CW&PC—Note Volume of Irrigation Chapter Tamil Nadu (March, 1970).

APPENDIX 18.2

Schedule of Water Rates

Sl. No.	Name of Project	Crop	Rate (Rs. per acre)	Remarks
1	2	3	4	5
1. Lower Bhavani 2. Amaravathy 3. Mettur Canals	}	Cotton, Yarn, Castor, Plantain, Coconut Fruit trees	} 20.00	In the case of Lower Bhavani and Amaravathy projects, concessional water rates were given as follows: $\frac{1}{2}$ of the rates for the first year of issue of permit, $\frac{2}{3}$ of the rates in the second year and full rates thereafter.
		Paddy, Chillies, Tobacco, Onion, Sweet Potato, Turmeric, Tapioca, Vegetables	} 15.00	In the case of Mettur Canals, half the rates were charged for Fasli 1364, 1,365 and 1,366 if irrigation was for the first time in the case of right bank canal; and for Fasli 1,366, 1,367 & 1,368 if irrigation was for the first time in case of left bank canal.
		Groundnut, Gingelly, Millets, Pulses, Fodder Crop)	} 10.00 } 7.50	
4. Manimuthar		All crops in Delta area	12.50	All tanks which are fed by the reservoir are provisionally ordered to be classified as Class I source for levy of assessment.
		All crops in non-Delta area	10.00	
5. Vaigai (Madurai Distt.)		1st wet crop	10.00	During the first year, no charge was levied for water used to convert dry lands into wet, unless a crop was grown.
		2nd wet crop	10.00	
		3rd wet crop	10.00	
		1st dry crop (systematically irrigated)	10.00	

Appendix 18.2—*contd.*

Sl. No.	Name of Project	Crop	Rate (Rs. per acre)	Remarks
1	2	3	4	5
		2nd dry crop	10.00	For the first crop raised after conversion, only half the rates are charged.
		1st, 2nd & 3rd dry crops (occasionally irrigated)	5.00	
		Sugarcane, Turmeric and Crops standing more than 6 months	20.00	Existing wet rates increased by Rs. 10.00 per acre (Revised rates are Rs. 14.37 per acre).
Vaigai (Ramanathapuram Distt.)		1st wet crop	5.00	
		2nd wet crop		
		3rd wet crop		
		Dry crops	5.00	
		Sugarcane & Crops standing more than 6 months	10.00	"

Note: Existing wet rates increased by Rs. 5.00 per acre.

6. Parambikulam Aliyar	Wet crops	25.00	1/3 rate in the first year of irrigation. 2/3 rate in the 2nd year of irrigation and full rates from third year onwards.
	Dry crops	15.00	

7. Cauvery System

(i) Cauvery-Mettur Project

<i>Ryatwari dry lands</i>	
1st crop	10.00
2nd crop	5.00
3rd crop	2.50
Duffasal crop	15.00

<i>Ryatwari wet lands</i>	
1st crop	—
2nd crop	5.00
3rd crop	—
Duffasal	5.00

Appendix 18.2—*contd.*

1	2	3	4
(ii) New Kattlai High Level Canal	1st crop	10.00	Water cess at half rates levied for the first five years and subsequently full rates.
	2nd crop	5.00	
(iii) Pullambadi Canal	3rd crop	2.50	
	Duffasal crop	15.00	

Note: Tanks fed by these two canals have been classified as Class I sources for purposes of levy of wet assessment.

8. Chittar Pattanamkal	Paddy, Chillies Tobacco, Onions, Sweet Potato, Turmeric, Tapioca and Vegetables	}	20.00	1/5 rate for the first year. 2/5 rate for the 2nd year. 3/5 rate for the 3rd year, 4/5 rate for the 4th year and full rate for the fifth year and thereafter.
	Cotton, Coconut, Fruit trees, Plan- tain, Yams and Castor			
	Groundnut	}	15.00	
	Gingelly			
	Milletts, Pulses and Fodder Crops	}	10.00	

APPENDIX

Salient Features of Projects Irrigating

Name of Project	Source of water	Storage/ Diversion	Capital cost (Rs. million)	Year of completion	Storage	
					Type	Max. height (metres)
1	2	3	4	5	6	7
Eastern Yamuna Canal	Yamuna	Diversion	7.20	1830	Canal	—
Upper Ganga Canal	Ganga	"	47.56	1854	"	—
Doon Canal	Yamuna	"	2.68	1863	"	—
Agra Canal	Yamuna	"	13.28	1873	"	—
Lower Ganga Canal	Ganga	"	45.89	1878	"	—
Betwa Canal	Betwa	Storage	14.02	1886	*Masonry dam/canal	17.37
Rohilkhand Canal	Behgul & Kitcha	Diversion	2.81	1894	Canal	—
Ken Canal	Ken	Storage	30.31	1902	Masonry dam	13.07
Dhasan Canal	Dhasan	"	5.06	1911	"	13.70
Ghaggar and Garai Canal	Ghaggar	"	16.70	1918	"	22.82
Sarda Canal	Sarda	Diversion	151.7	1927	Canal	—
Ramganga Pumped Canal	Ramganga	" (lift)	3.06	1935	"	—
Ghagra Pumped Canal	Ghagra	" (lift)	5.17	1937	"	—
Rampur Canal	Small river in Rampur district	Diversion	0.18	N.A.	"	—
Lilitpur Dam	Shahzad	Storage	4.32	1953	Earthen dam	18.29
Saprar Dam	Saprar	"	9.50	1956	"	17.00
Ahaura Dam	Garai	"	5.90	1956	"	23.00
Rangwan Dam	Banne-Nadi	"	12.84	1956	"	27.43
Shahganj Distributary	Ghaggar	Diversion	2.29	1956	Canal	—
Arjun Dam	Arjun Nadi	Storage	11.70	1956	Earthen dam	24.37
Nagwa Dam	Karamnasa	"	8.34	1957	"	17.00
Chandraprabha Dam	Chandraprabha	"	8.77	1957	Masonry dam	20.10

20.1

4,000 Hectares and Above

work		Canal					Remarks
Length (metres)	Capacity (m.cu.m.)		Full supply discharge (cumecs)	C.C.A. (hectares)	Gross area to be irrigated (hectares)		
	Gross	Live					
8	9	10	11	12	13	14	
—	—	—	85.00	476,609	209,126		
—	—	—	297.50	1,585,468	716,129		
—	—	—	10.80	18,360	10,920		
—	—	—	92.10	496,560	159,202		
—	—	—	156.50	1,997,288	591,973		
1,168.44	—	83.60	65.60	471,268	119,983	*Paricha dam	
—	—	—	18.70	83,006	21,020		
801.28	—	59.65	56.60	312,580	74,354		
542.24	—	36.20	20.97	133,256	23,994		
695.90	—	149.12	N.A.	175,320	38,833		
—	—	—	311.70	2,948,636	605,121		
—	—	—	5.60	38,567	19,224		
—	—	—	8.50	52,164	17,465		
—	—	—	N.A.	126,464	17,426		
3,668	—	93.80	4.55	48,279	7,488		
3,883	—	65.70	N.A.	55,096	16,800		
1,402	—	58.30	N.A.	17,580	8,772		
427	—	156.00	57.40	89,600	37,200		
—	—	—	N.A.	19,000	7,980		
4,543	—	57.79	5.88	48,280	10,640		
1,993	—	397.00	N.A.	96,751	26,920		
1,610	—	70.20	19.40	22,000	14,000		

Name of Project	Source of water	Storage/ Diversion	Capital cost (Rs. million)	Year of comple- tion	Storage	
					Type	Max. height (metres)
1	2	3	4	5	6	7
Increasing Capacity of Upper Ganga						
Canal	Ganga	Diversion	1.61	1957	Canal	—
Naugarh Dam	Karamnasa	Storage	13.63	1957	Composite dam	14.30
Remodelling of Eastern Yamuna						
Canal	Yamuna	Diversion	6.99	1957	Canal	—
Pratapgarh Branch	Sarda	"	6.99	1958	"	—
Sarda Sagar	Sarda	Storage	47.26	1959	Earthen Bund	12.20
Stage I						
Banganga Canal	Banganga	Diversion	4.51	1961	Canal	—
Narayani Gandak						
Pokhra Canal	Gandak	"	9.57	1961	"	—
Transkalyani	Sarda	"	5.72	1961	"	—
Belan and Tons Canals						
Canals	Belan	Storage	27.92	1961	N.A.	23.75
Afzalgarh Canal	Ramganga	Diversion	1.75	1962	Canal	—
Balmiki (Ohen)	Ohen	Storage	6.41	1962	Earthen Dam	24.00
Sarovar						
Jirgo Reservoir	Jirgo	"	12.52	1962	"	N.A.
Upper Khajuri Reservoir						
Reservoir	Khajuri	"	8.27	1962	"	9.80
Sarda Sagar Stage II						
	Chuka tributary of Sarda	"	73.23	1962	"	16.20
Tanda Pumped Canal						
Canal	Ghaghara	Diversion (Lift)	8.52	1963	Canal	—
Remodelling Agra Canal						
Canal	Yamuna	Diversion	8.02	1963	"	—
Nanak Sagar	Deoha	Storage	42.04	1964	Earthen dam	16.20
Kwano Pumped Canal						
Canal	Kwano	Diversion	3.75	1965	Canal	—
Construction of 40 miles channels on Dhanapur Distributary						
Distributary	N.A.	"	0.63	1965	"	—
Dohrighat Pumped Canal						
Canal	Ghaghara	Diversion (lift)	17.51	1966	Canal	—

20.1—*contd.*

work	Canal			C.C.A. (hectares)	Gross area to be irrigated (hectares)	Remarks
	Length (metres)	Capacity (m.cu.m.)				
	Gross	Live				
8	9	10	11	12	13	14
—	—	—	N.A.	N.A.	35,600	
7,244	—	87.80	26.50	72,000	34,400	
—	—	—	N.A.	N.A.	8,800	
—	—	—	N.A.	N.A.	18,904	
19,300	—	N.A.	220.80	N.A.	66,960	
—	—	—	7.50	26,080	8,800	
—	—	—	15.60	54,220	23,588	
—	—	—	N.A.	N.A.	18,840	
4,257	—	193.50	13.30	97,200	40,600	
—	—	—	1.68	10,000	4,000	
6,800	—	39.20	3.80	23,020	6,200	
6,700	—	141.50	N.A.	51,200	25,600	
2,320	—	N.A.	18.30	20,740	7,200	
23,496.40	—	3,719	N.A.	448,120	74,060	
—	—	—	10.20	57,800	27,160	
—	—	—	N.A.	N.A.	8,160	
20,116.80	—	4,350	N.A.	N.A.	52,800	
—	—	—	3.40	19,980	8,492	
—	—	—	N.A.	9,688	5,632	
—	—	—	13.50	91,200	47,520	

Appendix

Name of Project	Source of water	Storage/ Diversion	Capital cost (Rs. million)	Year of completion	Storage	
					Type	Max. height (metres)
1	2	3	4	5	6	7
Meja Reservoir	Belan	Storage	33.40	1966	Earthen dam	34.10
Matatila Dam	Betwa	"	124.60	1966	Masonry dam	36.60
Tumaria Reservoir	Tumaria, Phika, Dhela	"	21.63	1966	Earthen dam	21.30
Project for 78 miles on Ken Canal	Ken	Diversion	1.03	1966	Canal	—
Pilli Reservoir	Pilli & Dharan Banehi	Storage	24.00	1968	Earthen dam	N.A.
Tumaria Extension	Phika	Diversion	27.00	1968	Canal	—
Baur Reservoir	Baur	Storage	34.00	1968	Earthen dam	N.A.
Jahangirganj Branch	Ghaghara	Diversion	3.36	1968	Canal	N.A.
Musakhand Dam	Karmnasa	Storage	31.50	1969	Earthen dam	N.A.
Barwa Dam	Barwa	"	6.80		"	N.A.
East Baigal Reservoir	East Baigal	"	8.00 (Irrigation share)			N.A.

Source: (1) Irrigation Statistics of India 1960-61, CW&PC, March, 1968.

(2) Note Volume of Irrigation Chapter—Uttar Pradesh, CW&PC, March 1970.

(3) Replies to the Irrigation Commission Questionnaire, Uttar Pradesh Government, Jan., 1970.

20.1—*contd.*

work	Canal			C.C.A. (hectares)	Gross area to be irrigated (hectares)	Remarks
	Length (metres)	Capacity (m.cu.m.)				
	Gross	Live				
8	9	10	11	12	13	14
2,414	—	5,209	N.A.	54,333	20,956	
6,150.90	—	780	N.A.	273,570	163,832	
13,581	—	84.80	N.A.	32,000	16,000	
—	—	—	N.A.	—	4,332	
N.A.	N.A.	N.A.	N.A.	20,640	11,352	
—	—	—	N.A.	40,000	17,000	
N.A.	N.A.	N.A.	N.A.	34,224	18,676	
N.A.	N.A.	N.A.	N.A.	29,832	13,652	
N.A.	N.A.	N.A.	N.A.	36,756	22,028	
N.A.	N.A.	N.A.	N.A.	23,980	5,392	
N.A.	N.A.	N.A.	N.A.	24,890	7,158	