

**REPORT OF THE
IRRIGATION COMMISSION**

REPORT OF THE
IRRIGATION COMMISSION
1972

VOLUME I



Ministry of Irrigation and Power
NEW DELHI

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Chairman

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IRRIGATION COMMISSION
(Ministry of Irrigation and Power)

New Delhi, the 30th March, 1972.

My dear Dr. Rao.

Second in sequence, our Report is being presented to the Union Government almost seventy years after the report of the First Irrigation Commission in 1903. During the intervening years there has been a tremendous growth in irrigation engineering and irrigation concepts. The Mettur Dam built in the 'thirties was the first concrete dam to be built in India. India was not producing cement at the time, and it had to be imported from abroad. Beginning with the Hirakud and the Damodar Dams, the use of earth-moving machinery during the last 25 years has made spectacular progress in the construction of earth dams and excavation of canals. Tunnelling for the conveyance of water came into vogue.

2. The exploitation of deep aquifers by drilling tubewells several hundred metres below the earth's surface is a recent concept in irrigation. The Geological Survey of India and the State Departments of Geology have made fairly extensive surveys of ground water resources—though much remains to be done. The advent of electricity for lifting water from tubewells and from surface sources through high capacity and high lift pumps has opened possibilities of irrigating areas beyond the reach of surface flow.

3. The aerial survey and the aerial photography of catchment areas and irrigation commands have made possible the speedy execution of irrigation projects. The concept of ayacut development, which began in the Tungabhadra Project completed in the early 'fifties, is now generally accepted in all irrigation projects. The science of soil-plant-water relationship has gained new impetus.

4. An important feature of our recommendations is the need for the conjunctive use of ground and surface waters, preparation of complementary programmes covering engineering works, water-shed manage-

ment and ayacut development. The machinery proposed for the purpose would be the seven River Basin Commissions for the whole country, which will deal with about 20 major rivers.

5. We were commissioned to make special proposals for irrigation works in the chronically drought affected and food scarcity areas. As we proceeded in our work we found that the difference between the chronically drought affected and drought affected areas was only one of degree. The chronically drought affected areas are extremely limited and found only in the States of Rajasthan and Gujarat. We decided, therefore, to ignore the distinction between chronically drought affected and drought affected areas and accepted a larger definition covering both.

6. The concept of food deficit areas with the modern development of transport and communications has become irrelevant. It is not necessary for every area to produce its own food. Some areas of scanty rainfall such as the Jaisalmer region of Rajasthan or the Banni area of Gujarat must of necessity be devoted to sheep and cattle raising. When we posed a question to the experts of Indian Agricultural Research Institute asking them what programme of irrigation they would suggest for areas like Jaisalmer and Banni, they readily replied : "Leave them to sheep and cattle raising".

7. We were required to suggest the minimum works necessary for the drought affected areas to make them self-sufficient. The perspective programme suggested by us would increase the irrigated area to 50 per cent of the cultivated area for the country as a whole. The maximum development of irrigation in drought areas is not likely to increase it above the range of 25 per cent of the cultivated area. Keeping in view the social urges and the demand for the removal of regional and social disparities which are basic to establish socialism, we decided that the development of irrigation in the drought affected areas should be the maximum. Even so these areas will have only half the percentage of the average irrigation of the country.

8. The minor irrigation works have a special relevance to the drought affected areas and we have suggested that the programme of constructing minor works should be completed within the next ten years. They supplement the canal irrigation and fill the deficiencies of large irrigation works.

9. Many of our existing irrigation works, which were by all standards a creditable performance at the time when they were executed, are now proving too inadequate to meet the exacting demands of the new high-

yielding varieties of crops. These crops require not only timely irrigation but also irrigation in the required quantities. We have suggested measures to improve the irrigation capacity of these works to meet the requirements of new crops.

10. We have made proposals for streamlining procedures to expedite and facilitate construction of irrigation works. The proposed Directorate of Hydrology will make available the hydrological data for the river basin plans and major irrigation projects. The use of computers for the collation of irrigation and agricultural statistics will provide the latest material to irrigation planners. If the Union Irrigation Ministry plays a dynamic role in settling inter-State disputes of the kind the World Bank did in the Indus water dispute between India and Pakistan, delays inherent in procedures followed by courts and tribunals will be cut down.

11. The most important among our major recommendations is the one relating to a Water Resources Council. In a federal set up, such a body becomes necessary to harmonise regional and national interests, to establish smooth relations between State and State and between the Union and the States, and to ensure an integrated development of irrigation.

12. The gigantic programme of irrigation works envisaged by us for completion by the end of the century will roughly cost the nation 100 billion rupees. It will more than double our irrigated area, that is raise it to 81 million hectares or to 50 per cent of the sown area. This irrigation would, in our opinion, be needed to meet full needs of food and fibre requirements of the nation at that period of time. Judging from previous allocations and progressively higher allocations from one Plan to another, we think, that it should be possible to undertake financing of that order within the next 25-30 years.

13. In order that irrigation in India should pay for itself, it is imperative that the water rates be raised to a level sufficient to cover the cost of maintaining and running the works and a reasonable rate of interest on investment. We see no reason why a beneficiary from irrigation should not be made to contribute to the public exchequer a part of the increase in the value of land achieved at social cost. For that purpose, we have suggested the imposition of a betterment levy and have linked it with the cost of the project to reduce chances of litigation. The levy of rates on lands benefited from drainage and flood control measures, is in our opinion, fully justified.

14. There are prophets of doom who ask : "What will happen to our country after the capacity of our reservoirs is exhausted?" At the present rate of sedimentation some of the reservoirs may silt up much earlier than planned. But we have no serious apprehension in our mind about the future soil conservation measures, suggested by us, would help prolong the life of the reservoirs. The large resources of ground water in any event are not going to be affected. There is also the possibility of increasing ground water recharge through new processes. Desalinisation, though now too costly and a distant possibility for irrigation, cannot be ruled out as a feasible proposition with the development of new sources of energy.

15. The science of seeding clouds has made some progress in foreign countries though not much in India, but the creation of moisture bearing clouds by scientific methods and directing their movement is within technological possibility in the age of man's landing on the moon. And lastly, the Himalayas have inexhaustible reserves of snow and through the use of atomic energy, it may be possible to melt this snow to meet occasional shortages in snowfed rivers and reservoirs.

16. We have laid emphasis on the inter-valley transfers of water. The water of the mighty Brahmaputra is hardly being utilised in its flow through our country. It should some day be possible to divert some water of the Brahmaputra to West Bengal and other States. The Ganga-Cauvery link has been certified to be technically feasible by the experts from the United Nations. Its economics are going to be studied soon. We see no reason why a country-wide irrigation grid should not be treated as feasible.

17. The tremendous amount of work involved in collecting, sifting and scrutinising the voluminous data, classifying and using it for the purpose of the Report, would not have been possible but for the unflinching cooperation and support of the Members and Consultants of the Commission. They have worked hard and ungrudgingly. For the recommendations of the Report, they and I bear equal responsibility.

18. Most of the State Governments have rendered us unqualified cooperation. They set up special cells for the collection of the material asked for. We are grateful to the State Governments and their officers for helping us in our work and for making our visits to the States easy and comfortable.

19. I take special pleasure in acknowledging the services of the

National Atlas Organisation and the Survey of India in preparing the first Irrigation Atlas to be published in the country. This Atlas will supply reliable and important basic data to thousands of engineers working on irrigation projects.

20. The Indian Law Institute, which collected material and prepared a draft for the chapter on Irrigation Acts and Codes, deserves my special thanks.

21. The Central Water and Power Commission and the Irrigation and Agriculture Ministries of the Union as also other departments have assisted us in our difficult task. I offer them sincere thanks.

22. The large number of Heads of Departments, district officials and farmers who met us and gave valuable advice are also deserving of gratitude. So are the universities, research institutes and stations and experimental and demonstration farms which have supplied us with material.

23. The Directors, Private Secretaries, Stenographers and other officials who formed the invisible back-bone of the Commission deserve a tribute for their untiring labours.

24. Even at the risk of being accused of making an invidious distinction, I must record my appreciation of the services of Shri K.S.S. Murthy, our Member-Secretary, whose contribution throughout has been outstanding.

25. I am grateful to you for your help and advice on numerous problems with which we were confronted at various stages of our work.

With best wishes,

Yours sincerely,



(Ajit Prasad Jain)

Dr. K.L. Rao,
Union Minister of Irrigation & Power,
New Delhi.

CONTENTS

	PAGE
Letter of Transmittal	
CHAPTER I INTRODUCTION	1
The First Irrigation Commission	5
The Present Irrigation Commission	6
PART I	
CHAPTER II INDIA—PHYSICAL AND OTHER FEATURES	13
Physiography	15
Main Rivers	19
Population	22
Climate	24
Evaporation and Evapo-transpiration	27
Rainfall	28
Soils	35
CHAPTER III LAND AND WATER RESOURCES	41
Land Resources	41
Water Resources	43
Surface Water Resources	44
Ground Water Resources	49
Utilisable Water Resources	56
CHAPTER IV PROGRESS OF IRRIGATION—A REVIEW	59
Development of Irrigation during the 19th Century	60
Irrigation Development—1900–1950	62
Progress of Irrigation under the Five Year Plans—Major and Medium Projects	71
Overall Progress in Irrigation since Independence	78
Total Financial Outlay on Irrigation during the Plans	80

PART II

CHAPTER V PLANNED DEVELOPMENT OF WATER RESOURCES	85
River Basin Plans	86
Formulation of Irrigation Schemes	90
Conjunctive Use of Surface and Ground Waters	96
Investigation	99
Sanction of Schemes and Implementation	102
CHAPTER VI POLICIES AND CONSIDERATIONS IN IRRIGATION	105
Determinants of Irrigation Requirements	105
Irrigation of Rice	108
Irrigation in Low Rainfall Areas	110
Policies regarding the Use of Water Resources for Irrigation	112
Free Choice of Cropping—Block System—Localisation	113
Irrigation in Black Soils	115
Lining of Channels	116
Sprinkler Irrigation	119
Drip (Trickler) Irrigation	121
Lift Irrigation and River Pumping Schemes	122
Utilisation of Flows of Lower Dependability	125
Artificial Rain-making	126
Use of Desalinated Water	127
Classification of Works	128
CHAPTER VII AYACUT DEVELOPMENT	132
Problems of Ayacut Development	134
Administration and Co-ordination	135
Extension Services—Staffing Pattern	139
Pre-Irrigation Surveys and Localisation	140
Consolidation Operations	142
Water Courses and Field Channels	142
Land-Shaping	144
Research, Demonstration and Farmers' Training	147
Organising Inputs and Credit	149
Area Development Programme	151
Infrastructure	152

CHAPTER VIII DROUGHT AFFECTED AREAS	156
Dimensions of the Problem	157
Drought Areas as Identified by the States	159
The Criterion of Annawari Estimates and Revenue Remissions	161
Meteorological Criteria	162
Development of Irrigation in Drought Areas	167
Improvement of Existing Works	168
Expeditious Completion of Continuing Works	169
New Irrigation Schemes in Drought Areas	170
District-Level Agency for Minor Irrigation	175
Irrigation Policy for Drought Areas	175
Criteria for Irrigation Works in Drought Areas	176
 CHAPTER IX IMPROVEMENTS TO EXISTING IRRIGATION SYSTEMS	 178
The Sarda Canal System	180
The Lower Ganga Canal System	186
Godavari Delta System	187
Measures for Meeting Inadequacy	189
Deficiencies in Headworks	192
Shortcomings in the Distribution System	193
Remodelling	195
Drainage and Waterlogging	197
Irrigation Management	197
Improvement in Intensity	198
 CHAPTER X A PERSPECTIVE OF IRRIGATION DEVELOPMENT	 201
Population	202
Rice	205
Wheat	207
Pulses	208
Oilseeds	209
Cotton	211
Irrigation Potential as Assessed by States	217
Irrigation Potential as Assessed by the Commission	232
Conservation of Water Resources	238
Water Resources, Food & Fibre Needs and Irrigation Potential	241

Outlay on Development	243
Application of New Concepts in Irrigation Development	244
Domestic and Industrial Water Requirements	246
The Ecological Balance	246
CHAPTER XI ECONOMICS AND FINANCING OF IRRIGATION WORKS	
Criteria for sanctioning Irrigation Projects	249
Benefit-Cost Ratio	251
Consideration of Ayacut Development and Conservation of Catchment	254
Financing of Projects before Independence	257
Financing of Large Irrigation Schemes	258
Financing of Irrigation Schemes in Drought Affected Areas	259
Financing of Minor Irrigation Schemes	260
Financial Position of Irrigation Works	260
Financial Goal of Irrigation Projects	264
System of Levying Irrigation Charges	265
Considerations in Fixing Irrigation Rates	267
Volumetric Assessment	273
Assessment on Tubewells	274
Water Charges for Conjunctive Use of Surface and Ground Waters	275
Water Rates for Domestic and Industrial Supply	276
Promotional Water Rates	276
Revision of Water Rates	277
Betterment Levy	278
Measures for Improving Financial Position of Irrigation Works	280
Economic Review of Large Projects	281
CHAPTER XII ADMINISTRATION AND ORGANISATION	
Organisation for Assessment of Water Resources	282
Directorate of Hydrology	283
Organisation for Ground Water at the Centre	284
River Basin Commissions	288

CONTENTS	xvii
Water Resources Council	290
Other Administrative Matters in the Union Government	292
Secretariat Status for Chairman, Central Water & Power Commission	293
Investigation & Planning in States	294
Ground Water Organisation in States	294
Control Boards for Large Projects	296
Delay in the Execution of Projects	296
Inadequate Planning	297
Land Acquisition	297
Delay in the Procurement of Construction Material	297
Delay in Procurement of Equipment and Spares	298
Designs Organisation in States	298
Management of Irrigation Works	299
Set-up in State Secretariats	300
Administrative and Financial Powers to Departmental Officers	302
Matters relating to Engineering Service	303

PART III

<i>CHAPTER XIII</i> WATERLOGGING, DRAINAGE AND FLOODS	307
WATERLOGGING	307
Causes of Waterlogging	307
Effects of Waterlogging	308
Extent of Waterlogging	309
Brief Review of Action taken so far	311
Remedial and Precautionary Measures	312
DRAINAGE	312
Suggestions for Drainage Relief	317
FLOODS	320
Integrated Planning for Flood Control and other Benefits	320
Construction of Embankments	321
Maintenance of Embankments	322
Other Flood Control Measures	322
Flood Forecasting	323
Flood Patrolling	324

CHAPTER XIV	SEDIMENTATION OF RESERVOIRS	325
	The Problem of Sedimentation	325
	Factors Contributing to Sediment Production	327
	Location of Sediment Deposits	327
	Measures for Control of Sedimentation	328
	Special Problems	330
	Magnitude of the Problems	332
	Administrative Arrangements	333
	Legislation	334
	Financing of Soil Conservation Measures	334
CHAPTER XV	INTER-STATE RIVER DISPUTES	339
	History of Legislation dealing with Inter-State Rivers	341
	Issues in Inter-State Disputes	344
	Disputes settled by Negotiations	345
	Limitations of Adjudication	347
	River Boards	352
	River Basin Commissions	354
	Role of the Union Government	355
CHAPTER XVI	IRRIGATION ACTS AND CODES	358
	Constitutional Position	358
	Irrigation Practices and Acts	358
	Ground Waters	362
	Supply of Water for Irrigation	363
	Provision of Water Courses and Field Channels	365
	Drainage and Prevention of Waterlogging	368
	Requisition of Labour in Emergencies	369
	Protection of Irrigation Works and un- authorised Irrigation	370
	Settlement of Disputes among Irrigators	372
	The Procedure for Assessment of water Rates and Betterment Levy	373
	The Role of Irrigation Panchayats and other similar Institutions in the Admi- nistration of Irrigation Systems	373
CHAPTER XVII	RESEARCH, EDUCATION AND TRAINING	375
	Co-ordination of Research	377
	Basic & Fundamental Research	378

CONTENTS	xix
Research in the Future	378
Library and Documentation	382
Personnel of Research Stations	383
Co-ordination with Research in higher Institutions of Engineering	385
Finance	385
Education and Training	386
CHAPTER XVIII IRRIGATION STATISTICS	387
All-India Irrigation Statistics	387
Primary and Intermediary Agencies in Collection of Irrigation Statistics	388
Contents of Statistics	389
Delays in Publication	389
Quinquennial Survey of Irrigation	390
Irrigation Departments Statistics	391
CHAPTER XIX SUMMARY	393
APPENDICES	415

APPENDIX 4.1

Projects costing over Rs. 10 million completed during pre-Independence period

State/Name of the Project/Year of completion	Type (Storage or Diversion)	Estimated cost (Rs. million)	Ultimate Benefit ('000 hectares)
1	2	3	4
<i>Andhra Pradesh</i>			
1. Kurnool-Cudappah Canal (1870)	Diversion	76.5	39.51
2. Godavari Delta System (1890)	..	29.6	449.64
3. Penner river and Canal system (1894)	..	70.7	74.34
4. Krishna Delta System (1898)	..	74.1	442.37
5. Nizamsagar (1930)	Storage	39.2	111.29
<i>Bihar</i>			
6. Sone Canals (1875)	Diversion	26.8	347.23
<i>Haryana</i>			
7. Western Yamuna Canal (Ex. Yamuna at Tajewala—1886)	..	20.2	411.95
8. Western Yamuna Canal (Extension—1892)	..	15.9	48.94
<i>Madhya Pradesh</i>			
9. Tandula Reservoir (1923)	Storage	12.0	66.76
10. Mahanadi Canal and Murrum— silli Reservoir (1923)	..	15.7	84.46
<i>Maharashtra</i>			
11. Godavari Canal (Nandur Madhmeshwar Weir—1916)	Storage	10.7	32.15
12. Pravara river works (Bhandardara) (1926) (Wilson dam and Ozat Weir)	..	16.2	23.07
13. Nira Left Bank Canal and Shetpal Tank (1927)	..	11.7	47.54
14. Nira Right Bank Canal (Bhatgar Lloyd Dam) (1927)	..	60.2	35.19
<i>Mysore</i>			
15. Krishnarajasagar Dam and Visveswaraya Canal (1930)	..	45.0	48.56
<i>Orissa</i>			
16. Orissa Canal (1895)	Diversion	27.2	111.86
17. Rushikulya System (1901)	Storage	12.2	2.79

Appendix 4.1—Contd.

(1)	(2)	(3)	(4)
<i>Punjab</i>			
18. Upper Bari Doab Canal (1879)	Diversion	23.6	335.17
19. Sirhind Canal (1887)	"	45.1	600.17
20. Eastern Canal (1933)	"	25.8	141.35
<i>Rajasthan</i>			
21. Gang Canal (1928)	"	33.2	303.52
<i>Tamil Nadu</i>			
22. Periyar System (1897)	Storage	10.8	57.70
23. Cauvery Mettur Project (1934)	"	66.2	134.00
<i>Uttar Pradesh</i>			
24. Upper Ganga Canal (1854)	Diversion	47.6	699.38
25. Agra Canal (1873)	"	13.3	138.36
26. Lower Ganga Canal (1878)	"	45.9	527.95
27. Betwa Canal (1886)	"	14.0	98.70
28. Ken Canal (1915)	"	30.3	75.26
29. Garai & Ghaggar Canal (1917)	Storage	16.7	39.30
30. Sarda Canal (1926)	Diversion	151.7	612.47
<i>West Bengal</i>			
31. Damodar Canal Project	"	12.4	72.85

APPENDIX 4.2

Major Irrigation Projects taken up during the Plan periods

State/Name of the Project/Year of completion	Type (Storage or Diversion)	Estimated cost (Rs. million)	Ultimate Benefit (000 hectares)
1	2	3	4
<i>Andhra Pradesh</i>			
1. Tungabhadra Low-level Canal (1957)	Storage	134.5	60.25
2. Improvement to K.C. Canal and Sunkesula anicut (1962)	Diversion	76.8	122.22
3. Tungabhadra High-level Canal Stage I (1971)	..	190.0	48.21
4. Kadam Project*	Storage	83.9	34.40
5. Nagarjunasagar Project	..	1,649.0	833.28
6. Pochampad Project*	..	401.0	230.68
7. Tungabhadra High-level Canal Stage II*	Diversion	112.0	55.62
<i>Bihar</i>			
8. Chandan Reservoir (1963)	Storage	104.2	70.38
9. Kosi Project (Barrage) (1963)	Diversion	553.3	570.00
10. Sone Barrage (1965)	..	183.2	124.00
11. Badua Irrigation Project (1966)	Storage	66.0	42.49
12. Sone High-level Canal*	Diversion	88.4	102.00
13. Rajpur Canal	..	97.2	161.00
14. Western Kosi Canal System	..	196.9	325.00
15. <i>Gandak Project</i>			
(a) Bihar portion	..	1,081.8	1,151.00
(b) U.P. portion	..	465.1	—
<i>Gujarat</i>			
16. Shetrunji (Palitana) (1966)	Storage	69.6	34.80
17. Banas (Dantiwada) Project (1969)	..	108.8	44.52
18. Hathmati Reservoir (1969)	..	54.5	37.60
19. Mahi Stage I*	Diversion	245.7	186.16
20. Mahi Stage II (Kadana)*	Storage	210.0	16.55 Direct 270.00 Indirect
21. Kakrapar*	Diversion	180.5	227.54
22. Ukai Project*	Storage	1,044.0	152.40 Direct 227.43
23. Narmada (Broach) Irrigation Project*	..	1,097.0	403.69
<i>Haryana</i>			
24. Remodelling Western Yamuna Canal	Diversion	95.0	264.89 New areas 425.00 Existing areas

Appendix 4.2—Contd.

(1)	(2)	(3)	(4)
25. Gurgaon Canal*	..	83.6	101.58
<i>Jammu & Kashmir</i>			
26. Tawi Lift Irrigation*	..	51.7	12.14
<i>Kerala</i>			
27. Malampuzha (1967)	Storage	58.0	38.53
28. Kuttiadi*	..	52.4	31.16
29. Periyar Valley Scheme* (Bhoothathankettu)	Diversion	64.9	41.00
30. Pamba*	..	92.1	34.00
31. Kallada*	Storage	144.9	105.22
<i>Madhya Pradesh</i>			
32. Gandhi Sagar Dam (1960)	..	136.0	222.59
33. Chambal Stage II (Rana Pratap Sagar Dam)	..	94.0	60.71
34. Tawa Project*	..	401.5	328.00
35. Barna Project*	..	70.0	60.29
36. Hasdeo Project*	Diversion	98.6	Supplying cooling water to Korba Thermal Power Station
37. Hasdeo Right Bank Canal*	..	96.6	47.46
<i>Maharashtra</i>			
38. Ghod Project (1966)	Storage	55.6	24.62
39. Pus River Project (1964)	..	51.3	11.72
40. Vir Project (1966)	..	54.1	26.71
41. Purna Project (1968)	..	160.7	61.51
42. Girna Project (1968)	..	127.5	57.21
43. Khadakwasla Stage I*	..	167.0	22.30
44. Mula Project*	..	161.6	65.56
45. Itiadhoh*	..	69.2	46.14
46. Bagh Project*	..	58.4	33.67
47. Jayakwadi Project Stage I*	..	587.8	141.65
48. Bhima Project*	..	425.8	172.88
49. Warna Project*	..	310.9	99.06
50. Krishna Project*	..	276.6	106.29
51. Upper Godavari Project*	..	142.9	44.27
52. Kukadi Project Stage I*	..	179.0	42.70
<i>Mysore</i>			
53. Tungabhadra Project (1963)	Storage	680.2	272.10
54. Ghataprabha Stage I (1966)	Diversion	69.3	70.46
55. Bhadra Project*	Storage	350.0	99.02
56. Ghataprabha Stage II*	..	485.3	46.54
57. Malaprabha Project*	..	676.5	121.41
58. Kabini Reservoir*	..	248.0	50.99

Appendix 4.2—Contd.

(1)	(2)	(3)	(4)
59. Upper Krishna Stage I*	..	750.0	242.82
60. Tungabhadra High-level Canal Stage I	Diversion	62.3	40.47
<i>Orissa</i>			
61. Hirakud Project*	Storage	827.6	496.57
62. Salandi Project*	..	130.8	61.90
63. Mahanadi Delta Irrigation Project*	Diversion	683.8	680.71
<i>Punjab</i>			
64. Harike Project (1958)	..	91.3	13.80
65. Sirhind Feeder (1960)	..	67.0	no direct benefit
66. Bhakra Nangal Project (1964)	Storage	1,031.8	(680.00 Haryana 550.00 Punjab 230.00 Rajasthan)
67. Beas Unit I (Beas-Sutlej link)*	..	1,468.7	530.00 (Punjab and Haryana)
68. Beas Unit II (Pong Dam)*	..	1,676.7	650.00 (Punjab and Haryana).
<i>Rajasthan</i>			
69. Chambal Project Stage I (Kota Barrage) (1960)	Diversion	217.5	222.00**
70. Ranapratapsagar Dam (Chambal Stage II)*	Storage	278.4	60.70**
71. Rajasthan Canal*	Diversion	1,960.0	1,163.00
<i>Tamil Nadu</i>			
72. Lower Bhavani (1956)	Storage	103.4	78.92
73. Manimuthar Project (1958)	..	50.5	41.69
74. Parambikulam Aliyar Project*	..	675.3	97.13
75. Chittar Pattanamkal*	..	73.3	19.02
76. Modernising Thanjavur Channels*	..	225.0	57.90
<i>Uttar Pradesh</i>			
77. Matatila Dam (1966)	Storage	124.6	165.76
78. Sarda Sagar Stage II (1966)	..	73.2	74.93
79. Ramganga River Project*	..	96.9	659.00
80. Western Gandak Canal Project	Diversion	503.8	264.00
81. Improvement to Lower Sarda Canal*	..	648.4	607.05
<i>West Bengal</i>			
82. Mayurakshi Dam at Masanjore and Barrage at Tilpara (1956)	Storage	204.6	246.87
83. Kangsabati Reservoir (1965)	..	460.0	384.47
84. Durgapur Barrage—Improvement and Extension of Irrigation System*	Diversion	188.2	417.00
		107.1	

*Yet to be completed.

**An equal extent of area will be irrigated in Madhya Pradesh.

APPENDIX 8.1

Districts and Taluks/Tehsils Identified as Drought Affected

I ANDHRA PRADESH

(i) *Anantapur District*

- (1) Anantapur
- (2) Tadpatri
- (3) Dharmavaram
- (4) Kalyandurg
- (5) Rayadurg
- (6) Penukonda
- (7) Madakasira
- (8) Hindupur
- (9) Kadiri
- (10) Gooty
- (11) Urvakonda

(ii) *Chittoor District*

- (12) Chittoor
- (13) Chandragiri
- (14) Madanapalli
- (15) Vayalpad
- (16) Pungunur
- (17) Palmaner
- (18) Kuppam

(iii) *Cuddapah District*

- (19) Cuddapah
- (20) Kamalapuram
- (21) Rayachoti
- (22) Rajampet
- (23) Badwei
- (24) Jammalamadugu
- (25) Proddatur
- (26) Pulivendla

(iv) *Kurnool District*

- (27) Markapur
- (28) Kurnool
- (29) Dhone
- (30) Nandikotkur
- (31) Adoni
- (32) Aluru
- (33) Pattikonda
- (34) Koilkuntla
- (35) Banganapalli

(36) Allagadda

(37) Giddalur

(38) Atmakur

(39) Nandyal

(v) *Hyderabad District*

(40) Hyderabad (West)

(41) Ibrahimpatnam

(42) Hyderabad (East)

(43) Chevella

(vi) *Mahabubnagar District*

(44) Kalwakurthi

(45) Nagarkurnool

(46) Wanaparthy

(47) Alampur

(48) Makthal

(49) Shadnagar

(50) Achampet

(51) Kollapur

(52) Godwal

(53) Atmakur

(vii) *Nalgonda District*

(54) Suryapet

(55) Bhongir

(56) Hazarnagar

(57) Devarkonda

(58) Miryalguda

(59) Ramannapet

(60) Nalgonda

II GUJARAT

(i) *Banaskantha District*

(1) Santhalpur

(2) Radhanpur

(3) Wao

(4) Tharad

(5) Dhanera

(ii) *Mehsana District*

(6) Harij Mahal

(7) Sami

- (8) Chanasma
 (9) Patan
 (10) Kadi
 (11) Kalol
 (iii) *Ahmedabad District*
 (12) Viramgam
 (13) Dhandhuka
 (14) Dholka
 (15) Sanand

- (iv) *Kaira District*
 (16) Cambay
 (17) Matar
 (18) Mehmedabad

- (v) *Broach District*
 (19) Jambusar
 (20) Waghra
 (21) Hansot

- (vi) *Kutch District*
 (22) Anjar
 (23) Nakhtrana
 (24) Abdasa
 (25) Lakhpat
 (26) Rahpur
 (27) Khavda
 (28) Khadir
 (29) Mundra
 (30) Bhachau
 (31) Mandvi
 (32) Bhuj

- (vii) *Surendranagar District*
 (33) Dasada
 (34) Wadhvan
 (35) Muli
 (36) Dhrangadhra
 (37) Halvad
 (38) Limbdi
 (39) Lakhtar
 (40) Sayla

- (viii) *Jamnagar District*
 (41) Okhamandal
 (42) Kalyanpur
 (43) Jodia
 (44) Kalavad

- (ix) *Rajkot District*
 (45) Malia

- (46) Morvi
 (47) Wankaner

- (x) *Bhavnagar District*
 (48) Bhavnagar
 (49) Gadhada
 (50) Vallabhipur
 (51) Botad
 (52) Gariadhar
 (53) Kundla

- (xi) *Amreli District*
 (54) Amreli
 (55) Khambha
 (56) Jafrabad
 (57) Rajula
 (58) Babra
 (59) Lilia
 (60) Lathi

III HARYANA

- (i) *Gurgaon District*
 (1) Rewari
 (2) Gurgaon

- (ii) *Rohtak District*
 (3) Jhajjar

- (iii) *Mohindergarh District*
 (4) Dadri
 (5) Mohindergarh
 (6) Narnaul

IV MADHYA PRADESH

- (i) *Jhabua District*
 (1) Jhabua
 (2) Thandla
 (3) Patlawad
 (4) Jobat
 (5) Alirajpur

- (ii) *Dhar District*
 (6) Dhar
 (7) Badnawar
 (8) Sardarpur
 (9) Kukshi
 (10) Manawar
 (11) Tappa (Dharamपुरi)

- (iii) *Dewas District*
 (12) Bagli

(13) **Khategaon**

(iv) *Ujjain District*

(14) **Khachrod**

(15) **Ujjain**

(16) **Tarna**

(v) *Khargaon District*

(17) **Rajpur**

(18) **Harwani**

(vi) *Khandwa District*

(19) **Khandwa**

(20) **Harsood**

(vii) *Datia District*

(21) **Datia**

(viii) *Shajapur District*

(22) **Shajapur**

(ix) *Betul District*

(23) **Betul**

(24) **Bhainsadehi**

V MAHARASHTRA

(i) *Poona District*

(1) **Dhond**

(2) **Sirur**

(3) **Indapur**

(4) **Purandhar**

(5) **Haweli**

(ii) *Ahmednagar District*

(6) **Shrigonda**

(7) **Karjat**

(8) **Sangamner**

(9) **Pathardi**

(10) **Parner**

(11) **Ahmednagar**

(12) **Jamkhed**

(iii) *Sangli District*

(13) **Jath**

(14) **Khanepur**

(iv) *Sholapur District*

(15) **Pandharpur**

(16) **Madha**

(17) **Mangalvedha**

(18) **North Sholapur**

(19) **South Sholapur**

(20) **Sangola**

(21) **Karmala**

(22) **Mohol**

(23) **Akkalkot**

(24) **Barshi**

(v) *Satara District*

(25) **Khandala**

(26) **Man**

(27) **Khatav**

(vi) *Aurangabad District*

(28) **Vaijapur**

(29) **Gangapur**

(vii) *Bhir District*

(30) **Ashti**

(31) **Patoda**

(32) **Bhir**

(33) **Georai**

(viii) *Osmanabad District*

(34) **Parenda**

(35) **Bhoom**

(36) **Kalam**

(37) **Osmanabad**

(ix) *Nasik District*

(38) **Baglan**

(39) **Malegaon**

(40) **Kalwan**

(41) **Chandor**

(42) **Nandgaon**

(43) **Niphad**

(44) **Yeola**

(45) **Sinnar**

VI MYSORE

(i) *Chitradurga District*

(1) **Challakere**

(2) **Hiriyur**

(3) **Davangere**

(4) **Molakalmuru**

(5) **Jagalur**

(6) **Hosadurga**

(7) **Chitradurga**

(8) **Holalkere**

- (ii) *Dharwar District*
 (9) Ron
 (10) Gadag
 (11) Ranebennur
 (12) Mundargi
- (iii) *Bangalore District*
 (13) Hoskote
 (14) Doddaballapur
 (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) Srinivasapur
 (36) Gudibanda
 (37) Chickaballapur
 (38) Gauribidanur
 (39) Bagepally
 (40) Kolar
 (40) 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) Chicknaikanahally
 (57) Koratagere
 (58) Gubbi
- (ix) *Bellary District*
 (59) Bellary
 (60) Siruguppa
 (61) Hadagalli
 (62) Kudligi
 (63) Harapanahalli
 (64) Mallapuram
 (65) Hospet
 (66) Sandur
- (x) *Mysore District*
 (67) ChamaraJanagar
 (68) Hunsur
 (69) Gundlupet
 (70) Nanjangud
 (71) T. Narsipur
 (72) Peryapatna
 (73) Kollegal
- (xi) *Mandya District*
 (74) Malavalli
 (75) K.R. Pet
 (76) Nagamangala
 (77) Pandavapura
- (xii) *Bijapur District*
 (78) Bijapur
 (79) Indi
 (80) Sindgi
 (81) Bagewandi
 (82) Jamakhandi
 (83) Bilgi
 (84) Muddebihal
 (85) Mudhol
 (86) Bagalkot
 (87) Hungund
 (88) Badami

VII RAJASTHAN

(i) *Jaisalmer District*

- (1) Jaisalmer
- (2) Pokaran

(ii) *Barmer District*

- (3) Barmer
- (4) Shiv
- (5) Pachpadra

(iii) *Jodhpur District*

- (6) Phalodi

(iv) *Churu District*

- (7) Dungargarh

(v) *Bikaner District*

- (8) Bikaner
- (9) Lunkaransar
- (10) Kolayat

(vi) *Ajmer District*

- (11) Ajmer
- (12) Beawar

(vii) *Udaipur District*

- (13) Kherwara

(viii) *Dungarpur District*

- (14) Aspur
- (15) Dungarpur
- (16) Sagwara

(ix) *Banswara District*

- (17) Garhi
- (18) Ghatol
- (19) Bagidora

VIII TAMIL NADU

(i) *Dharmapuri District*

- (1) Hosur
- (2) Krishnagiri
- (3) Harur
- (4) Dharmapuri

(ii) *Salem District*

- (5) Sankari
- (6) Tiruchengode

(iii) *Coimbatore District*

- (7) Dharapuram
- (8) Palladam
- (9) Avanashi

(iv) *Tiruchchirapalli District*

- (10) Perambalur
- (11) Karur
- (12) Kolathur
- (13) Alangudi

(v) *Madurai District*

- (14) Dindigul
- (15) Palani
- (16) Tirumangalam

(vi) *Ramanathapuram District*

- (17) Tiruvadanai
- (18) Paramakudi
- (19) Ramanathapuram
- (20) Mudukulathur
- (21) Aruppukottai
- (22) Sathur

(vii) *Tirunelveli District*

- (23) Koilpatti
- (24) Nanguneri

APPENDIX 8.2

Irrigation Works under construction in Drought Areas

Sl. No.	State/Project	Drought districts which benefit	Continuing from	Irrigation Benefit (000 hectares)
1	2	3	4	5
ANDHRA PRADESH				
1.	Nagarjunasagar	Nalgonda & Kurnool	I Plan	829.64
2.	Musi	Nalgonda	..	16.92
3.	Tungabhadra H.L. Canal Stage I	Anantapur & Cuddapah	II Plan	48.21
4.	Tungabhadra H.L. Canal Stage II	Kurnool, Bellary, Cuddapah & Anantapur	Annual Plans	55.62
5.	Rajolibanda Diversion	Mahbubnagar	I Plan	35.61
6.	Okachetti Vagu	..	Annual Plans	2.71
7.	Gajuladinne	Kurnool	Annual Plans	5.06
8.	Kotepalli Vagu	Hyderabad	III Plan	4.04
9.	Kanupur Canal	Nellore	..	6.89
10.	Gandipalem	..	Annual Plans	4.05
11.	Bahuda Reservoir	Chittoor	Annual Plans	1.17
GUJARAT				
1.	Narmada	Broach & Baroda	II Plan	403.69
2.	Mahi Stage I	Kaira	I Plan	186.16
3.	Mahi Stage II	and Panchmahal	II Plan	16.55
4.	Saraswati	Mehsana	..	8.74
5.	Dhatarwadi	Amreli	..	2.43
6.	Goma	Bhavnagar	..	2.19
7.	Machhu II	Rajkot	..	7.69
8.	Rudramata	Kutch	I Plan	7.20
9.	Ganjansar	..	II Plan	1.62
HARYANA				
1.	Gurgaon Canal	Gurgaon	II Plan	101.50
2.	Rewari Lift Irrigation	Gurgaon, Rohtak and Mohindergarh	..	27.82

Appendix 8.2—Contd.

1	2	3	4	5
MADHYA PRADESH				
1.	Borad (Setak & Segwal)	Khargaon	I Plan	5.06
2.	Chandrakeshar	Dewas	II Plan	4.86
3.	Bhehsakhedi	Ujjain	..	1.39
4.	Pampavati	Jhabua	..	1.09
MAHARASHTRA				
1.	Mula	Ahmednagar	II Plan	65.56
2.	Adula	..	Annual Plans	5.75
3.	Kukadi Stage I	Ahmednagar & Poona	..	42.70
4.	Khadakwasla Stage I	Poona	II Plan	22.30
5.	Bhima Irrigation	Poona & Sholapur	Annual Plans	172.89
6.	Padwal-Karwadi	Sholapur	..	0.83
7.	Upper Godavari	Nasik	..	44.27
8.	Chankapur Dam	..	..	12.04
9.	Jayakwadi Stage I	Aurangabad & Bhir	..	141.65
10.	Warna	Sangli	..	99.06
11.	Kadi	Bhir	..	1.10
12.	Krishna Irrigation	Satara, Sangli	..	106.29
MYSORE				
1.	Hathikoni Dam	Gulbarga	I Plan	2.14
2.	Upper Krishna Stage I	Bijapur, Raichur & Gulbarga	III Plan	242.82
3.	Rajolibanda Diversion	Raichur	I Plan	2.38
4.	Kanakanala	..	II Plan	2.06
5.	Tungabhadra High Level Canal Stages I & II	Bellary	I Plan/ Annual Plans	80.94
6.	Hagaribommanahalli	..	II Plan	2.97
7.	Kabini	Mysore	..	50.99
8.	Chickhole	..	..	1.60
9.	Hebbahalla	..	..	1.21
10.	Arakavathy	Bangalore	Annual Plans	2.83
11.	Hemavati	Hassan & Mandya	—	
12.	Chandrapalli	Gulbarga	—	5.00

APPENDIX

427

Appendix 8.2—Contd.

1	2	3	4	5
RAJASTHAN				
1.	Rajasthan Canal	Bikaner & Jaisalmer	II Plan	1263.00
2.	Mahi (Banswara)	Banswara	—	30.75
3.	Lasaria	Ajmer	Annual Plans	1.62
4.	Berch	Udaipur	II Plan	3.24
5.	Sci Diversion	..	Annual Plans	9.02
6.	Khari Feeder	..	II Plan	3.24
7.	Jakham Part II	..	Annual Plans	11.65
TAMIL NADU				
1.	Parambikulam-Aliyar	Coimbatore	II Plan	97.13
2.	Modernising Vaigai Channels	Madurai & Ramanathapuram	Annual Plans	44.42
3.	Gatana Reservoir	Tirunelveli	..	3.29
4.	Ramanadhi	..	..	1.41

APPENDIX 16.1

Irrigation Acts and Codes

ANDHRA PRADESH

1. Andhra Pradesh (Andhra Area) Irrigation Act, 24 of 1957 F.
2. Andhra Pradesh (Andhra Area) Canals and Public Ferries Act, 2 of 1890.
3. Andhra Pradesh (Andhra Area) Irrigation Cess Act, 7 of 1865.
4. Andhra Pradesh (Andhra Area) Irrigation Works (Repairs, Improvement and Construction) Act, 18 of 1943.
5. Andhra Pradesh (Andhra Area) Irrigation Tanks (Improvement) Act, 19 of 1949.
6. Andhra Pradesh (Andhra Area) Land Improvement Schemes (Contour Bunding and Contour Trenching) Act, 22 of 1949.
7. Andhra Pradesh (Andhra Area) Irrigation Works (Levy of Compulsory Water-Cess) Act, 24 of 1955.
8. Andhra Pradesh (Andhra Area) Rivers Conservancy Act, 6 of 1884.
9. Andhra Pradesh (Andhra Area) (Levy of Betterment Contribution) Act, 25 of 1955.
10. Andhra Pradesh Irrigation (Construction and Maintenance of Water Courses) Act, 1969.
11. Hyderabad Irrigation (Betterment Contribution and Inclusion Fees) Act, 5 of 1952.

ASSAM

1. Assam Betterment Fee and Mooring Tax (Dibrugarh) Act, XII of 1953.
2. Assam Embankments and Drainage Act, 1 of 1954.

BIHAR

1. The Bihar Irrigation Field Channels Act, 1965.
2. Jharia Water-Supply Act, 3 of 1914.
3. Bihar Irrigation and Flood Protection (Betterment Contribution) Act, 28 of 1959.
4. Bihar Lift Irrigation Act, 16 of 1956.
5. Bihar Public Irrigation & Drainage Works, Act, 10 of 1947.
6. Bihar Private Irrigation Works Act, 5 of 1922.
7. Bengal Irrigation Act, 3 of 1876.
8. Bihar Emergency Cultivation and Irrigation Act, 22 of 1955.
9. Bengal Canals Act, 5 of 1864.
10. Bengal Embankment Act, II of 1882.

HIMACHAL PRADESH

1. Himachal Pradesh Minor Canals Act, 1968.

JAMMU & KASHMIR

1. J. & K. Government Aid to Agriculturists and Land Improvement Act, VII of 1993. (1936 A.D.).
2. Kashmir Valley Embankment Act, VII of 1992 (1935 A.D.).
3. J. & K. State Canal & Drainage Act, 1963.

KERALA

1. Kerala Land Development Act, 1964.
2. Kerala Irrigation Works (Extension of Joint Labour) Act, 1967.
3. Irrigation Tanks (Preservation and Improvement) Act, 23 of 1952.
4. Public Canals & Public Ferries Act, 1096.
5. Madras Irrigation Works (Repairs, Improvement and Construction) Act, Mad.18 of 1943.
6. Irrigation (Levy of Betterment Contribution) Act, Mad. 3 of 1956.
7. Irrigation (Voluntary Cess) Act, Mad. 13 of 1942.
8. Irrigation Tanks (Improvement) Act, Mad. 19 of 1949.
9. Irrigation (Construction and Levy of Cess) Act, Mad. 7 of 1947.
10. Irrigation Act, T. C. 7 of 1956.

MADHYA PRADESH

1. Land Improvement Schemes Act, 10 of 1958.
2. M.P. Irrigation Act, 14 of 1931.

MAHARASHTRA & GUJARAT

1. Bombay Irrigation Act, 7 of 1879.
2. Bombay Land Improvement Schemes Act, 28 of 1942.

MYSORE

1. Mysore Irrigation Act, 1965.
2. Mysore Irrigation (Levy of Betterment Contribution and Water Rates) Act, 1957.

ORISSA

1. Orissa Betterment Charges Act, II of 1956.
2. Orissa Irrigation Act, 14 of 1959.

PUNJAB

1. Northern India Canal and Drainage Act, 8 of 1873.
2. Punjab Betterment Charges and Acreage Rates Act, 2 of 1953.
3. Punjab Minor Canals Act, 3 of 1905.

RAJASTHAN

1. Rajasthan Lands Special Irrigation Charges Act, 23 of 1953.
2. Rajasthan Irrigation and Drainage Act, 21 of 1954.
3. Rajasthan Minor Irrigation Works Act, 12 of 1953.

TAMIL NADU

1. Madras Irrigation Cess Act, 7 of 1865.
2. Madras (Additional Assessment and Additional Water-Cess) Act, VIII of 1963.
3. Madras Irrigation (Voluntary Cess) Act, 13 of 1942.

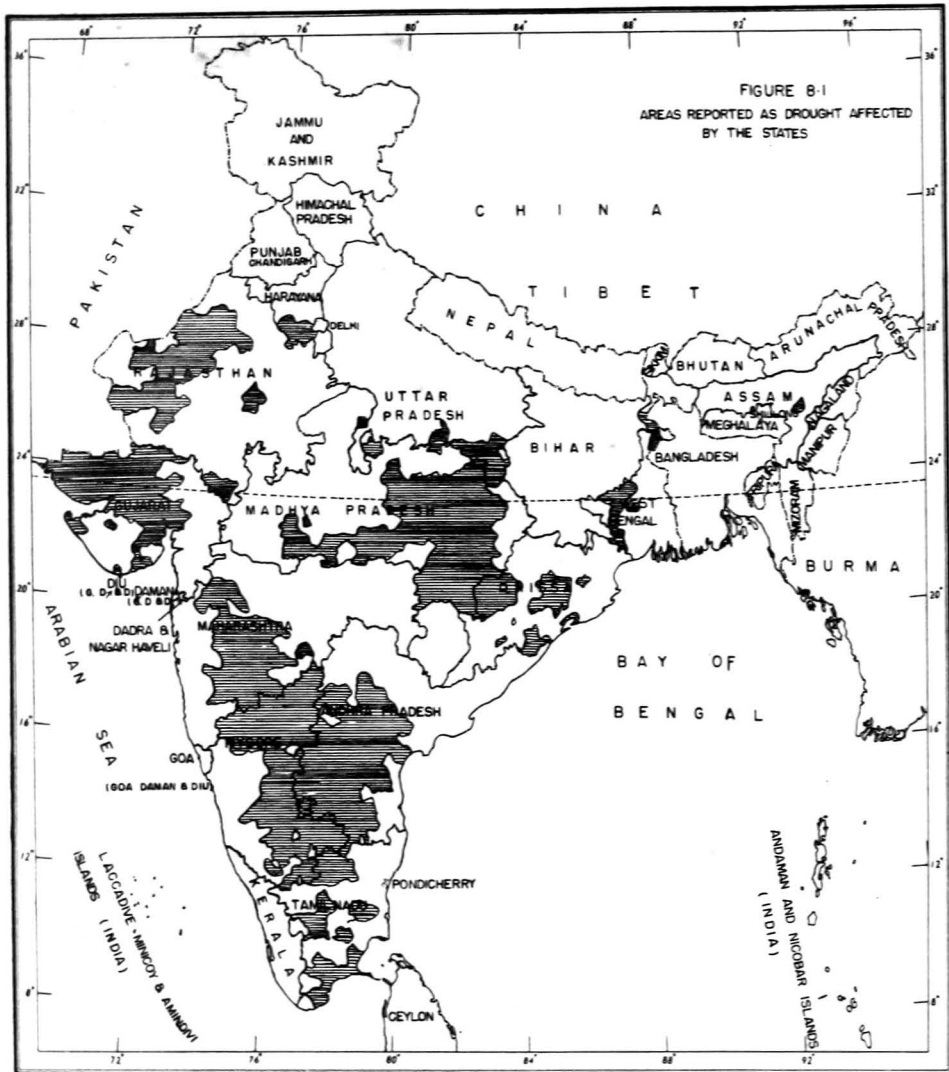
4. Bhavani Reservoir Irrigation Cess Act, 16 of 1933.
5. Madras Irrigation (Levy of Betterment Contribution) Act, 3 of 1955.
6. Malabar Irrigation (Construction and Levy of Cess) Act, Mad. 7 of 1947.
7. Mettur Canal Irrigation Cess Act, 17 of 1953.
8. Madras Irrigation Works (Repairs, Improvement & Construction) Act, XVIII of 1943.
9. Madras Land Improvement Schemes Act, XXXI of 1959.
10. Madras Irrigation Tanks (Improvement) Act, XIX of 1949.
11. Madras Irrigation Works (Construction of Field Bothies) Act, XXV of 1959.
12. Periyar Irrigation Tanks (Preservation) Act, V of 1934.

UTTAR PRADESH

1. Northern India Canal & Drainage Act, VIII of 1873.
2. United Provinces Private Irrigation Works Act, 2 of 1920.
3. United Provinces State Tubewells Act, 12 of 1936.
4. Minor Irrigation Works Act, 1 of 1920.

WEST BENGAL

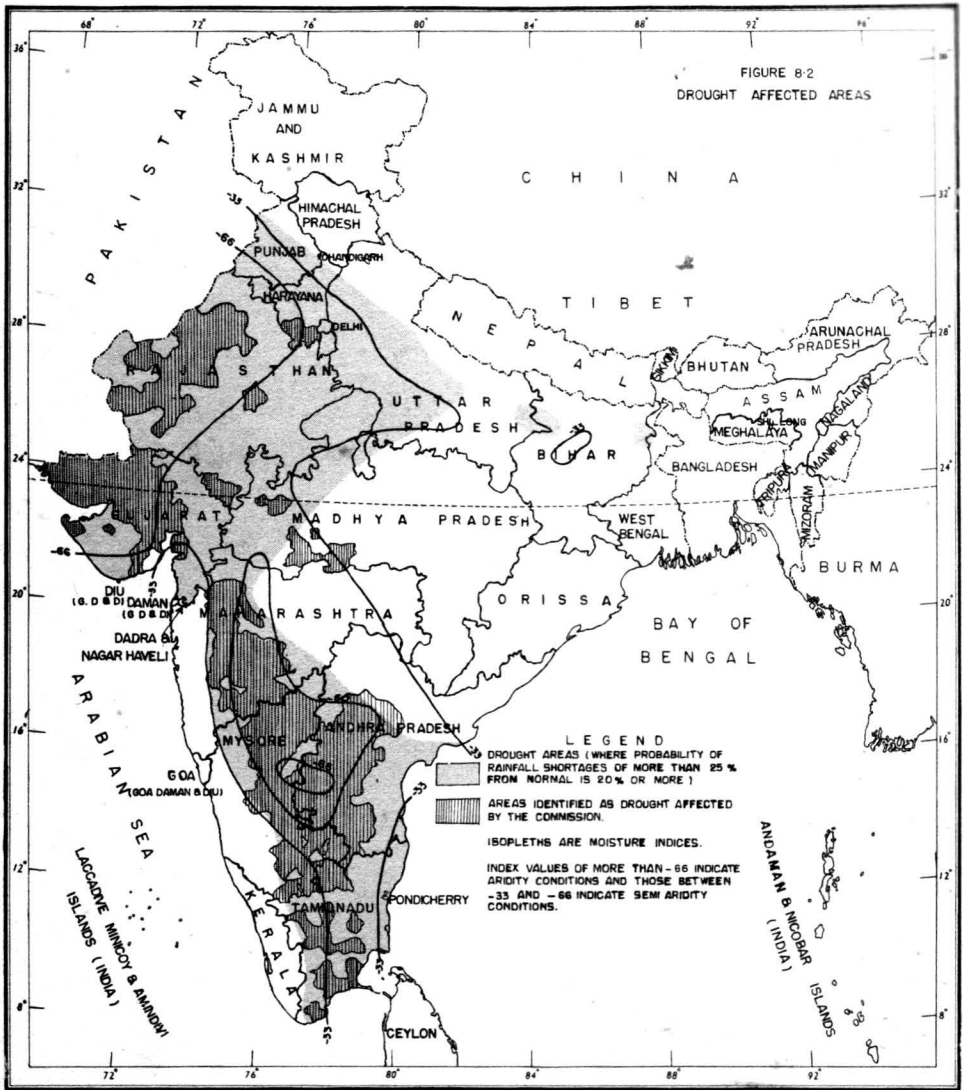
1. Bengal Irrigation Act, 3 of 1876.
2. Canals Act, 5 of 1864.
3. West Bengal Irrigation (Imposition of Water-Rates for Damodar Valley Corporation Water) Act, 25 of 1959.
4. West Bengal Closing of Canals Act, 2 of 1959.
5. Bengal Tanks Improvement Act, 15 of 1939.
6. Bengal Development Act, 16 of 1935.



Based upon Survey of India map with the permission of the Surveyor General of India.

The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.

The boundary of Meghalaya shown on this map is interpreted from the Assam Saargeosman (Meghalaya) Act, 1961, but has not yet been verified.



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