

**GOVERNMENT OF INDIA
MINISTRY OF IRRIGATION AND POWER**

**REPORT
OF
THE COMMITTEE OF MINISTERS
ON
UNDERUTILISATION OF CREATED
IRRIGATION POTENTIAL**



**JUNE 1973
NEW DELHI**

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has been taken, as far as possible, to avoid elaborate discussions of the problems or repetition of facts already well-known and to keep the reviews brief and concise and the recommendations action-oriented. The Committee feels confident that an early action on the various steps outlined in the Report would lead to the prompt utilisation of the created irrigation potential.

5. It is my great pleasure to place on record my grateful thanks to many distinguished colleagues on the Committee for their whole-hearted and unstinted cooperation. I must also convey my sincere thanks to the valuable cooperation extended to the work of the Committee by the officers and staff of the Union Ministries of Irrigation and Power, Agriculture and Planning Commission as also the different departments of the State Governments. A large number of local officials, cultivators and other public men gave valuable suggestions during our visits and discussions for which I am grateful to all of them.

6. I am most grateful to you for the readiness with which you have offered, help and advice whenever needed and for placing at the Committee's disposal the services of your officers and staff which greatly facilitated the Committee's work,

With kind regards,

Yours sincerely,

Sd/-

(VASANTRAO PATIL)

Dr. K L, Rao,
Union Minister for
Irrigation & Power,
NEW DELHI.

P R E F A C E

The Government of India in the Ministry of Irrigation & Power *vide* Resolution No. DW. II-31(17)/72, dated the 4th August, 1972, set up a Committee of Ministers to look into the reasons for the underutilisation of created irrigation potential and suggest remedial measures.

The Committee inspected selected major projects with large lags in utilisation and held useful discussions with the Project officials, cultivators and public men. Detailed proformae were also circulated to all the States and they were requested to furnish information in respect of major and medium plan projects wherein the utilisation of created potential is less than the National average.

The Collection, Compilation, analysis and presentation of the information received from the States and supplementing this with the information available in the Ministry of Irrigation and Power has been done in a manner which greatly facilitated the Committee's work.

The Report of the Ministers Committee has been prepared in two parts. Part I deals with All India problems and issues pertaining to under-utilisation of created irrigation potential. The Recommendations of the Committee on the measures to ensure prompt and full utilisation of created irrigation potential are given in chapter V of the Report. Part II of the report makes a review of the irrigation potential and utilisation under major and medium plan projects as also the reasons for the lag in different states.

The position of utilisation of created irrigation potential under major and medium projects is by and large satisfactory. However, there are certain regions and/or projects where the utilisation is much below the National average. It is hoped that the recommendations of the Committee would enable a careful appraisal of all such regions and projects so that utilisation can be accelerated there. As the Nation has made sizeable investment in irrigation projects, it is most necessary to adopt all such measures which would lead to utilisation of created potential in the shortest possible time. The Committee confidently feels that the implementation of its recommendations would go a long way towards achieving this objective.

ACKNOWLEDGEMENTS

The Committee is sincerely indebted to the various Ministers in the Government of India and State Governments, Planning Commission, Legislators, leading public men, farmers and other individuals who favoured us with their views on accelerated utilisation of created irrigation potential. The various State Governments assisted the Committee by furnishing basic data on plan projects. All this largely contributed to the formulation of this report.

The State Governments of Maharashtra, Gujarat, Andhra Pradesh, Mysore, Rajasthan, Madhya Pradesh, Bihar and Uttar Pradesh, made elaborate arrangements for Committee's inspection of command areas of Kakrapar, Tungabhadra, Nagarjunasagar, Chambal, Kosi and Gandak projects. The Committee gratefully acknowledges the personal interest of Sarvashri Vasantryao Patil, Jashwant Mehta, Ram Chandra Chaudhury, H.N. Nanje Gowda, Narasa Reddy, Amolak Chand Chhajed, Budhdeo Singh, Harminder Singh Chatha and Shrimati Sharda Rani, Irrigation Ministers in making these visits informative and fruitful. In this great task, the Irrigation Ministers were helped by Sarvashri B.A. Kulkarni, M.G. Shab, B.C. Gangopadhya, P.R. Dubhashi, S. Sahai, M. Taneja, K.C.S. Acharya, Sber Singh, B.L. Chak and P.P. Caprihan Secretaries to the Governments and S.S. Apte, C.C. Patel, P.A. Raj, S.P. Caprihan, I.M. Magdum, S. Gopatan, B.P. Sharma, Ram Singh, U.K. Verma, R. Ghosh, D.S. Sinha, K.S. Pathak, B.K. Uppal, and S.P. Bhatt, Chief Engineers. Their help is gratefully acknowledged.

The Committee is extremely grateful to Dr. K.L. Rao, Union Minister for Irrigation and Power for his expert advice whenever needed and also for placing at the Committee's disposal the services of his officers and staff for this work.

The Committee would like to place on record their deep appreciation of the excellent work put in by Sarvashri S.N. Gupta, Joint Secretary and R. Rangachari, Joint Commissioner in the preparation of this report. Mention will also be made of Dr. S.D.L. Luthra, Deputy Director and Shri E. Sivasankaran, Assistant Director, Ministry of Irrigation and Power, who largely assisted in the compilation of Part II of the report.

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ANNEXURES of PART II

No. M&P/347/73

OFFICE OF THE MINISTER FOR IRRIGATION
AND POWER (HYDRO ELECTRIC),

Sachivalaya, Bombay-32-BR

Dated 13th June, 1973.

Dear Dr. Rao,

The Government of India in the Ministry of Irrigation and Power vide Resolution No. DW. II-31(17)/72, dated the 4th August, 1972 set up a Committee of Ministers to look into the reasons for the under utilisation of created irrigation potential and suggest remedial measures. On behalf of the Committee, I have great pleasure in forwarding herewith the "Report of the Ministers Committee on under utilisation of created irrigation potential".

2. The report is in two parts. Part I deals with the National scene, policies and problems of all-India nature along with the recommendation of the Committee for the accelerated utilisation of created irrigation potential. Part II is a review of the potential and utilisation under major and medium Plan projects in different States. The details of the principal conclusions and recommendations of the Committee are in Chapter 5 of the Part I of the Report.

3. The Nation launched the planned development of irrigation potential in 1951 and by 1972, the country has doubled the pre-Plan irrigation potential under major and medium irrigation projects. While the position of utilisation of created potential has been satisfactory on the whole, the Committee has noted that in certain areas the pace of utilisation can be accelerated and has suggested suitable measures for this purpose. The Committee inspected certain major projects presently under execution in the country and analysed in detail the causes for the lag in utilisation as also the essential ingredients that contribute towards comprehensive ayacut development. It also obtained details of the Plan projects from various States.

4. Successful ayacut development is a multidiscipline task which calls for the closest coordination and constant vigilance. The Nation has made a sizeable investment in the irrigation projects under the Plans and it becomes incumbent on us to explore all ways and means of achieving the quickest possible use of such investment. The Committee's recommendations are designed to give an impetus to the ayacut development programme which must go side by side with the irrigation projects. Care

PART I

**NATIONAL SCENE, POLICIES,
PROBLEMS AND RECOMMENDATIONS OF
THE COMMITTEE FOR THE ACCELERATED
UTILISATION OF CREATED IRRIGATION POTENTIAL**

INTRODUCTION

Irrigation & Power Ministers' Conference at Srinagar

1.10 The Sixth Conference of the State Ministers of Irrigation & Power was held in Srinagar in June/July, 1972. It made a review of the targets and achievements of major and medium projects, inter alia, and the pace of creation of irrigation potential and its utilisation. There is always a certain time lag between the creation and utilisation of potential due to various reasons even though efforts are constantly being made to reduce the time lag and improve the percentage of utilisation. Lag in utilisation has, therefore, to be assessed by comparing the potential created in a particular year with the utilisation in the succeeding year. The Conference noted with satisfaction that as a result of various steps taken in the last decade, the National average of utilisation from major and medium irrigation schemes was as high as 88%. It, however, observed that there were areas and regions where utilisation was much below the National average and these offered scope for accelerating the utilisation of potential.

1.11 It recommended that a Committee of Ministers may be set up to look into the reasons for under utilisation of created irrigation potential and to suggest remedial measures.

Constitution of the Committee of Ministers

1.12 Accordingly, the Government of India set up a Committee of Ministers vide their Resclusion No. DW. II-31 (17)/72, dated the 4th August, 1972.

Terms of Reference

1.30 The terms of reference of the Committee were indicated as below :

- (i) To collect details and analyse the existing pattern of utilisation of irrigation potential in India, region wise and project wise ;
- (ii) To critically analyse the reasons for the lag in utilisation and under utilisation of irrigation potential in general and to identify critical regions or medium and major projects where steps are immediately called for ;
- (iii) To suggest remedial measures to be undertaken at different stages of planning, execution and operation of schemes that are designed to ensure proper and prompt utilisation of the irrigation potential created, in respect of administrative, technical, economic, legislative and other aspects of the problem ; and
- (iv) To make all other general recommendations to achieve quick utilisation of irrigation potential.

Membership

1.40 At the time of initial constitution of the Committee, it comprises the Ministers in charge of Irrigation in the States of Maharashtra, Gujarat, Madhya Pradesh, Bihar, Rajasthan, Mysore and Haryana with the Minister of Maharashtra Shri Vasant Rao Patil as Chairman. The Joint Secretary (Ganga Basin), Ministry of Irrigation & Power was made the Convenor of the Committee.

1.41 The Resolution of the Government of India outlining the terms of reference and indicating the initial composition is at Annexure I.1.1.

1.42 Subsequent to the publication of the Resolution, certain changes were effected in the composition of the Committee from time to time mainly due to change in the State Cabinets. The Committee requested the Union Minister of State for Agriculture to serve as a Member, but he regretted his inability to do so due to pre-occupations. The Composition of the Committee is as follow :

Chairman :

Shri Vasant Rao Patil, Minister for Irrigation and Power (Hydro-Electric)
Maharashtra.

Members :

1. Minister for Public Works, Gujarat.
Shri Jashvant Mehta.

2. Minister of Irrigation and Electricity, Madhya Pradesh.
Shri Amolak Chand Chhajed.
3. Minister for Irrigation, Bihar.
Shri Budhdeo Singh—(till 27.5.73)
Shri Lahtan Chaudhary (from 27.5.73)
4. Minister for Irrigation & Revenue, Rajasthan.
Shri Ramchandra Chaudhary.
5. Minister of State for Major Irrigation, Mysore.
Shri H.N. Nanje Gowda.
6. Minister of State, Irrigation & Power, Haryana.
Shrimati Sharda Rani (till 9.10.72)
Shri Harminder Singh Chatha (from 9.10.72)
7. Minister for Major Irrigation, Andhra Pradesh.
Shri Narasa Reddy—(till 18.1.73)

Convenor :

1. Joint Secretary. (Ganga Basin), Ministry of Irrigation & Power, Govt. of India.
Shri S.N. Gupta.
2. Joint Commissioner (Irrigation) Ministry of Irrigation & Power, Govt. of India.
Shri R. Rangachari.

Special Invitee :

Chief (Irrigation), Planning Commission, Government of India.
Shri O.P. Chadha.

1.43 The Secretaries to the Governments and Chief Engineers and other Senior Officers of the States whose Ministers were the Members of the Committee were invited to attend the deliberations of the Committee. A list of all such Senior Officers who attended various meetings of the Committee is at Annexure I.1.2.

Meetings and Inspections

1.50 The work of the Committee was inaugurated on 25th August, 1972, by Dr. K.L. Rao, Union Minister for Irrigation & Power at Delhi and the first meeting of the Committee was held immediately thereafter.

1.51 The second meeting of the Committee was held at Ukai/Surat/Bombay on 23/24 September, 1972, and simultaneously the Kakrapar/Ukai projects were inspected.

1.52 The third meeting of Committee was held at Bangalore on 25th October, 1972 and this was preceded by an inspection of the Nagarjunasagar and Tungabhadra projects between 21st and 24th October, 1972.

1.53 The fourth meeting of the Committee took place in Gwalior/Kotah/Jaipur between the 10th and 12th January, 1973 along with the inspection of the Chambal project.

1.54 The fifth meeting of the Committee was held at Valmikinagar/Bhimnagar/Kashmandu between the 19th and 23rd April, 1973 along with the inspection of the Gandak and Kosi Projects.

1.55 The draft report of the Committee was considered and finalised at its sixth meeting held at Bombay from 11th to 13th June, 1973.

Scope and Method of Work

1.60 At its first meeting, the Committee discussed the scope and method of its working and decided that being a Ministers' Committee, its attention should be devoted more to the policy and administrative issues involved than to the technical examination of the schemes which could be best left to experts.

1.61 Each meeting of the Committee was preceded by an inspection visit to one or more projects and the problems faced in these were highlighted in one or more background papers prepared by the Committee's Convenors. At the time of the inspection, the Committee took particular care to seek the views of Administrators, Technical Experts, leading public men as also the cultivators in the command areas on the problems faced by them and their suggestions.

1.62 Detailed proformae (copies at Annexures I. 1.3 and I. 1.4) were circulated to all States and they were requested to furnish information in respect of identified major and medium irrigation Plan projects in their respective States with the percentage of utilisation less than the National average. These details were collected, compiled and carefully analysed by the Convenors who highlighted the points for consideration of the Committee, which served as the basis for the Committee's final recommendations for accelerated utilisation of created irrigated potential, as outlined in Chapter V of this report.

Irrigation Potential and Utilisation in India

India

2.10 India has a geographical area of 328 m.ha., of which 180 m.ha. are considered as culturable. About 140 m.ha. are cultivated annually. Considering area sown more than once, about 164 m.ha. are cropped every year.

2.11 According to tentative assessments (which may change as a result of further planning studies), the ultimate irrigation potential of India has been placed around 89 m.ha., of which 53 m.ha. will be by major and medium irrigation projects and 36 m.ha. by minor irrigation projects. By 1951, when planned development of irrigation potential was initiated by Independent India, 22.5 m.ha. were under irrigation and after the two decades following, the potential stood at about 39 m.ha.

Plan Progress

2.20 Since the commencement of the Plan period in 1951, 107 Major and 458 medium irrigation schemes* were taken up till March, 1972 of which 31 major and 334 medium irrigation schemes had been completed by then. 36 major and 87 medium irrigation schemes, taken up were in such early stages of execution that they had not so far created any irrigation potential under them. 40 major and 37 medium irrigation projects had created partial irrigation potential and are continuing to be under execution.

2.21 India's created irrigation potential by major and medium schemes stood at 9.6 m.ha. in March, 1951. The ultimate irrigation potential on completion of all major

*Apart from a few Projects which had no direct irrigation potential.

and medium schemes taken up between April, 1951, and March, 1972 will be 19.2 m.ha. The irrigation potential created by 1972 by these Plan schemes was 9.6 m.ha. or half their ultimate potential.

The irrigation utilisation by major and medium schemes in March 51 was 9.6 m.ha. Plan projects taken up between April 51 and March 72 had increased the pre-Plan utilisation figures by 8 m.ha.

Utilisation percentage

2.30 The progressive increases in irrigation potential and utilisation during the Plan period were as summarised in table 2.1.

TABLE 2.1

(Area in m.ha.)

<i>S.No. Period</i>	<i>Cumulative irrigation potential of Plan projects</i>	<i>Cumulative Utilisation of Plan projects</i>	<i>% age col. 4 × 100 col. 3</i>
1	2	3	5
1. Mar'56 — End of I Plan	2.48	1.48	60
2. Mar'61 — II Plan	4.63	3.35	72
3. Mar'66 — III Plan	6.85	5.47	80
4. Mar'69 — three annual plans	8.43	7.00	83
5. Mar'72 —	9.61	8.01	83.3

The intensity of utilisation gradually rose from about 60% at the end of the First Plan to about 83% by March '72.

2.31 As generally utilisation can take place in the year following that in which potential is created, it will be appropriate if the utilisation in a particular year is compared with the potential created by the end of the preceding year. According to this comparison, the utilisation by March '72 is about 87% of the potential created by March 72 (viz 9.2 m.ha.*)

*Tentative figure.

Potential and lag

2.40 By March '72, the lag in the utilisation of created irrigation potential stood at 1.6 m.ba. The Statewise picture of created potential by major and medium Plan projects, utilisation and lag as of March '72 is summarised in Table 2.2.

TABLE 2.2

Irrigation potential and utilisation by major and medium Plan schemes by
March, 1972

(area in 000 ha)

S No.	State	Total		Irrigation potential			Lag
		No. of schemes taken up	Ultimate	Created by 3/72	Utilisation by 3/72	Utilisation $\frac{\text{col. 6}}{\text{col. 5}} \times 100$	
1	2	3	4	5	6	7	8
1.	Andhra Pradesh	57	1744.90	855.23	739.49	85.7	115.74
2.	Assam	6	95.05	44.07	38.67	87.7	55.40
3.	Bihar	57	3122.64	1143.92	763.61	66.8	380.31
4.	Gujarat	60	991.10	5667.31	341.95	60.3	225.36
5.	Haryana	11	1372.70	964.81	922.27	95.6	42.54
6.	Jammu & Kashmir	9	41.41	23.66	20.49	86.6	3.17
7.	Kerala	19	506.86	201.59	201.59	100.0	Nil
8.	Madhya Pradesh	55	1005.57	420.58	288.37	68.6	132.21
9.	Maharashtra	84	1315.82	424.62	202.20	47.7	222.42
10.	Mysore	32	1308.29	526.70	447.81	85.0	78.89
11.	Orissa	15	1102.52	722.95	706.34	97.7	16.61
12.	Punjab	10	1151.38	668.38	668.38	100.0	Nil
13.	Rajasthan	57	1346.00	806.90	712.20	88.3	94.70
14.	Tamil Nadu	29	287.41	232.96	196.24	84.2	36.72
15.	Uttar Pradesh	56	2738.52	1186.27	1045.60	86.1	140.67
16.	West Bengal	8	1044.28	816.00	717.09	87.9	92.91
Total	All India	565	19174.51	9605.95	8012.30	83.3	1593.65

2.50 The Committee was required to analyse the existing pattern of potential and utilisation and to identify critical regions and projects where high extent of lag existed. Such an analysis has been made and results presented state wise and project wise in part II of the report. A brief summary of the findings is given here.

From the statewise analysis of potential and utilisation, it is seen that the States of Andhra Pradesh, Bihar, Gujarat, Madhya Pradesh, Maharashtra and Uttar Pradesh together account for over three-fourth of the National lag. Lags of varying lesser order have been reported by Assam, Haryana, Jammu & Kashmir, Mysore, Orissa, Rajasthan, Tamil Nadu and West Bengal. Kerala and Punjab have recorded full utilisation of created potential. No major or medium projects have come up in the States of Himachal Pradesh, Manipur, Meghalaya, Nagaland and Tripura and thus the question of lag in utilisation there does not arise. Most of the Union territories did not undertake any major or medium projects in the Plan period and the projects of Delhi and Pondicherry are connected with projects in adjoining States.

Lag under major and medium Plan projects

2.60 As can be expected, major irrigation schemes account for about three fourths of the created potential. Correspondingly the lag in the major schemes is also about 80 per cent of the total lag.

2.61 The potential created by major and medium schemes were 7.1 m.ha. and 2.5 m.ha respectively. The corresponding utilisation by major and medium projects stood at 5.8 m.ha, and 2.2 m.ha, respectively. Brief details are summarised in table 2.3.

TABLE 2.3

Lag under major and medium Plan Projects

(area in 000 ha.)

S. No.	Category	Total No. of schemes taken up	Potential		Lag		
			Ultimate	created Utilisation			
					%age Col.6 ----- Col.5 × 100		
1.	2.	3.	4.	5.	6.	7.	8.
1.	Major Projects	107	15,993	7,113	5,812	81.7	1,301
2.	Medium Projects	458	3,182	2,493	2,200	88.3	293
Total		565	19,175	9,606	8,012	83.3	1,594

Lag under completed continuing Projects

2.70 A feature of concern noted by the committee was that many of the early projects have dragged on for over twenty years and are still indicated by the States as continuing schemes. Some of the prominent major schemes of this type like the Kosi, Kakrapar, Mahi I, Chambal, Bhadra, D.V.C., Mayurakshi are I plan projects. Some other schemes which have created full potential already are also being treated as "continuing" schemes due to some works still going on under the project. For the purpose of the Committee's work a project was considered as completed if either (i) ultimate potential has already been created or (ii) the project is reported to have been completed even though ultimate potential figures had not been reached. It could be expected that projects still under execution with partially created potential are likely to have a greater lag than the completed ones.

2.71 365 completed schemes accounted for over half the created potential. However, the lag under completed schemes was only one-fourth of the total lag. The potential created by completed and continuing schemes stood at 5.4 m.ha. and 4.2 m.ha. respectively. The corresponding utilisation figures were 5.0 and 3.0 m.ha. respectively.

Brief details are summarised in Table 2.4.

TABLE 2.4
Lag under completed and continuing Plan Projects

		areas in 000 ha					
S.No.	Category	Total No. of schemes	Potential		Utilisation	%age $\frac{\text{Col. 6}}{\text{Col. 5}} \times 100$	Lag
			Ultimate	Created			
1	2	3	4	5	6	7	8
1.	Completed schemes	365	5442	5403	4982	92.2	4201
2.	(a) Continuing schemes which have created some potential	77	9126				
	(b) Continuing schemes which have created no potential	123	4607	4203	3030	72.1	1173
Total		565	19175	9606	8012	83.3	1593

Major Projects with large lags

2.80 A scheme wise analysis of the major projects indicates that 53 out of 71 major schemes which have some created potential each have some lag in their utilisation. However, the 8 major projects listed in table 2.5, each with a lag of over 50 th.ha., account for 0.95 m.ha. out of the total 1.30 m.ha. lag under major schemes or three-fourths of the lag in that category.

TABLE 2.5

Lag in Major Projects

<i>S.No.</i>	<i>Name of Project</i>	<i>Approx. present estimated cost (Rs. crores).</i>	<i>State (s)</i>	<i>lag in th.ha.</i>
1	2	3	4	5
1.	Kosi (including Rajpur canal)	84.3	Bihar (145) 77)	222
2.	Chambal (Stages I & II)	85.5	Madhya Pradesh (130) Rajasthan 21)	151
3.	Gandak	224.1	Bihar (107) Uttar Pradesh 37)	144
4.	Kakrapar	18.9	Gujarat	130
5.	Tungabhadra (High and low level canals)	114.7	Andhra (37) Mysore 71)	108
6.	Rajasthan Canal	119.0	Rajasthan	75
7.	Kangsabati	49.5	West Bengal	71
8.	Mahi—Stage I.	30.6	Gujarat	57

Lag in medium Projects

2.90 A similar study of the 371 medium schemes that have created full or partial potential indicated that the lag is spread over a large number of them and thus it will not be easy to pin point specific critical projects. All that could be said in respect of medium schemes is that the four States of Andra Pradesh, Bihar, Maharashtra and Uttar Pradesh together account for about 90% of the total lag in this category.

Inspection of Project Commands

3.10 At its first meeting, the Committee decided to undertake a visit to all important major projects which lagged in utilisation and to hold its future discussions at these project sites.

3.11 On the basis of the extent of lag, the following eight major projects, each with a lag of over 50,000 ha. were tentatively selected for inspection by the Committee.

1. Kosi Project (including Rajpur canal) Bihar
2. Gandak Project (Bihar and U.P.)
3. Chambal Project (Madhya Pradesh & Rajasthan)
4. Tungabhadra Project (Andhra & Mysore)
5. Kakrapar Project (Gujarat)
6. Rajasthan Canal Project (Rajasthan)
7. Kangsabati Project (West Bengal)
8. Mahi Project (Gujrat)

3.12 The Committee also decided to visit the Nagarjunasagar Project in Andhra Pradesh as an example of major project which has reported quick utilisation of created potential.

3.13 The Committee was invited by the Government of Madras to visit the Pambikulam Allyar Project also.

3.14 The Committee accordingly visited the Kosi, Gandak, Chambal, Tungabhadra, Kakrapar and Nagarjunasagar Projects but due to lack of time it could not visit the Rajasthan Canal, Kangsabati, Mahi and Parambikulam Allyar Projects.

3.15. Brief details of the projects visited with the observations of the Committee for the lag there under are given in succeeding paragraphs.

3.20 Ukai and Kakrapar Projects (Gujrat)

3.21 The Basin

3.21 The Tapi basin lies between east longitudes $72^{\circ}-3'$ to $78^{\circ}-17'$ and north latitudes $20^{\circ}-5'$ to $22^{\circ}-3'$ and has a drainage area of 65,145 sq.km. through the States of Madhya Pradesh, Maharashtra and Gujarat. The river is 724 km. long from its source in Satpura hills in Madhya Pradesh to its outfall into the Arabian sea, its tail length in Gujarat being 214 km.

The Project

3.22 The Kakrapar weir and canal project—Stage I of the development of Tapi valley—was initiated in 1948. It comprises a masonry weir across the Tapi river, right and left bank-canals, each 61 km. long and their distribution systems. The project is estimated to cost Rs. 18.05 crores and expenditure thereon to the end of March 1972 is Rs. 16.11 crores. The weir was completed in 1953 and irrigation is being progressively stepped up since then. It is programmed to complete the project works by June 1974.

Ukai dam located 26 Km. upstream of Kakrapar weir forms stage II of Tapi Valley Development Programme. The left bank main cannal system takes off directly from Ukai dam while the right bank canal system takes off at 46th Km. of the Kakrapar right bank canal. The construction of these canal systems is in progress. Stage II is scheduled for completion by 1976.

Irrigation Potential created and utilised

3.23 Stage I, will provide an ultimate irrigation potential of 2.28 lakh ha. By March, 1972, an irrigation potential of 2.03 lakh ha. has been created; the irrigation potential utilised is 0.73 lakh ha i.e. 36% Stage II, will provide an ultimate irrigation potential of 1.58 lakh ha. By March, 1972 no irrigation potential has been created. The Kakrapar command is divided into 3 zones according to climatic and soil conditions. Zone I ... covers the area between river Tapi and Kim, the annual rainfall being 75 cm., Zone II - covers area between river Tapi and Purna, the annual rainfall

being 125 cm. to 150 cm, Zone III - covers area between river Purna and Par, the annual rainfall being 150 cm to 200 cm. The Tapi basin consists mainly of black soils.

The cropping pattern as envisaged as a result of introduction of irrigation has not developed on account of several causes. The cropping pattern as visualised after the completion of Ukai dam has yet to materialise.

Reasons for under-utilisation of created irrigation potential

3.24 The reason for under-utilisation of created potential are as follow

(a) Owing to well distributed rainfall in Kakrapar Command, demand for irrigation water for existing varieties of Jowar and Cotton is negligible. The traditional varieties of Jowar and Cotton are required to be replaced by improved varieties requiring irrigation.

(b) There is meagre demand for irrigation of Paddy in such areas of the command where rainfall is heavy. There is need for growing finer varieties of Paddy requiring irrigation water.

(c) The existing field channels cover hardly 10% of the Kakrapar Command. It is found difficult to achieve the required progress on the execution of field channels through the beneficiaries by persuasive methods.

(d) It is estimated that a little less than half the Kakrapar Command needs levelling. No significant progress has been made so far in this regard.

(e) After harvesting paddy, the cultivators adopt 'Val' crop which involves no expenditure but provides them manure and fodder. Cultivators need to be encouraged to adopt wheat cultivation during Rabi season.

(f) There are four trial-cum-demonstration farms in Kakrapar Command at Kim, Bardoli, Kholwad and Chikhli. These determine water requirements and irrigation schedules for various crops but the cultivators are, by and large, unaware of these findings due to lack of adequate extension services.

Area Development Programme

3.25 The Government of Gujarat have prepared a consolidated area development programme which covers various measures required for speedy development of Kakrapar and Ukai Commands. The proposals include the following :

- (a) Speedy execution of field channels.
- (b) Speedy execution of Drainage channels.

- (c) Construction of all weather communication system to connect each village with the nearest highway.
- (d) Provision of facilities such as :-
 - (i) Timely supply of improved seeds and fertilizers.
 - (ii) Setting up of Agro-industries
 - (iii) Providing banking facilities including agricultural financing.
 - (iv) Cold storage and other storage facilities.

Views of State Government to improve utilisation

- 3.26 (a) The system of block irrigation which is prevalent in the Kakrapar command for Kharif needs to be introduced for Perennial irrigation,
- (b) Lining of all channels of capacity 25 cusec and more is necessary to prevent seepage and wastage of water.
- (c) Remodelling of Kakrapar canal system is required as duties earlier adopted for various crops were high.
- (d) Private tubewells need to be encouraged for growing perennial crops over additional areas.

3.30 Nagarjunsagar Project

The Krishna Basin

3.31 It lies between east longitudes 73°-21' to 81°-9' and north latitudes 13°-7' to 19°-25' and covers a drainage area of 258,94² sq. km in the States of Maharashtra, Mysore and Andhra Pradesh. The Krishna rises in the Western Ghats, just north of Mahabaleshwar, about 64 km from the Arabian sea and flowing from west to east, covers a length of 1400 km before it outfalls into the Bay of Bengal.

The Project

3.32 The Nagarjunsagar project comprises a 125 m. high and 1450 m long rubble masonry dam and 26 m high 3415 m long earth dam on the flanks across river Krishna, after its confluence with Tungabhadra, at a point two km below the village of Nandikonda. In the first phase, the Right Bank canal will be 203 km long with a carrying capacity 312 Cumec (11,000 cusec) and will irrigate 4.75 lakh ha. Likewise, the left bank canal will be 179 km long with a carrying capacity 312 cumec (11,000 cusec) and will irrigate 3.56 lakh ha. Whereas the main dam has been completed, the work on the canal system is in progress.

The normal rainfall in this area is 75 cm of which 80 per cent is received during the South West Monsoon period, i.e. from June to September and the balance is received from North East monsoon during October to December. The soils in the area are black, red and black, red, sandy loam, clayey loam and loam.

Ayacut Development

3.33 The ultimate irrigation potential under the project is 4.3 lakh ha. The potential created by March, 1972 was 4.13 lakh ha. and the corresponding utilisation 3.8 lakh ha. i.e. 92%.

The Committee was informed that under this project various steps were undertaken since the inception of the project which had contributed to quick utilization of created potential. The more important amongst such steps are detailed as under :

- (a) Village maps showing distribution and extent of different soil types were prepared to indicate the agricultural possibilities of the tract.
- (b) Block Command plans were prepared showing the distribution and extent of different soils with areas demarcated as suitable for (a) intensive irrigation (paddy), (b) light or intermittent irrigation during Kharif and or Rabi seasons, (c) both intensive and light irrigation, and (d) unfit for irrigation.
- (c) Extensive experiments carried out at the two Nagarjunasagar Project Research Station both in left and right bank canal areas have indicated that best results are obtained for intermittently light irrigated crops only in the Rabi season. Therefore, against the preirrigation cropping pattern of 4.76 lakh ha. Kharif and 1.1 lakh ha. Rabi, revised cropping pattern with 4.06 lakh ha. Kharif and 4.26 lakh ha. Rabi was proposed.
- (d) Areas requiring land preparation for wet cultivation, were identified.
- (e) A socio-economic survey of the command area made by Andhra University prior to the commencement of irrigation, brought out the inherent drawbacks of the area and the zones where the State should assist the local farmers to realise the full benefits of the project by providing infra-structural facilities, inputs and agricultural credit. Accordingly, action was initiated by the State Government on the various suggestions put forward.
- (f) The project irrigation channels were taken upto 40 ha. limit; field channels beyond this limit were also executed by the Irrigation Department, the cost of which was to be recovered later from beneficiaries.
- (g) A well knit and well organised system of team work and management by itinerant four-man teams consisting of representatives of the departments

of Irrigation, Agriculture, Co-operation and Revenue under unitary control of a Special Commissioner, Board of Revenue was evolved well in advance to tackle the problems of quick development of irrigated areas in this project.

The State authorities indicated that these steps enabled them to achieve utilisation of 80% of the created potential in the very first year and full development within 3 years.

3.40 Tunga Bhadra Project

The Thung Bhadra

3.41 The two rivers Tunga and Bhadra which rise together in the Western Ghats at Gangamula join together to form Tunga Bhadra—an important tributary of Krishna. The river flows for about 531 Km. in a generally north-easterly direction, through Mysore and Andhra Pradesh and joins the Krishna beyond Kurnool. The total drainage area of Tungabhadra is 71, 417 sq.Km.

The Project

3.42 It comprises a masonry dam 2441 m.long and 49 m. high above the deepest foundation. A 227 Km. long canal takes off from its left bank to provide irrigation to 2.35 lakh ha. in Raichur district. Two canals take off from its right bank, low level canal, 349 km. long, and high level canal, 196 Km. long to irrigate lands in Bellary district of Mysore State and Guddapah and Anantapur Districts in Andhra Pradesh.

The annual rainfall is 46 cm. The soils are black red and mixed (red, black, yellow etc.)

Co-ordination Agency

The District Collector is the co-ordinating authority at District level and Board of Revenue is the co-ordinating authority at the State level. Water regulation is controlled by the Superintending Engineer. Water courses act of 1965 empowers the departmental officers to compulsorily execute the field channels in case the ayacutdars fail to execute.

Potential and utilisation in Andhra Pradesh

3.43 Under the various phases of this project, the total irrigation potential created and utilisation by March, 1972 were 1.11 lakh ha, and 0.74 lakh. in Andhra Pradesh.

The reasons for under utilisation of created potential in Andhra Pradesh are as follows:

- (a) Enough facilities for land shaping and land levelling are not available.
- (b) There is inadequate response for construction of field channels beyond outlets which is to be done by cultivators themselves.
- (c) Farmers are not accustomed to night irrigation for growing light irrigated crops and thus water goes to waste.
- (d) The results of scientific studies carried out at the Agricultural Research Station are not being adequately made available to the farmer. Further, the research and demonstration units are inadequate.
- (e) There is inadequate supply of water in the tail reaches of Tungabhadra canals as duties adopted presently are high.
- (f) Market, communication, and storage facilities are not sufficiently provided.
- (g) Credit facilities for purchase of implements, seeds and fertilisers are not adequate.
- (h) Adequate drainage facilities are not available.

Potential and utilisation in Mysore

3. 44 The potential created and utilisation under the different phases of the Project in Mysore State up to March, 1972, were 3.24 lakh ha and 2.53 lakh ha respectively.

Reasons for under utilisation of created potential in Mysore

3. 45 Essentially the main reasons for under utilisation of potential in Mysore are inadequate finances, unworkable duties and inadequate water. To achieve quick utilisation of potential the following steps are required to be taken.

- (a) Land levelling and shaping
- (b) Construction of field channels
- (c) Provision of credit facilities to cultivators for purchase of seeds, fertilisers and implements.
- (d) Improved infrastructure facilities like communication, ware houses, markets, repair facilities for machinery
- (e) Construction of drainage channels

(f) Adequate water facilities on the basis of actual duties.

(g) Establishment of adequate demonstration farms and extension agency.

3.46 In Tungabhadra project, the Government of Mysore have provided for excavation of field channels upto the last survey number under the Mysore Irrigation Act.

3.47 With a view to coordinate development activities, an Administrator has been appointed for the project under whom Special Officers of the Agriculture, Co-operation and Revenue departments are working.

3.50 Chambal Project (Rajasthan and Madhya Pradesh)

Chambal Basin

3.51 The Chambal basin lies between east longitudes 73°-20' to 79°-15' and north latitudes 22°-27' to 27°-20' to the north of the Vindhya range. It covers a drainage area of 139,468 sq. km. in the States of Madhya Pradesh, Rajasthan and Uttar Pradesh. The total length of the river from the source to its confluence with the Yamuna river is 960 km.

The Project

3.52 The Chambal Valley Development Scheme which is a joint venture of Madhya Pradesh and Rajasthan comprises three dams, namely, Gandhi Sagar Dam, Rana Pratap Sagar dam and Jawhar Sagar dam and one Barrage at Kotah. Two canal systems takeoff upstream of Kotah barrage. The Right Main Canal has a design capacity of 190 cumec (6656 cusec) and is 372. km. long of which the first 130 km lie in Rajasthan and the remaining 342 km. in Madhya Pradesh. The design capacity of Right main canal at the Rajasthan Madhya Pradesh Border is 110.4 cumec (3,900 cumec). The left Main Canal has a capacity of 42.5 cumec (1500 cusec) and is only 3 km. in length ; there after it bifurcates into two branch canals and this entire system lies in Rajasthan. The entire project relevant to irrigation has been substantially completed. Water has been made available for irrigation since 1960.

The annual rainfall in Rajasthan portion of the project command is 72 cm. mostly during the monsoon period.

The soils are mainly medium black, mixed red and black, red and yellow.

Irrigation potential created and utilised

3.53 According to the approved project an ultimate irrigation potential of 5.67 lakh ha. is envisaged viz. 2.83 lakh ha. each in States of Rajasthan and Madhya

Pradesh. The Right Main Canal was ultimately to irrigate 4.6 lakh ha. with 1.75 lakh ha. in Rajasthan and 2.83 lakh ha. in Madhya Pradesh. The Left Main Canal was ultimately to irrigate 1.07 lakh ha. in Rajasthan.

The irrigation potential created by March 1972 was 2.59 lakh ha. in Madhya Pradesh and 1.74 lakh ha. in Rajasthan.

The actual development of irrigation has, however been far behind the designed schedule even 10 years after the opening of the canal system. By March, 1972, the actual development was only 1.53 lakh ha. in Rajasthan and 1.29 lakh ha. in Madhya Pradesh.

Rajasthan could develop only about 11% of the expected Kharif irrigation while in Madhya Pradesh, it was only 7%. The Rabi achievement has been 60% of the Projected figure in Rajasthan and 40% in Madhya Pradesh.

Reasons for under-utilisation of created irrigation potential and remedial measures

3.54 The reasons for under-utilisation are as follow :

- (a) The right main canal passes through five tanks in its head reach of 16 km. After the canal was opened for irrigation, it was observed that these tanks acted as nurseries for the luxuriant growth of weed which spread throughout the canal length and hampered the flow of water reducing thereby the designed area to as much as 50%. To reduce this menace, it was suggested that these tanks should be by-passed by constructing a single or double-bank canal. It was seen that there were rocky mounds in the bed of the canal which obstructed flow. Also, slips had occurred in reaches of heavy cutting due to saturation of banks because of inadequate drainage. All the slipped material was required to be removed for improving channel conditions. Weed clearance and other corrective measures undertaken so far had necessitated closure periods of one to three months every year. This affected utilisation.
- (d) As per original planning, the project has been designed as an Irrigation oriented project but in practice, and because of the demand for power it is acting as a power oriented project. This has resulted in wastage of water when it is not required for irrigation use and shortage later on. Further, owing limited surplussing capacity of the Gandhi Sagar spillway, a portion of the live storage capacity had been set apart for flood moderation. This has resulted in a reduced utilisable storage than contemplated originally.

- (c) In the early years, additional outlets were allowed in the channels in the interest of fast development of irrigation. Subsequently, when irrigation developed, difficulties were experienced in carrying water to the tail reaches. Because of improper distribution of water, intensity of irrigation at the head and tail of channels varied considerably. The Government of Rajasthan have now issued orders for the removal of these additional outlets. Regulators are also to be provided in the distributaries and minors for judicious control and distribution of supplies.
- (d) In the early years, the cultivators did not come forward for excavation of field channels and this hampered with the timely development of irrigation. Corrective steps have now been initiated.
- (e) Work on land shaping and land levelling was not taken up in the project command area in the past years for want of suitable agency and proper organisation to carry out this work as also the financial backwardsness of the cultivators.
- (f) There are Five Extension and Demonstration Centres in the command where the farmers are trained in the present day methods of irrigation and Agriculture farming. These centres are, however, not adequate to serve the entire command.
- (g) Consequent on introduction of irrigation, heavy seepage was observed through canals especially in reaches where these traverse through fissured rocky layers and also where the soil is not good and canals are in filling. Inadequate surface and sub-surface drainage combined with excessive irrigation throughout the years has resulted in water logging of irrigated lands in the command area. It has, therefore, become necessary to line canals in rocky reaches and construct seepage drains. Also, steps are required to be taken for early disposal of rain water from tanks, depressions and pockets of area without the natural outlet, to check rise of water table. Further, to avoid wastage of water, irrigation should be given to the fields after bunding. Also, night irrigation should be enforced.
- (h) Other infra-structural facilities such as supply of improved seeds, processing industries, godowns and credit facilities are not adequately available and should be provided.

Command Area Development Authority

A Planning and Development Co-ordination Committee for the Chambal area has been constituted at the State level, by the Government of Rajasthan at Jaipur. It comprises members representing Finance, Agriculture, and Planning Departments, Development Commissioner and also Heads of Departments concerned with Chief Secretary as Chairman.

A regional Chambal Development Co-ordination Committee has also been constituted at Kotah with the Development Commissioner as Chairman. Collectors and Pramukhs of Districts concerned, Superintending Engineer, Chambal Project, Director U.N.D.P., representatives of Forests, State Electricity Board, P.W.D., Co-operation and Soil Conservation Departments, Agro-Industries Corporation, Local Industries etc. serve as members.

3.60 The Gandak Project

The Gandak River

3.61 The Gandak rises in the Himalaya range near Dhaulagiri at north latitude 29°-18' and east longitude 83°-58' (near Nepal Border). It debouches into the plains at Tribeni (Bihar). From Tribeni, the Gandak travels a distance of 275 km, to drain into the Ganga near Hajipur, opposite Patna. The average rainfall in the valley varies from 110 cm. to 140 cm. The principal soils types in the basin are alluvium, calcareous alluvium and peat.

The Project

3.62 It comprises 70 m. long barrage across the Gandak river at Valmikinagar with main Eastern and Western canals taking off from the left and right banks, upstream of the barrage. The main Eastern canal has a total length of 291 Km. and will irrigate a crop area of 6.7 lakh ha. in Champaran, Muzaffarpur and Darbhanga districts of Bihar. The main Western canal has a total length of 200 Km. In India it will irrigate a crop area of 3.1 lakh ha. in Gorankhpur and Deoria districts of Uttar Pradesh and 4.8 lakh ha. in Saran district of Bihar. The estimated project cost is about Rs. 225 crores.

Irrigation Potential and utilisation :

3.63 The Gandak barrage was completed by 1970. The Main Western and Eastern Canals started creating partial potential since then. The canals systems are scheduled to be completed by 1977. The created potential and utilisation by March, 1972 were 0.6 lakh ha. and 0.29 lakh ha. in U.P. and 1.58 lakh ha. and 0.5 lakh ha. in Bihar respectively.

The project report envisaged that irrigation development would take place in five years from the creation of potential in successive steps 20% each year.

Factors relevant to quick utilisation of created potential

364 (a) To ensure optimum benefits from Gandak irrigation project, it is very necessary to remove drainage congestion and complete the execution of drainage schemes along with the irrigation counterpart. The main problem in the construction of these works is land acquisition,

(b) With the introduction of perennial irrigation in the entire Gandak Command, which is overlain by a thick layer of alluvium, the sub-soil water table is bound to rise and present problems in the shape of water logging. Along with an efficient horizontal trunk drainage system, vertical drainage by tubewells will greatly help to hold sub-soil water table at the proper level.

(c) In Bihar, the field channel construction work is being co-ordinated by Gandak Area Development Commissioner through the District Magistrates. The Project Executive Engineer gives the location, alignment and cross section of the field channels, which are constructed by the cultivators under the supervision of Block Development Officers. Under the Bihar Irrigation Field Channels Act of 1965, the District Magistrate is empowered to get the field channels constructed and recover the cost, in case of failure to do so by the cultivators themselves. However; the progress on this work is rather slow.

(d) For the construction of Field drainage channels the Government is contemplating to enact Bihar Field Drainage Channels Act, on similar lines as the Field Irrigation Channel Act. So far no field drainage channels have been constructed.

(e) The Government of Bihar have prepared a comprehensive Area Development Programme for Gandak Command. This envisages provision of tractors for ploughing the fields, and other agricultural implements, agricultural credits and inputs in the shape of improved varieties of seeds, fertilizers and pesticides, and infrastructure facilities of farm roads, ware housing and marketing centres backed by intensive agricultural research, efficient land and water management and field demonstration.

365 In Uttar Pradesh, the above factors are equally responsible for lag in utilisation of created potential.

3.70. The Kosi Project

The Kosi Basin

3.71 The Kosi rises in the Himalayan region of Nepal and Tibet. It debouches into the plains near Chatra (Nepal). Beyond, it traverses through alluvial plains of North Bihar till it joins Ganga below Kursela railway bridge, the river length from Chatra to Kursela being about 300 Km. The Kosi is notorious for its vagaries and desolation caused by its floods. Owing to acute variation in its flood slopes and excessive movement of sediments, it has changed its course from east to west in a width of 110 Km. or so in the past.

The mean annual rainfall of Purnea district is 148. cm, while that of Saharsa district is 138 cm. The soils are predominantly sandy loam. The salt content of the soil is low and the soils are mildly to moderately alkaline.

The Project

3.72 It comprises a 450 m. Barrage at Bhimnagar which is designed to pass a flood of 9.5 lakh cumecs. On either side of Kosi river, flood embankments have been constructed to confine the meandering Kosi within a defined course and this has provided relief to 2.4 lakh ha. of flood affected area.

The originally approved Kosi project comprises the Kosi Eastern Canal system designed to irrigate 4.95 lakh ha. of culturable area. With an annual intensity of 115% of C.C.A. an ultimate irrigation potential of 5.8 lakh ha. was envisaged.

The Rajpur canal scheme which was sanctioned in 1961 envisages irrigation on an additional C.C.A. of 1.32 lakh ha. or 1.57 lakh ha. of irrigation potential.

The barrage was completed in 1965 and partial irrigation commenced thereafter. The work on canal systems is in progress.

Irrigation Potential and Utilisation

3.73 By March, 1972, the irrigation potential created is 2.75 lakh ha. under the Kosi Eastern canal and 0.89 lakh ha. under Rajpur canal. The corresponding utilisations stood at 1.30 lakh ha. and 0.12 lakh ha. under the Kosi eastern canal and Rajpur canal respectively.

Of the total C.C.A. of 6.27 lakh ha. under the two canal systems, 2.86 lakh ha. are not capable of being irrigated by the gravity canal system, being in high patches and low pockets subject to flooding and water logging. Thus the ultimate potential of the project has been temporarily brought down till such time remedial measures under consideration are undertaken to restore the full potential anticipated in the sanctioned project.

Reasons for lag in utilisation of created potential

3.74 (a) Till bypass channels were built, irrigation supplies could not be drawn in the canal due to non-completion of the power house.

(b) The Project provides water courses upto one cusec. The cultivators have not adequately responded to the construction of field channels below one cusec.

(c) Siltation in the Head reaches of the main and branch canals is another major factor to render the canal system incapable of carrying its full capacity discharge. Both preventive and curative measures are necessary to check this menace.

(d) Work on land shaping and micro land levelling has lagged behind.

(e) The crop pattern envisaged under the project has not developed.

(f) The consolidation of land holdings has not yet been done in the Kosi area.

(g) Research, Demonstration and extension facilities in the command area are inadequate.

(h) Infra-structure facilities such as communication, storage, marketing, etc. are inadequate.

(i) Water supply is released at present in any block on filing of Satta by 75% or more of the cultivators every season. This system is defective as it causes considerable delay and loss to the cultivators in the judicious application of water and the Government is deprived of its revenue. The Satta system was suspended for one year in 1972 and this proved beneficial both to the cultivator and the Government.

(j) An intensive Ayacut Development programme is yet to be undertaken in Kosi command.

4.0 Standardisation in reporting of Potential and Utilisation

4.10 Irrigation Potential

4.11 Irrigation potential created by an irrigation project at any time during or after its construction has been defined as the "aggregate gross area" that can be irrigated annually by the amount of water which could be made available by all connected and completed works including and upto the end of water courses.

4.12 According to this definition, it can be seen that "potential" is deemed to have been created only after water could be made available upto the end of waters courses. It goes without saying that as a pre-condition, enough water must be available at the storage or diversion point to satisfy the needs of the lands that can be served by the completed portion of canal system. Planning Commission defines a water course as "a channel built at Government expense and maintained by the beneficiaries to convey water from an outlet to a hundred acre block or as may be prescribed." A field channel is simultaneously defined as "a channel built and maintained by cultivators beyond the water courses to serve the various fields.

4.13 The term "water course" is used in different sense in various States. Other terms such as "village channel" are also in vogue. The Irrigation Commission (1972) referred to this confusion and recommended the adoption of the definition given by the Planning Commission by all the States for the purposes of law and administration.

4.14 The area which a "water course" has to serve varies from State to State and even Project to Project within a State. In 1958, the Planning Commission recommended the 40 ha. (100 acres) block size to be served by a water course, depending on the local conditions.

4.15 By and large, this criterion is being adopted in the present day projects, while in certain States the Government have relaxed this limit upto which they would provide the Channel at the Project cost with a view to accelerate utilisation (still there have been demands for water courses to serve smaller blocks). One will have to balance this with the other view that irrigation projects hardly cover a fourth of the cultivated area of the Nation and it will be unfair to "spoonfeed" this sector while the non-irrigated lands received inadequate attention from Government.

4.16 The term "gross irrigated area" will include all the cropped area which will get irrigation facilities whether in kharif, rabi or hot weather. The irrigated area under sugarcane or other perennial crops or two seasonal crops will be counted once and area covered by two or three crops in a year counted twice or thrice as the case may be. Stabilisation of an existing irrigated area is also not to be counted as "potential". This gross area proposed to be irrigated on full development will be the ultimate irrigation potential.

4.20 Utilisation

4.21 Similarly, utilisation of irrigation potential means the maximum gross annual irrigation achieved by the project in any one year prior to the year under consideration.

4.30 Reporting Date

4.31 At present the States are expected to report data on potential and utilisation as at the end of March each year. A common variation noticed in reporting potential and utilisation figures is that many States relate them to June every year as it is more relevant to "crop year". While this would naturally be convenient, the Planning Commission consider that the present procedure might continue so long as the financial year remains from April to March.

4.40 Recommendations

4.41 The Committee recommends as follows

- (i) The water course and field channel should be defined as under

A water course is a channel built and maintained at Government expense to convey water to 40 ha. block or as may be prescribed by the State Govt.

A field channel is a channel built and maintained by or at the cost of cultivators beyond a water course to serve the various fields.

- (ii) Irrigation potential created should be the gross area that can be annually irrigated, in accordance with the water allowance accepted in the sanctioned project (unless re-appraised), which could be made available by all the connected and completed works including and up to the end of a water course.
- (iii) For a proper assessment of the potential and utilisation, the reporting period should be July to June.

4.42 The State Governments may also consider the adoption of these definitions and expressions in their Irrigation Codes and Acts also.

Measures to ensure prompt and full Utilisation of created Irrigation Potential

5.0 General

5.10 In almost all tropical, sub-tropical and temperate climate zones of the world the two post-war decades have been a period of widespread new developments and extensions of previous developments in controlling and increasing the use of water for agriculture. There are several reasons for this, the principal one being the food demand of a rapidly increasing world population. After independence, India too embarked on a planned programme of constructing storage and diversion schemes on its rivers and tapping underground water resources for the development of irrigated agriculture to meet the requirements of food and fibre for its growing millions. Although water availability facility has been created in various parts of the country, yet its fuller use is lagging behind in several major and medium irrigation projects.

5.11 Underutilisation of created irrigation potential is caused by the inadequate planning of the project or lack or inadequate provision of one or more of the essential ingredients for irrigated agriculture. Sometimes underutilisation is apparent due to over assessment of potential in the approved project. Excessive use or wastage of water and inefficient distribution system are also responsible for underutilisation. An efficient command area development programme has to anticipate and timely provide for all requisite facilities and inputs. The Committee examined the contributory factors that were responsible for the lag in some of our major projects like Kakrapar, Tung Bhadra, Chambal, Kosi and the Gandak by on the spot inspections and discussions with field officials as well as farmers in the command. To the extent data

was available, a study of the various other Plan projects, with particular reference to the pattern of utilisation under them, was also undertaken.

Problems and Suggestions

On the basis of these studies, the Committee would like to highlight the important points that are responsible for the present lag in utilisation of created irrigation potential and to suggest ways and means of accelerating the pace of utilisation.

5.20 Constructions of field channels not keeping pace with the water availability facility.

5.21 Under most of the present day irrigation projects, the Government undertakes responsibility for the construction of outlets and water courses upto 40 ha. block, or as may be prescribed. Within each block, the beneficiaries are responsible to execute and bear the cost of the field channels to serve their individual fields. The project usually offers technical help in planning and aligning the field channels.

5.22 It is a common experience shared by all States that the requisite response from the farmers for the construction of field channels is not forthcoming and the non-provision of field channels constitutes the most common causes for the lag in utilisation as also wastage of water. The reasons attributed for this are the lack of a spirit of cooperation among the irrigators, lack of funds particularly with small farmers, the lack of expertise to construct culverts and other structures and an expectation that the Government might come to their assistance by a subsidy if they hold out long enough.

5.23 To expedite the construction of field channels and to provide for the procedure in this regard as also for the maintenance of such field channels, most State Governments have made enactments. The amended Northern India Canal and Drainage Act as applicable to Punjab and U.P., the Bombay Irrigation Act and Land Improvement Act as applicable to Maharashtra and Gujarat, the Mysore Irrigation Act, etc. could be cited as examples of such acts which contain many progressive measures. Even though all the States have some law governing the construction and maintenance of field channels, in actual practice these have field to ensure quick construction and proper maintenance of field channels.

5.24 The importance of field channels in ensuring accelerated utilisation cannot be over emphasised. There are many recent instances wherein the State Government offered incentives and even undertook construction of field channels to accelerate the development and which yielded spectacular results e.g. Tungabhadra and Nagarjunasagar projects.

5.25 The Committee therefore recommended as follow :

- (i) As a general principle, the present practice of execution and maintenance of field channels with in the 40 ha. block at the cost of the beneficiaries could continue.
- (ii) In case of failure of the beneficiaries to construct and/or maintain the field channels within a notified period, the States should undertake the work through their own agencies and recover the cost in lump sum or instalments as arrears of land revenue. The agency of the State, if it is a department of the Government, should preferably be the Irrigation Department which has the requisite technical know how for quick implementation.
- (iii) The State Governments may examine their Irrigation Acts and other laws relating to field channels to see if these require amendments/ additions to ensure quick execution of field channels and their proper maintenance.

5.26 The implementation of the recommendations made in para 5.25, is dependent upon the following two points :—

- (a) Making adequate provision in the existing State Irrigation and Drainage Acts to empower the Irrigation Department to undertake, where necessary, construction and maintenance of field channels on behalf of cultivators.
- (b) Provision of adequate funds for initially bearing the cost of construction of field channel.

The Committee examined the prevalent practices in the various States. By and large it was found that the existing Irrigation & Drainage Acts do not provide for and empower the Irrigation Officers to undertake construction of field channels on behalf of cultivators though a few States have the necessary provision. Wherever the provision exists, the procedure is cumbersome and time consuming.

As regards provision of the funds, these are neither provided in the project estimates nor do the State Governments provide for the same in the maintenance grants. In some of the states, action has been initiated to take up field channel works by the departments under T-Loans. In some other states like Gujarat loans are advanced by the Land Development Bank to the State Government ; the responsibility

for recovery thereof from the farmers is that of the Land Development Bank. The Committee therefore, recommends as follows -

- (i) Adequate provisions should be made in the existing State laws to empower Irrigation Department to take up the field channels works on behalf of the cultivators.
- (ii) To meet expenditures on construction of field channels, fund should normally be made available to the Irrigation Department by way of loans from Land Development Banks Agricultural Refinance Corporation/other organised Credit Institutions. In the event of institutional loans being not available, the State Government should consider the feasibility of providing adequate funds from its own or other resources.

5.30 Inadequate drainage facility hampers development of irrigation.

5.31 Impeded drainage and water logged conditions are created in irrigation project commands mainly due to interception of natural drainage lines by the embankments, canals, roads, railways, etc., seepage from irrigation system, delay in disposal of accumulated surface water, non maintenance of natural drainage lines in the Command, over irrigation and misuse of water. It has been well recognised that all irrigation systems must provide adequate drainage. Most of the present day irrigation projects have been taken up fully recognising the importance of drainage. However, in certain cases, the drainage needs have been either under-estimated or given a low priority in the order of execution of the scheme.

5.32 In regions with high water table, conjunctive use of ground and surface waters ensures not only control of rising water table but also adequate water for use during critical periods of crop growth. Of late, this concept is gaining momentum in several States like, Punjab, Haryana and Western U.P. and proving useful in maximising food production.

5.33 To make efficient use of the irrigated land, the farmer should have direct access to a field channel and a field drain. It is often the experience of the States that just as execution of field channels for irrigation is lagging behind similarly the field drains do not get constructed in time, thus leaving a missing link between the fields and the trunk drain system. It is also often noticed that the drainage nals and other natural waterways are not kept in proper condition and free of obstructions.

5.34 Recognising the important and integrated role that drainage plays side by side with irrigation in all irrigation projects, the Committee recommends as under :

- (i) The drainage system of the irrigation command must be planned side by side and as an integral part of the irrigation scheme.
- (ii) In the case of completed and ongoing projects, treatment and improvement or drainage in the command area shall be taken up by the State Govt., under the project estimate suitably revised or through a supplementary estimate.
- (iii) Wherever feasible, the State should encourage conjunctive use of ground and surface waters, in regions susceptible to high water table as this will not only keep the water table under control but also provide additional irrigation water during periods of heavy demand or low surface water supply in canals.
- (iv) Wherever the area conditions warrant field drainage, the same principle under which irrigation canals and distribution systems are generally executed, should be followed. Field drainage systems beyond 40 ha. block should be generally executed at the project expense, and within 40 ha. block at the cost of the beneficiaries. The State Govt. should provide necessary technical guidance to the small land holders where they want to execute the work themselves.
- (v) The State Government may examine their irrigation acts and other laws to see if they have the requisite powers to ensure the quick execution and proper maintenance of field drains and in case of default to have these executed by their own agencies at the cost of the beneficiaries.

5.40 Inadequate preparation of land for irrigated agriculture e.g. land levelling and land shaping being neglected.

5.41 In many projects where irrigation is introduced for the first time, land has got to be made ready in time to receive irrigation. Undulated land will require levelling and this may need not only implements and machinery but also technical assistance. Land shaping and making of 'kharis' will also need to be done in many cases. These activities will have to be undertaken by the cultivators and their inability to have these done in time constitutes an important cause for the lag in utilisation. The National Commission on Agriculture has observed that the expenditure on land shaping, field channels and drains which have to be undertaken by the cultivators varies widely according to the nature of the terrain i.e. from Rs. 500 per ha. where land is

good loam and in level country to as much as Rs. 4000 per ha. in ravinous territory. This constitutes a sizeable part of initial investment to be made by the cultivators who are often not in a position to obtain the requisite credit on reasonable terms.

5.42 The importance of consolidation of land holdings also becomes clear in this context as no proper land preparation can be organised for fragmented small holdings. In fact, the small land holding stand in the way of efficient irrigation planning and cause considerable difficulty in making available the requisite inputs.

The committee would therefore recommend as follows:

- (i) In recognition of the importance of land levelling and land shaping, the State Governments should examine the existing arrangements for the land preparation works effectively executed prior to the creation of potential and to ensure that these are reoriented to achieve quick land preparation by the cultivators.
- (ii) In the case of Government land, levelling and land shaping operations should be done by the Government simultaneously with the project so that the land becomes fit to receive water by the time the project gets completed.
- (iii) In case of private holdings, the State should adopt extension methods to acquaint the landholders with the importance and necessity of land shaping and levelling, and necessary technical guidance and assistance on the field be provided wherever desired by the cultivators. In the event of the cultivators failing to level and shape the land to receive irrigation waters thereby tarring the efficiency of the project, the State should adopt alternative methods of execution of these works at the cultivator's cost, the expenditure in such cases being recoverable from the beneficiaries in reasonable instalments.
- (iv) Long term agricultural credit facilities in the project command area need to be improvised so as to ensure credit at reasonable terms.

5.43 Consolidation of land holding in command area.

The concept of consolidation has originated sometime back. However, not much progress has been made in this sector in most of the States. In the various project areas, the Committee was informed that consolidation has not made much progress. For a proper utilisation of water and fuller utilisation of the cultivators' labour and finances, it is very essential that cultivators' financial and labour resources should not be dissipated by way of attending to scattered holdings. For a proper development of land as recommended in the previous paragraphs 5.30 and 5.40, it is essential that land holder is provided the

advantage of concentrating his labour and resources at minimum possible places, for a fuller utilisation of water. The Committee, therefore, recommends as follows :

- (i) The State Government should introduce compulsory consolidation of holdings in all projects and this must be taken up before the commencement of irrigation. For this purpose, it would be necessary for the Consolidation Department to co-ordinate their Plan of Consolidation with the Irrigation Department's lay-out of water courses.
- (ii) Such consolidation should be irrigation oriented, and keep the following factors in view :-
 - (a) Consolidation of the area of an individual holder, physically.
 - (b) utilisation of water with least wastage;
 - and
 - (c) Saving in the financial resources of labour of the land-holder.

5.50 Anticipated Crop pattern and water allowances under the project not being realised.

5.51 When an irrigation project is drawn up, the most suited crop pattern and water requirements are evolved in detailed consultation between the Irrigation and Agriculture departments. It must be noted that unless the authorities are in a position to ensure that the crop pattern so finalised is generally adhered to, the term created potential will be a misnomer and it may not be possible to satisfy the needs of a different crop pattern with the original water allocation. It has, however, been the experience in many States that the crop pattern developing under the projects widely differ from those originally proposed. Also, the originally proposed duties and irrigation water requirements have been found to be unworkable in many cases.

5.52 There are two probable causes for this : (i) the project planning may not have been based on adequate knowledge of the local conditions of rainfalls, soils, crops, farmers' preferences and the assured availability of water or (ii) where the crop pattern has been evolved on a sound basis, the cultivators may not have been educated on the merits of the proposed cropping pattern and practices in preference to the traditional pattern. In respect of the latter, this will be examined in the next para. In respect of the former, it can bear repetition to State that the crop pattern proposed for all irrigation projects has to be evolved very carefully in consultation between the Irrigation and Agriculture departments.

5.53 The committee recommends as follows :

- (i) For a successful and full utilisation of water and economic uplift of the agriculturists, it is necessary that advance cropping programme should be worked out and intimated to the local cultivators wherein the Irrigation Department should also indicate the water availability and number of waterings that could be reasonably given to the command area well in advance.
- (ii) The under utilisation of created irrigation potential in some of the States is mainly due to lack of adequate demand for water in the Kharif season. The State Governments may, therefore, examine the carry over of water from the previous Rabi or hot Weather season to facilitate supply of water in early June to crops like Rice, Hybrid Jawar etc.
- (iii) The irrigation potential of the projects should be reappraised every 5 years or so in the light of experience gained on their operation.
- (iv) In consultation and co-ordination with the Agriculture and Area Development Authorities, the Irrigation Department should assess the water availability and finalise the cropping programme each year before rabi sowing season. This could be achieved by constituting Water Utilisation Committee comprising representatives of Development, Agriculture and the Irrigation Departments for each project who could meet the land holders of the project area and finalise the cropping programme and the irrigation schedule. The Irrigation Department should adhere to the water regulation programme, approved by the utilisation committee.
- (v) Water allowance and cropping programme should be worked out both for long range planning and year to year planning. The long range planning should merge with the general area and economic development of the project. The yearly plan should be worked out on the same lines as (iv) supra.
- (vi) The crop pattern, water requirements, etc. for major projects will have to be evolved in close consultation between the Irrigation and Agriculture Departments which should take note of all relevant factors. Further, as the farmer's predilections as also the agricultural prices are not likely to be constant for ever, there would be occasions for adjustment in the

cropping pattern periodically. We would recommend that the crop pattern as has developed under irrigation projects may be examined in context of the originally proposed one and the most suitable cropping pattern that can be assured with irrigation facilities at present be evolved. A periodic re-examination of the position, say, once in five years would also be warranted.

- (vii) The State Governments may also examine whether they possess the requisite powers to ensure the adoption by the cultivators in the command the suggested cropping pattern and for the adoption of optimum land and water management practices.

5.60 Lack of adequate agricultural experimental and demonstration farms and training and extension facilities.

5.61 Successful irrigated agriculture require that the farmers are prepared for the change over and are supplied with the right amount of water and other inputs at the right time. Considerable extent of information in regard to the optimum water needs and culturable practices are available and these studies are also undertaken under local condition in the research and demonstration farms established within project commands. But the research findings have not often found their way to the cultivators and the farmer is still enamoured of the traditional practices. The water requirements of crops as scientifically evolved are often a fraction of the demand and supplies made in the fields. This is not only due to seepage and waste in the canal distribution system but also overuse of water by the cultivators due to lack of scientific training on land and water management. As the average cultivator is not highly educated, there is a need to educate him on the scientific practices of irrigated agriculture. A proper research, demonstration, training and extension service is of great importance in this context.

The Committee would therefore recommend that adequate agricultural research demonstration and training farms should be established in the commands of the major projects and that the lessons learnt from the research farms should be propagated to the cultivators by a suitably staffed extension agency.

5.70 Maldistribution of available supplies and problems of tail end cultivators.

5.71 Due to wastage and over use of water in the upper reaches of the distribution system, the tail end cultivators are often left without adequate water. The efficient distribution of water within the command with regard to water availability is an earned

art in itself and it requires cooperation of the farmers as well as the organisation. In States like Punjab, U.P., Rajasthan, Madras etc., judicious distribution of available water among the irrigators is effected through 'Varabandhi' system. According to this the available water for a particular command under an outlet is equitably distributed to the cultivators prescribing a certain period of time as rotation period of supply for each cultivator.

The Committee therefore recommends as follows :

- (i) For equitable distribution of supplies to the cultivators, adoption of 'Varabandhi' system, should be made compulsory.
- (ii) Projectwise reviews of actual water use with a view to bring maximum area under irrigation by preventing wastage and promoting optimum use of water. Modern and appropriate land and water management practices should be kept in view while making such reviews.

5.80 Lack of inputs and infrastructure facilities.

5.81 Agricultural production requires a number of inputs of which irrigation is the most important one. Adequate supply of the other inputs such as, better seeds, fertilisers, insecticides, pesticides, etc. are also to be organised to enthuse the cultivators to go in for modern irrigated agriculture. It was brought to the notice of the Committee that owing to non-availability of fertilisers the farmers were not able to effectively use improved seeds for higher yields. Lack of credit facilities on reasonable terms is a difficulty felt by the Indian cultivator. The cultivator also needs roads to move his produce, markets, storages and other infrastructure facilities. In many cases the initiative of the cultivators is lost as these are unable to receive fair price for their produces. Often the lack of one or more of these has discouraged the cultivator from taking to irrigated agriculture and this led to non utilisation of available potential.

The Committee would therefore recommend as follows :

- (i) The credit needs of the farmers on long term, medium term and short term basis have to be organised through agricultural refinance cooperative and credit institutions on reasonable terms.
- (ii) Government should ensure through coordinated action of the various departments that the requisite infrastructure facilities such as, adequate roads, storage facilities, markets, agro-industries, etc. are developed;

also requisite inputs such as seeds, fertilisers pesticides etc. are made available in the command to ensure its optimum development.

- (iii) Government should ensure that the cultivators receive a fair price for their produce.

5.90 Operation and maintenance of irrigation and drainage systems is often a neglected field.

5.91 Many irrigation distribution systems as well as drainage systems have not efficient operators. In most of the cases adequate funds are not made available from the maintenance grants to carry out the repair jobs particularly soon after the first operation of the canal system, when substantial works e.g. strengthening and raising of the earth banks and repairs after first testing are necessary. The maintenance grants given for maintenance and operation of the projects are too inadequate, the major part of the grants being consumed by the work-charged establishment which has to be maintained almost on permanent basis for the operation of the canal system. The Committee is informed that at present hardly Rs. 15 to 20 per hectare are being allotted for maintenance and operation of the irrigation systems by the various State Governments, which is entirely inadequate. Consequently, the system cannot be operated even with reasonable efficiency and the irrigation programmes suffer.

The Committee therefore, recommends that :

- (i) All the work-charged staff which requires to be continued for a long period must be appointed on regular establishment, and financed from the normal establishment budget of the State for Irrigation.
- (ii) To meet the rising costs of labour and materials and maintain the channels to a satisfactory standard, atleast Rs. 30 per hectare should be allotted for operation and maintenance of irrigation systems. Where drainage system forms considerable part of the irrigation system, this maintenance grants would have to be increased suitably.
- (iii) Engineering and other personnel for maintenance and operation of irrigation and drainage systems should be specially selected and given appropriate training of technical knowhow for efficient maintenance and operation.

experience in dealing with the problems of land and water management. This organisation should be responsible for the irrigation development from the canal system onwards leaving the running and maintenance of the project headworks or storage facilities to the Irrigation Department. In order to be able to fully discharge its responsibility in respect of field irrigation channels and field drainage channels, the authority will have to be clothed with Legal and administrative powers relating to land and water regulation, land acquisition and revenue matters. The head of Government say, as Secretary to the Government responsible for the project development. Ancillary requirements, like construction of roads, markets, warehouses, processing industries, etc. could continue to be the responsibility of the respective departments concerned while the area development authority should coordinate their functions in respect of the project command.

5.115 At the State level, we recommend that there should be a high power board in the form of a Cabinet Sub-Committee wherein all departments concerned would be represented and this Board would hold periodic reviews of the difficulties, progress and achievement of the various project area development authorities.

As for the projects with less than 1 lakh ha. command, the States could consider the grouping together of adjoining schemes in a region such as a Revenue Division or District and create a similar set up for comprehensive area development.

5.120 The Committee has made a number of recommendations for utilisation of potential and area development to derive optimum benefits from available water which will need additional funds. Under utilisation of the potential has also been in many cases due to inadequate funds to undertake various measures. Arrangement of adequate funds is thus an important point needing careful consideration.

The National Commission for Agriculture in its interim report on modernisation of irrigation systems and integrated development of command areas, has made important recommendations in this regard under paras 21, 22 and 23 of the summary of recommendations. The Committee fully endorses these recommendations, and further recommends that the State and Central Governments should keep continuous watch on the progress and ensure that various programmes suggested by this Committee do not suffer at any stage for want of funds.

Under para 2.8, the committee has identified certain projects, where lag of irrigation with respect to the created potential has been substantial. In order to derive full benefits from the huge investments already made on these projects, all such projects including the 8 projects listed in Table 2.5 should be completed in the shortest possible time latest by the end of Fifth Plan. The Committee, therefore, recommends that the State Governments and the Planning Commission should allot sufficient funds for completing all the works, necessary for utilising the fullest potential of these projects.

(Vasant Rao Patil)

Minister for Irrigation and Power

(Hydro-Electric)

Maharashtra.

(Amolak Chand Chhajed)

Minister of Irrigation and Electricity,
Madhya Pradesh.

(Lalman Chaudhary)

Minister for Irrigation,
Bihar.

(Ramchandra Chaudhary)

Minister for Irrigation and Revenue,
Rajasthan.

(H. N. Nanje Gowda)

Minister of State for Major Irrigation,
Mysore.

(Jashvant Mehta)

Minister for Public Works,
Gujarat.

(Harjinder Singh Chatha)

Minister of State, Irrigation & Power,
Haryana.

- (iv) Efficient communication systems such as telephones, service roads, inspection paths and also quarters for operating crew should be provided.

5.100 Development Period

5.101 The period of development adopted for irrigation projects varies widely. Most major projects have assumed a development period of three to five years even though there are many instances of even ten to fourteen years. It has been brought to the notice of the Committee that it is possible to ensure full development within three years under major projects if ayacut development is planned and executed on proper basis.

5.102 Since the start of the First Five Year Plan in 1951 an investment of Rs. 2400 crores has been made (upto 1972) in major and medium irrigation projects to create an irrigation potential of 9.6 m. ha. (an investment of the order of Rs. 2500 per ha.). It goes without saying that the Nation cannot afford to make anything less than the quickest possible use of such huge investments. A lag of the order of 1.6 m. ha. would be equivalent to a locked up capital of the order of Rs. 400 crores. Any avoidable lag in utilisation of created potential should therefore, be prevented.

The Committee would, therefore, recommend that :

The State Governments should aim at full utilisation of irrigation potential within three to five years after its creation and plan for all ayacut development activities on this basis.

5.110 Command area development authority

5.111 The essential ingredients of comprehensive Ayacut Development comprise many factors all of which are designed to ensure at the right time and place the requisite inputs, services, training and infrastructure facilities for scientific irrigated agriculture. This is a multi-discipline task necessitating close coordination and constant attention. Some of the easily distinguishable development activities in this context are (i) provision of irrigation and drainage facilities extending right upto the field (ii) land levelling, shaping and preparation prior to creation of potential (iii) integrated use of ground and surface waters (iv) provision of inputs like improved seeds, fertilisers, insecticides and pesticides (v) infrastructure facilities like farm implements, marketing, processing, communication and storage (vi) education, demonstration training and extensive facilities for the cultivators and (vii) credit facilities.

5.112 At present, these are being attended to by various departments of the State Governments and quasi-Govt. and private agencies even though it is clearly discernable that the leading role has to be played by the departments of Irrigation, Agriculture and Revenue. Ordinarily, the officers of the various departments are entrusted with the tasks relating to command area development as an additional duty to their general functions and the "coordinating authority", if any keeps the liaison between the various departments. In such major projects where a special coordinating officer for development has been named, here again we come across a multiplicity of staffing and coordination patterns. In certain cases, a senior officer is nominated for the job but he is given hardly any supporting staff directly under him thus making him helpless in cases of failure by concerned departments to properly link up their activities with those of others. The existing patterns of institutional arrangements for efficient development of command areas have not yielded the desired results. Thus, the question of a suitable set up for administering and coordinating command area development has received increasing attention in recent years. Many august bodies like the Irrigation Commission (1972) and the National Commission on Agriculture have recently devoted considerable attention to this subject. The views expressed by them have also varied.

5.113 We have given careful consideration to the various activities forming part of successful ayacut development as also the existing pattern of catering to this task in the various projects that we came across and come to the conclusion that a definite need exists for an independent command area development authority with specific responsibility for the task and with adequate staff.

5.114 The Committee recommends as follows :

- (i) Every major project with a command extending over one lakh ha. must be put under the charge of a broad based Area Development Authority which shall be responsible for all the activities in the field in respect of comprehensive area development. We like to sound a note of caution here that we do not suggest that the authority be made responsible for "comprehensive economic development" of the region which would only clutter up its basic tasks; it should only aim at the limited objective of making the optimum utilisation of the irrigation resources created. As the Irrigation and Agriculture departments of the States have a major role to play in the various tasks relating to command development, we would recommend that the organisation should be headed by a Chief Engineer or Director of Agriculture with proven merit and considerable

ANNEXURE I.1.2

Senior Officers who attended the meeting of the Committee

Government of India

1. Shri B. P. Patel,
Secretary, Ministry of Irrigation and Power, New Delhi.
2. Shri S. N. Gupta,
Joint Secretary (G. B.) Ministry of Irrigation and Power, New Delhi.
3. Shri R. Rangachari,
Joint Commissioner (I), Ministry of Irrigation and Power, New Delhi.
4. Shri J. P. Naegamwala,
Member, Central Water and Power Commission, New Delhi.
5. Shri O. P. Chadha,
Chief (Irrigation), Planning Commission, New Delhi.
6. Shri K. S. S. Murthy,
Officer on Special Duty, Ministry of Irrigation and Power, New Delhi.
7. Dr. S. D. L. Luthra,
Deputy Director (GB), Ministry of Irrigation and Power, New Delhi.

Maharashtra

1. Shri B. A. Kulkarni,
Secretary, Irrigation and Power, Maharashtra.
2. Shri Madhav Rajwade,
Secretary, Irrigation and Power, Maharashtra.
3. Shri S. S. Apte,
Chief Engineer (Irrigation), Maharashtra.
4. Shri Y. D. Kharade,
Under Secretary, Irrigation and Power, Maharashtra.
5. Shri V. N. Panditrao,
Statistician, Irrigation and Power, Maharashtra.

Gujarat

1. Shri M. G. Shah,
Secretary, P.W.D., Gujarat.
2. Shri C. C. Patel,
Chief Engineer (Irrigation Projects) and Additional Special Secretary,
Gujarat.
3. Shri P. A. Raj,
Chief Engineer (Irrigation) and Joint Secretary, Gujarat.

Madhya Pradesh

1. Shri K. C. S. Acharya,
Secretary, P.W.D., Madhya Pradesh.
2. Shri D. S. Sinha,
Engineer-in-Chief, Madhya Pradesh.
3. Shri Dikey,
Chief Engineer, Madhya Pradesh.
4. Shri Arun Bhatnagar,
Deputy Secretary, Irrigation and Electricity, Madhya Pradesh.
5. Shri S. P. Caprihan,
Chief Engineer, Madhya Pradesh.
6. Shri P. K. Roy,
Superintending Engineer, Madhya Pradesh.
7. Shri D. S. Sikka,
Chief Engineer (Irrigation), Madhya Pradesh.

Bihar

1. Shri U. K. Varma,
Chief Engineer (Gandak), Bihar.
2. Shri R. Ghosh,
Chief Engineer, (Kosi), Bihar.
3. Shri M. Taneja,
Special Secretary (RVPD), Bihar.

(To be published in the Gazette of India, Part I Section 1)

No. DW.II-31(17)/72-

Government of India
Ministry of Irrigation and Power

New Delhi, the 4th August, 1972.

RESOLUTION

The sixth conference of the State Ministers of Irrigation and Power held recently in Srinagar while noting with satisfaction that as a result of the various steps in the last decade, the National average of utilisation of the potential from major and medium irrigation schemes was as high as 88%, observed that there were areas and regions where utilisation was much below the national average and offered scope for accelerating the utilisation of potential. The Conference, therefore, recommended that a Committee of Ministers be set up to look into the reasons for under utilisation of irrigation potential and suggest remedial measures. Accordingly, the Government of India have decided to set up a Committee of Ministers consisting of :

- | | |
|---|----------|
| 1. Sbri Vasantao Patil,
Minister of Irrigation and Power, Maharashtra. | Chairman |
| 2. Minister for Public works, Gujarat. | Member |
| 3. Minister for Irrigation and Electricity,
Madhya Pradesh. | Member |
| 4. Minister for Irrigation, Bihar. | Member |
| 5. Minister for Irrigation & Revenue, Rajasthan. | Member |
| 6. Minister for Major Irrigation, Mysore. | Member |
| 7. Minister for Health, Irrigation & Power and transport,
Haryana. | Member |

2. The Joint Secretary (Ganga Basin), Ministry of Irrigation and Power. Government of India, will be the convenor of the Committee.

3. The terms of reference of the Committee are indicated below :-

- (i) To collect details and analyse the existing pattern of utilisation of irrigation potential in India, regionwise and projectwise.
- (ii) To critically analyse the reasons for the lag in utilisation and under utilisation of irrigation potential in general and to identify critical regions or medium and major projects where steps are immediately called for.
- (iii) To suggest remedial measures to be undertaken at different stages of Planning, execution and operation of schemes that are designed to ensure proper and prompt utilisation of the irrigation potential created, in respect of administrative technical, economic, legislative and other aspects of the problem.
- (vi) To make all other general recommendations to achieve quick utilisation of irrigation potential.

4. The Committee will submit its report within a period of six months.

Sd/-

(B. P. Patel)

Secretary to the Government of India.

New Delhi, the 4th August, 1972.

No. DW. II-31 (17)/72

ORDER

Ordered that the Resolution be published in the Gazette of India, Part, I, Section I.

Ordered also that a copy of the Resolution be communicated to all Ministries/ Departments of the Government of India including Prime Minister's Secretariat, President Secretariat and the Planning Commission, all State Governments/ Administrations of Union Territories and the Chairman/Members of the Committee.

Sd/-

(B. P. Patel)

Secretary to the Government of India

To

The Manager,

Government of India Press, Faridabad.

Rajasthan

1. Shri J. S. Mehta,
Commissioner & Secretary, Irrigation and Power, P.W.D., Rajasthan.
2. Shri Sher Singh,
Commissioner & Secretary, Irrigation and Power, Rajasthan.
3. Shri Ram Singh,
Chief Engineer and Additional Secretary, Rajasthan.
4. Shri R. C. Sood,
Commissioner, Chambal Development, Rajasthan.
5. Shri Mahesh Narain Bharadwaj,
Superintending Engineer, Rajasthan.

Mysore

1. Shri R. A. Naik,
Administrator, Tungabhadra Project, Mysore.
2. Shri P. R. Dubhashi,
Commissioner and Secretary, P. W. D, and Electricity, Mysore.
3. Shri S. Venkatesh,
Secretary, D. H. P. G., Mysore.
4. Shri A. R. Ratar,
Secretary, Agriculture and Forest, Mysore.
5. Shri I. M. Magdum,
Engineer-in-Chief and Additional Secretary, Mysore.
6. Shri S. P. Bhat,
Chief Engineer, P. W. D., Mysore.
7. Shri R. Maharudriah,
Registrar of Co-operative Societies, Mysore.
8. Shri Sulkunte,
Saperintending Engineer, Mysore.
9. Shri Sriramappa,
Superintending Engineer, Mysore.
10. Shri S. K. Mohan,
Under Secretary, P. W. D., Mysore.

Haryana

1. Shri P. P. Caprihan,
Secretary, Irrigation Department, Haryana.
2. Shri K. S. Pathak,
Chief Engineer, Irrigation, Haryana.
3. Shri B. K. Uppal,
Additional Chief Engineer, Haryana.

Andhra Pradesh

1. Shri B. C., Gangapadhyay,
Secretary, Irrigation Department, Andhra Pradesh.
2. Shri S. Gopalan,
Chief Engineer, Major Irrigation and General, Andhra Pradesh.
3. Shri J. A. Murray,
Chief Engineer, Major Irrigation and General, Andhra Pradesh.
4. Shri C. Subbarama Sastri,
Deputy Chief Engineer, Andhra Pradesh.

Uttar Pradesh

Shri B. P. Sharma,
Chief Engineer, Uttar Pradesh.

PROFORMA I.

Proforma for information on lag in the utilisation of created Irrigation potential : Major projects

1. The Projects :

Name of Project, its location, brief description including details of areas commanded and to be irrigated : Mention G.C.A., C.C.A., irrigable area, crop pattern, cropwise duties, deltas and crop periods as proposed at the time of approval of the project. Also rainfall in project command 10 daily or monthly. Attach Index maps showing the command.

2. Present stage of execution :

Indicate-physical and financial detail for full execution and up-to date progress. Indicate dates of actual and target completion of headworks, main canals and distribution works separately.

Irrigation potential of the Project :

- (a) Describe ultimate irrigation potential (including net irrigated area and gross irrigated areas seasonwise and cropwise).
- (b) Indicate potential created yearwise (March of each year) from the start of partial or full operation of the system.

4. Utilisation :

Indicate yearwise irrigation utilisation (March of each year) corresponding to the potential indicated earlier (under item 3).

5. Assumptions regarding development of potential :

- (a) What were the assumption regarding irrigation development in the project report ?
- (b) In how many years was full development anticipated ?
- (c) What incentives for utilisation were contemplated in the Project ?

6. *Facilities made available for utilisation*

What facilities were available in the command area to encourage quick utilisation. Briefly discuss under the following headings :

- (a) Organisation and execution of field channels.
- (b) Land levelling.
- (c) Roads and Railway network.
- (d) Agricultural credit.
- (e) Agriculture Research, demonstration, training.
- (f) Free or concessional water supply.
- (g) Centralised coordinating Authority for command Area Development and related activities.
- (h) Existing Legislation regarding water supply to cultivators and for compulsory execution of field channels.
- (i) What crop pattern, cropwise duties, deltas and crop periods have developed or are developing in the command area.
- (j) Any others.

7. *Reasons for lag in utilisation :*

In case there has been lag in utilisation of created potential variation from original plans, the reasons therefor may be analysed under the following sub-heads :

- (a) Planning of Project defective.
- (b) Operational shortcoming of the project.
- (c) Figure of irrigation potential needs revision.
- (d) Non-coordination in completion of different components of the Project.
- (e) Organisation for Command Area development being non-existent or formed late or difficulties in its functioning.
- (f) Inadequate field channels.
- (g) Ill distribution of irrigation supplies.
- (h) Delay in evolving crop pattern suitable for the Command or in the adoption thereof.
- (i) Works on land shaping, land levelling etc. have lagged behind.

PART II

A REVIEW OF THE CREATED IRRIGATION POTENTIAL AND ITS UTILISATION UNDER MAJOR AND MEDIUM PLAN PROJECTS IN THE STATES

- (j) Inadequate or lack of extension and demonstration services.
- (k) Temporary reduction in storage, river flow or canal capacity or demand for water.
- (l) Confronted with problems not originally anticipated e.g. rise of sub-soil water table.
- (m) Financial difficulties.
- (n) Number of tube wells installed or planned to be installed in the command area and what area is irrigated by them.
- (o) Any other item (State the reasons).

8. *Steps already taken and those proposed to be taken up to overcome the impediments.*

Here in also briefly describe the relevant findings of Expert Committees or Studies made in the Project Command or nearby projects where there is lag in utilisation.

9. *Any other specific suggestions which would be helpful in ensuring full utilisation under this project.*

ANNEXURE I.1.4

PROFORMA II

**Proforma for information on lag in the utilisation of created potential :
Medium Projects.**

1. **Name of Project**, its location, brief description including details of areas commanded and to be irrigated ; Mention G.C.A., C.C.A., irrigable area, crop pattern, rainfall in the command ; attach index map showing the Command.
2. **Stage of Execution** : Indicate present stage of project and target date for completion.
3. **Irrigation Potential** : Describe ultimate irrigation potential, potential created yearwise (each March) since start of operation of system.
4. **Utilisation** : Indicate yearwise irrigation utilisation (each March) corresponding to 3 above.
5. **Reasons for lag in utilisation** : Briefly discuss reasons for lag in the utilisation of created irrigation potential.
6. **Remedial Steps** : Briefly discuss remedial steps already taken or proposed to be taken to ensure quick utilisation in this project.
7. **Any other suggestions** for ensuring quick utilisation in this or similar projects.

Major and Medium Irrigation project under the plans

1.1 Planned development of Irrigation commenced in Independent India since April, 1951. By March, 1972, the various States undertook 565 major and medium irrigation projects¹. Many of these projects have created full or partial irrigation potential. The picture of irrigation potential and utilisation under major and medium plan projects (April '51 to March '72) is briefly examined, Statewise, in the succeeding chapters. The position can be briefly summed up here.

1.2 For administrative purposes, India is divided into twentyone States and eight Union Territories. Five States viz Himachal Pradesh, Manipur, Meghalaya, Nagaland and Tripura did not undertake any major or medium irrigation projects in the plan period. Most of the Union Territories also did not undertake any such schemes and major or medium irrigation projects in the Union Territories of Delhi and Pondicherry are connected with projects in adjoining States. The remaining sixteen States undertook 565 major and medium schemes which, on full completion, have an ultimate irrigation potential of 19.2 m.ha.

1.3 Of the 565 plan schemes (107 major and 458 medium) taken up, 123 schemes (36 major and 87 medium) with an ultimate potential of 4.6 m ha. are in such early stages of execution that they have created no irrigation potential under them till March '72. Statewise details of these schemes are at Annexure II. 1.1 and II. 1.2.

1. Excluding those which do not have any direct irrigation potential.

According to the terms of reference of the Committee, these schemes do not come under their purview of study.

1.4 The remaining 442 schemes (71 major and 371 medium) which together have an ultimate potential of 14.6 m.ba. have created by March '72 an irrigation potential of 9.6 m.ba. The corresponding utilisation stood at 8.0 m.ba. The lag thus amounts to 1.6 m.ba. Statewise details of potential created utilisation and lag are summarised in Table II, 1.1.

1.5 The picture of potential created, utilisation and reasons for lag under the 71 major and 371 medium schemes, each of which has created some potential, was examined in a comprehensive manner with the help of the material furnished by the States and data available in the Ministry of Irrigation and Power. The results of this analysis are incorporated in the succeeding chapters.

TABLE II. 1.1
Irrigation Potential from Plan Projects ('51-'72)
SUMMARY

(all areas in thousand ha.)

Sl. No.	State	No. of schemes	Projects with some created potential				Lag	Projects without any potential created	
			Ultimate potential	Created potential by Mar. 72	Utilisation by Mar. 72	Percentage		No. of projects	Ultimate potential
1.	2	3	4	5	6	7	8	9	10
1.	Andhra Pradesh	47	1606.95	855.23	739.49	85.7	115.74	10	137.95
2.	Assam	3	45.23	44.07	38.67	87.7	5.40	3	49.82
3.	Bihar	46	2661.65	1143.92	763.61	65.8	380.31	11	460.99
4.	Gujarat	51	677.02	567.31	341.95	60.3	225.36	9	314.14
5.	Haryana	9	1114.70	964.81	922.27	95.6	42.54	2	258.00
6.	Jamu & Kashmir	5	23.66	23.66	20.49	86.6	3.17	4	17.75
7.	Kerala	13	235.55	201.59	201.59	100.0	Nil	6	271.31
8.	Madhya Pradesh	33	484.01	420.58	288.37	68.6	132.21	22	521.56
9.	Maharashtra	73	776.43	424.62	202.20	47.7	222.42	11	539.39
10.	Mysore	23	620.36	526.70	447.81	85.0	78.89	9	687.93
11.	Orissa	10	1071.02	722.95	706.34	97.7	16.61	5	31.50
12.	Punjab	8	668.38	668.38	668.38	100.0	Nil	2	483.00
13.	Rajasthan	49	1256.20	806.90	712.20	88.3	94.70	8	89.80
14.	Tamil Nadu	17	273.44	232.96	196.24	84.2	36.72	12	13.97
15.	Uttar Pradesh	49	2024.37	1186.27	1045.60	86.1	140.67	7	714.15
16.	West Bengal	6	1029.12	816.00	717.09	87.9	98.91	2	15.16
Total		442	14568.09	9605.95	8012.30	83.3	1593.65	123	4606.42

Andhra Pradesh

General

2.1 Andhra Pradesh, covering about one fourth of the Deccan Plateau has a geographical area of 2,767,60 sq. kms. The State has a population of 43.4 million (as per 1971 census) and the density of population is 157 persons per sq. Km. Andhra Pradesh is predominantly an agricultural State with 90% of the population depending on agriculture.

Climate and rainfall

2.2 The region is generally hot with the maximum and minimum temperatures of 40°C and 16°C respectively during a year, the extreme summer temperature reaching up to 50°C in places. There are two monsoons in the area, the south-west monsoon during June to September, and the north-east monsoon between October and December. The northern area falls within the area of south-west monsoon with rainfall varying from 90 to 115 cm. i.e., sub humid zone. Coastal half of the southern area is in the semi arid zone with rainfall of 50 to 75 cm. during north-east monsoon. In the remaining region, the rainfall varies from 75 to 90 cm.

Land and soils

2.3.1 Physiography divides the State into three parts, (i) mountainous region (ii) plateau and (iii) delta plains. The soils of the State are generally loamy, gravelly or sandy derived from disintegration of rocks. These are alternated by alluvial deposits of the great rivers. The deposits vary in character according to the nature

of the soils in the drainage basins of the rivers concerned and in parts by wide stretches of what is commonly called "Black Cotton Soil".

2.3.2 According to the land utilisation statistics of 1969-70 (the latest year for which details are available), the utilisation of land is as given in Table 2.1

TABLE 2.1
Land utilisation statistics—Andhra Pradesh

<i>Category</i>	<i>Area m.ha.</i>
1. Geographical area	27.68
2. Area under forests	6.51
3. Area not available for cultivation	4.14
4. Net area cropped	11.51
5. Total cropped area	13.15
6. Net irrigated area	3.19
7. Gross irrigated area	4.15

Water resources

2.4 Water resources of the State are considerable. Besides the two major river basins viz. the Krishna and the Godavari, there are many smaller river basins, the important among which being Vamsadhara, Nagavali, Gundlakamma and Pennar river basins. The total surface water resources contributed by the State was assessed as 185 milliard cu.m. (150 MAF). About 62 milliard cu.m. (50 MAF) of this are reported to be utilised in the head reaches by the upper riparian States viz. Maharashtra and Mysore and about 32 milliard cu.m. (26 MAF) by Andhra Pradesh. About 91 milliard cu.m. (74 MAF) of surface water would thus remain to be tapped yet. The ground water potential of the State has not been assessed so far on a systematic basis.

Ultimate irrigation potential

2.5 The ultimate irrigation potential of Andhra Pradesh from different sources has been tentatively indicated by Central Water and Power Commission as 10.32 m.ha., the break up of which is as under :

1. Major and medium surface water schemes	6.48 m.ha.
2. Minor surface water & ground water schemes	3.84 m.ha.

Total: 10.32 m.ha.

However, the ultimate irrigation potential from all sources, as indicated by the State Government to the Irrigation Commission (1972) was 8 66 m.ha.

Pre-Plan achievements

2.6 Irrigation development in Andhra Pradesh has taken place over the past many centuries. The pre-Plan irrigation potential under major and medium schemes in Andhra Pradesh is 1.68 million hectares which has been fully utilised.

Plan projects

2.7 During the era of planned development since 1951 and up to March '72, 8 major and 49 medium irrigation schemes with a total ultimate irrigation potential of 1.74 m.ha. had been undertaken in this State. Of these, 1 major and 9 medium schemes with an ultimate potential of 0.133 m.ha. were either in the early years of execution or at such a stage of development that no irrigation potential in these schemes has so far been created. The remaining 7 major and 40 medium projects, which will have an ultimate potential of 1.6 m.ha. had created a potential of 0.855 m. ha. of which 0.739 m.ha. had been utilised i.e. 85.7% of created potential. Schemewise details of these projects are at annexures II.2.1 and II.2.2 and a summary is given in table 2.2

TABLE 2.2

Plan Projects in Andhra Pradesh

(Area in th.ha.)

Category	No. of schemes	Potential		
		Ultimate	Created	Utilised
I. Major				
(a) Completed	3	228.00	228.00	192.87
(b) Continuing with some potential	4	1178.00	440.75	395.60
(c) Continuing with no potential	1	59.89	—	—
II. Medium				
(a) Completed	38	187.09	184.85	150.61
(b) Continuing with some potential	2	13.86	1.63	0.41
(c) Continuing with no potential	9	78.05	—	—
Total :	57	1744.90	855.23	739.49

Major Projects

2.8 There are seven major Plan projects which had created full or partial potential. Special feature of utilisation under major projects noticed in Andhra Pradesh is that the utilisation under continuing schemes was better than that under completed schemes. This is largely attributable to the satisfactory pace of utilisation under Nagarjunasagar scheme as against the slow development under Tungabhadra project.

The position under the various major projects is as under

Kurnool-Cuddapah Canal

2.8.1 The Kurnool Cuddapah canal is one of the oldest major irrigation schemes of the State which serves the irrigation needs of chronically drought affected regions of Kurnool and Cuddapah. The canal takes off from Sunkesala anicut across the Tungabhadra river and runs for 304 km. The total cultivable command under the system is 1.6 lakh ha. but the localised irrigable area is about 1.13 lakh ha. only. The ultimate irrigation potential is 1.223 lakh ha. The remodelling of the old irrigation system was completed in 1962 and the ultimate irrigation potential created but the utilisation stood at 1.188 lakh ha. i.e. 91.3%. The field channels here have been executed by the Government up to 10 ha. limit. The reasons for non-development of the full potential have been indicated as inadequate field channels, work on land shaping and land levelling not having been completed, lack of full extent of ayacut roads and financial difficulties. The State Government have prepared a master plan for ayacut roads and have under consideration a better water management system by providing shutters with sluices to ensure strict water regulation.

Tungabhadra Low Level Canal

2.8.2 This canal takes off from the right flank of Tungabhadra Dam across river Tungabhadra in Bellary district of Mysore State. After traversing about 156 km. in Mysore State and serving the land enroute, it enters Andhra Pradesh, at which point the canal is to be provided with a discharge of 20.8 cumec (734 cusec). It runs in Andhra Pradesh for a further distance of 168 km. In Andhra Pradesh, this canal serves a culturable command of 304 th. ha. but the ultimate irrigation potential is 60.29 th. ha. only. Of the 60.29 th. ha. about 15.3 th. ha. are wet (paddy) and the balance irrigated dry. The scheme was completed by 1957 and the full potential created. However, only 39.78 th. ha. or 66% of the created potential had been utilised by March '72. It has been reported that the under-development of ayacut is mostly in the black cotton soil area for irrigated dry crops in rabi season. Apprehension by cultivators of salinity problems in black soils under light irrigation is the reason attributed for

under utilisation in this area. It has also been reported that there was insufficiency of water due to both non-receipt of designed discharge at the border and unworkable duty for irrigated dry crops.

The other reasons attributed for the under utilisation of the created potential are as under :

- (a) Inadequate field channels,
- (b) Inadequate land levelling and shaping,
- (c) Reluctance to use night irrigation,
- (d) Seepage,
- (e) Financial difficulties and
- (f) Lack of ayacut roads and other infrastructure facilities.

Tungabhadra High Level Canal Stage I

2.83 Tungabhadra High Level Canal takes off from the high level sluices on the right flank of Tungabhadra Dam in Mysore State. After serving the ayacut all along its length of 110 km. in Mysore State, it enters Andhra Pradesh. The High level canal is being executed in two stages. Stage I was started in 1958 and completed in 1968. The full irrigation potential under Stage I of 45.40 th.ha. had already been created by 1968 75.5% of which i.e. 34.29 th.ha had been utilised by March '72. The High Level Canal Stage I envisages all the irrigation in kharif season only, of which 20.29 th. ha would be paddy the rest irrigated dry crops.

The reasons attributed for the under-utilisation of created potential are :

- (a) Inadequate field channels,
- (b) Inadequate land levelling,
- (c) Seepage, water-logging and salinity,
- (d) Financial difficulties in certain areas,
- (e) Inadequate supply of water,
- (f) Unauthorised wet irrigation,
- (g) Reluctance on the part of cultivators to adopt irrigated dry crops in black cotton soils, and
- (h) Reluctance to undertake night irrigation.

Tungabhadra High Level Canal Stage II

2.8.4 The Stage II of the Tungabhadra High Level Canal in Andhra Pradesh would extend irrigation to further areas in the drought affected parts of Anantapur, Kurnool and Cuddapah districts. The soils in the area are mostly black cotton soils with a few patches of red loam and gravel. Irrigation envisaged under Stage II is 55.66 th.ha. in kharif of which one-third will be paddy and the balance "irrigated dry" crops,

The scheme started in 1966, is in progress and is expected to be completed by 1976. The irrigation potential created so far (as of March'72) was only 5.47 th.ha. and utilisation was yet to commence. The problems contributing to the slow pace of utilisation of the created potential under this project are more or less of the same nature as those encountered under Stage I of the project. Further, only about 10% of the potential has been just created.

Pochampad Project

2.8.5. The Pochampad project which is still under construction envisages a masonry-cum-earth dam across the river Godavari in Adilabad district of Andhra Pradesh. The scheme will ultimately provide irrigation benefits to an area of 267 th.ha. The project is expected to be completed by the end of the Fifth Five Year Plan. However, from 1970 onwards the creation of potential had been possible in a progressive manner. The water was utilised for the first time in July, 1970 on trial basis. By March, 72, a potential of 10 th.ha. had been created and the corresponding utilisation for the first full year of irrigation was 2.91. th.ha.

As the project was still in the initial stage of development it will be too early to make an assessment of its performance. It may, however, be mentioned that a portion of the project is covered by World Bank loan and the Review Missions have been locating and advising on the shortcomings noticed in the development of ayacut from time to time which mostly relate to land levelling and land shaping.

Nagarjunasagar Project

2.8.6 Nagarjunasagar Project comprising a masonry-cum-earth dam across Krishna river in Nalgunda district, about 145 km. from Hyderabad with a maximum height of dam 127 m. is being executed in two phases. In the first phase, the canal system will comprise a 203 km. long right bank main canal named Jawahar Canal and 179 km. long left bank main canal named Lal Bahadur Canal. The ultimate irrigation potential of the canals will be 0.831 m. ha. The potential created under the project by March' 72 was 0. 413 m. ha., the corresponding utilisation being 0. 38 m. ha.

Special efforts had been made in the command to accelerate the pace of utilisation. The activities of various government departments dealing with supply of water, seeds, fertilisers, credit, agricultural machinery, scientific advice on the utility of soils, effects on Irrigation and water requirements etc. had been geared up to their respective tasks right from the time of the inception of the project in order to achieve quick development. Legislation was also enacted to construct field channels below 40 ha. by the agencies of the Government, the cost being recoverable later from the beneficiaries. Special itinerant teams of local officers comprising of the representatives of the departments of Irrigation, Agriculture, Cooperative and Revenue were organised to solve the problem at the field level to ensure timely supply of inputs. The experience of this project indicated that 80% of the created potential can be developed in the very first season.

Among the important points which need further attention are : the need for accelerated programme of ayacut road development, timely supply of water, facilities for levelling up of land, marketing centres, storage facilities, supply of adequate agricultural inputs like fertilisers, completion of a drainage scheme for the ayacut and re-assessment of the crop pattern and localisation in the light of the knowledge gained in the first few years of irrigation as also the agricultural experiments conducted in the region.

Kaddam Project

2.8.7 The Kaddam project involves the construction of composite dam across Kaddam river, a tributary of the Godavari, in Adilabad district. An ultimate irrigation potential of 24. 0 th. ha. was originally envisaged under the coordinated development of Godavari and Kaddam. However, as the project, at present, is based only on the run of the Kaddam river, it had not been possible to create a potential of more than 12.28 th. ha. which was being fully utilised. The manner of increasing the potential further is under the consideration of the Government of Andhra Pradesh and for this reason the scheme, work on which has commenced in 1949, is being treated as a continuing scheme.

Medium Irrigation Projects

2.9.1 In all 49 medium irrigation projects were taken up in the Plan period from April '51 to March '72, of which 9 had not created any potential by March '72. The remaining schemes had created a potential of 186.48 th. ha, of which 151.02 th. ha. or 81% of created potential had been utilised. Of the 40 medium schemes, excepting two viz Kanupur canal and Vottigedda all others had already been completed also. Projectwise details o' these schemes with reasons for lag in utilisation are given at annexure II.2.2.

2.9.2 A review of the medium schemes shows that the main reason attributed for the lag in utilisation is inadequate inflow into the reservoir due to drought conditions. Other common reasons given are :

- (a) Lack of field channels,
- (b) Non-reclamation of land,
- (c) Silting up of channels, and
- (d) Non-assignment of waste lands.

2.9.3 In most of the existing medium projects, the under utilisation is observed to be due to inadequate inflow into the reservoir. As many of these schemes are seen to have been in existence for over 5 years, apparently the projects were planned on inadequate hydrological details of inflow leading to over assessment of irrigation potential at the time of formulation of the projects. Hence, it would be necessary to have a realistic re-assessment of their irrigation potential giving due consideration to hydrological details that have since become available. In some schemes, it is seen that field channels are not adequately developed. This would call for a programme for quickly completing the work (if need be by the Government, the cost being later recovered from the beneficiaries). Adequate agriculture credit could also be ensured.

Assam

General

3.1.1 Assam State covers an area of 78.5 th.sq.km. The population of the State according to 1971 census was 1.45 crores.

3.1.2 Assam received high rainfall in both south-west and north east monsoon. However, the average rainfall varies in different parts of the State from about 110 cm. (in the Nowgong area) to over 250 cm. The heaviest rainfall station in India viz Chirapunji in adjacent Meghalaya receives about 1270 cm. Though the State generally receives heavy rain extending over eight months in the year (March to October), some parts, at times, require irrigation to grow good crops and increase agricultural production.

Surface water resources

3.2.1 The two principal river systems which drain Assam, are (i) the Brahmaputra and (ii) the Barak. The Brahmaputra with total length of 2,900 km., catchment area of 0.94 m.sq.km, and an annual run off 590 milliard cu.m. is one of the biggest river in the world. A number tributaries drain into the Brahmaputra from north and south, in its course through the State.

3.2.2 The Barak rises on the southern slopes of the mountain range to the north of Manipur and flows through the Cachar district of Assam before crossing over to Bangladesh. The length of the Barak from its source to the international border is 560 km. The annual run-off of the Barak and its tributaries within India is about 33 milliard Cu.m.

3.2.3 The water resources in both these systems are plentiful and perhaps, more than what can be utilised in the near future.

3.2.4 Taking into account the heavy rainfall, it can safely be assumed that the ground water resources in Assam are considerable and there is scope for utilising them for irrigation. In Brahmaputra Valley there are good possibilities of utilising ground water for irrigation. Irrigation from Ground Water Sources would probably be more dependable than from diversion work on small streams.

Land Use

3.3 According to the 1969-70 land utilisation statistics (the latest data available), details in respect of Assam are as given in Table 3.1.

TABLE 3.1

Land utilisation statistics - Assam

<i>Category</i>	<i>area in m.ha.</i>
1. Total geographical area	7.85
2. Area under forest	2.08
3. Area not available for cultivation	2.57
4. Net area cultivated	2.23
5. Total cropped area	2.77
6. Net irrigated area	0.57
7. Gross irrigated area	0.57

Irrigation

3.4 The ultimate irrigation potential of Assam as was indicated to Central Water & Power Commission is as under :-

(a) Major and medium	0.97 m.ha.
(b) Minor : Surface water	1.01 ..
Ground water	0.20 ..
	<hr/>
	2.18 ..
	<hr/>

However, the State had indicated to Irrigation Commission that the ultimate irrigation potential was 1.3 m.ha.

Irrigation development by major and medium Plan schemes

3.5.1 No major or medium irrigation project was taken up in the State in the pre-Plan period. Even under the Five Year Plans, no major scheme had been taken up till 1972. Also, no medium irrigation projects were taken up till 1961. Six medium irrigation projects had been taken up in Assam (upto March '72) which will ultimately create a potential of 95.05 th.ha. Of these, three schemes with an ultimate potential of 49.82 th.ha. had not created any potential. Two schemes with an ultimate potential of 41.18 th.ha. had been completed and one scheme with an ultimate potential of 4.05 th.ha. had been partially executed. The categorywise details are given in Table 3.2.

TABLE 3.2

Plan Projects in Assam

(area in th.ha.)

Category	No. of schemes	Potential		
		Ultimate	Created	Utilised
I. Major Schemes	Nil	—	—	—
II. Medium Schemes				
(a) Completed	2	41.18	41.18	35.78
(b) Continuing with some potential	1	4.05	2.89	2.89
(c) Continuing with no potential	3	49.82	—	—
Total	6	95.05	44.07	38.67

3.5.2 No reasons are available for the slow pace of development of created potential but the lag (as also the potential created) in Assam is insignificant. Scheme-wise details are at annexures II.3.1 and II.3.2.

Bihar

General

4.1 Bihar is the ninth largest in size but second most heavily populated State of India. The State can be divided into three parts i.e. North Bihar comprising a portion of the alluvial plains of the Indo-Gangetic basin; South Bihar having flat alluvial plains and the Chhota Nagpur and Kaimur plateaus. It has an area of 173,876 sq. km. The population of Bihar according to the 1971 census was 56.3 millions.

Climate

4.2 The climate of Bihar is moist and warm. Rainfall is largely confined to the south-west monsoon period. The average rainfall is in the range of 100 cm. to 120 cm. in the southern and northern most districts and between 85 cm. to 100 cm. in the area in between comprising Patna, Monghyr, Bhagalpur, Saran and Shahabad districts. The distribution of rainfall in crucial months has a high variability. The late September-October rains-locally known as 'Hathia rains' account for only 5 to 10 cm. of the annual rainfall but play a crucial role in agriculture. Analysis of the past record of 25 years has shown that the 'Hathia rains' fail once in every three years in South Bihar, once in four years in North Bihar and once in five years in Chhota Nagpur.

Soils

4.3 In the North Bihar plains the soils which are sandy and alluvial are among the most fertile in India and are useful for growing a variety of crops. In South Bihar

the plains consist of alluvium of heavy texture. The Chhota Nagpur plateau is almost covered with highly ferruginous red and black soil which is also present in some parts of south-east Ranchi.

Land Use

4.4 According to land utilisation statistics for 1969-70 (the latest year for which details are available), the pattern of land use in Bihar is as given in Table 4.1.

TABLE 4.1
Land utilisation statistics—Bihar

<i>Category</i>	<i>Area/m. ha.</i>
1. Geographical area	17.39
2. Area under forests	3.02
3. Area not available for cultivation	2.59
4. Net area sown	8.40
5. Total cropped area	11.06
6. Net irrigated area	2.28
7. Gross irrigated area	2.74

Surface Water Resources

4.5 The Ganga flows through Bihar. The State is also interspersed by a number of tributaries of the Ganga like Kosi, Gandak, Ghagra, Sone, etc. which are themselves fairly big rivers. The water resources of Bihar rivers had been assessed as 123 milliard cu.m. at their points of entry into the State and the water potential added in Bihar as 60 milliard cu.m.

Ultimate irrigation potential

4.6 The ultimate irrigation potential in Bihar has been tentatively assessed as 7.6 m.ha., of which 4.5 m.ha. will be by major and medium projects.

Pre-Plan achievements

4.7 The Sone river project is amongst the oldest irrigation works of India serving for over 100 years now. Other pre-Independence projects are the Tribeni canal project, the Dhaka canal project and the Teur canal project. The pre-Plan (1951) irrigation potential in Bihar from major and medium irrigation projects was 588.43 th. ha. which was being fully utilised.

Plan Projects

4.8 From April, 1951 to March, 1972, Bihar undertook 9 major and 48 medium irrigation projects which would have an ultimate potential of 3.12 m. ha. Of these, 2 major and 9 medium schemes with a total ultimate potential of 0.46 m. ha. had not created any potential so far. The remaining 46 projects had created a potential of 1.14 m. ha. and the corresponding utilisation stood at 0.76 m. ha. i.e. 67% of the potential. The categorywise break up is given in Table 4.2

TABLE 4.2
Plan Projects in Bihar

(area in Th. ha)

Category	No. of schemes	Potential		
		Ultimate	Created	Utilised
I. Major :				
(a) Completed	2	166.83	166.83	165.74
(b) Continuing with some potential	5	2050.95	554.25	208.99
(c) Continuing with no potential	2	428.73	—	—
II. Medium				
(a) Completed	36	350.93	300.93	356.71
(b) Continuing with some potential	3	62.94	42.31	32.17
(c) Continuing with no potential	9	32.26	—	—
Total	57	3122.64	1143.92	763.61

Major Projects

4.9 The details of major irrigation projects that have fully or partially created potential are at annexure II, 4.1. The created potential by major schemes was 721 th. ha. and the corresponding utilisation was 375 th. ha. i.e. 52% of created potential. The lag in utilisation by major schemes is almost wholly due to lag in the five continuing major schemes, particularly the Kosi and Gandak projects.

The details of these 7 major projects are briefly as follows:-

Badua Irrigation Project

4.9.1 Padua irrigation project comprises a storage dam across the river Badua and a canal system ultimately to irrigate 42.5 th. ha. The scheme had been completed in 1966. The irrigation potential created upto March 1972 was 42.50 th. ha. with a corresponding utilisation of 41.41 th. ha. The utilisation was thus satisfactory.

Sone barrage and remodelling of canals

4.9.2 The Sone canal system is over a hundred years old. This scheme involved the construction of a barrage across the river Sone in place of the old weir and the remodelling, extension and improvement of the old Sone canal system with an ultimate irrigation potential of 124.33 th. ha. The scheme has been completed in 1968. The potential created under the Sone canal system was 124.33 th. ha. and was being more than fully utilised.

Kosi Project

4.9.3 The control and development of the Kosi river has been undertaken in stages. The Kosi project, as originally sanctioned and taken up in the First Plan period, comprised the Fhimragar Barrage across the Kosi, flood embankments, and the Eastern Kosi Canal System. Subsequently the Rajpur Canal Scheme was sanctioned to extend irrigation on the Eastern side. The Kosi Western Canal which has been taken up next would similarly extend irrigation on the western side. All the three schemes are dependent on the Fhimragar Barrage. The Barrage and appurtenant works were completed by 1963 and the Eastern Canal System which started creating potential since 1965 is now nearly completed. Work on Rajpur Canal started in 1961 and is in progress. Partial potential has however been created since 1967. Work on the Western Kosi Canal could commence only in November 1972. The Ayacut development in the Project is being carried out under the guidance of the Kosi Division Commissioner who coordinates the various activities.

The Kosi Eastern Canal, as approved, is to irrigate a culturable command of 4.95 lakh ha. within a gross command of 7.42 lakh ha. The ultimate irrigation potential is 5.8 lakh ha.

It has been now informed that on detailed examination of the contours, and by site inspection an area of 1.19 lakh ha. has become uncommandable, being on higher levels where canal water cannot reach by gravity. Also an area of 1.38 lakh ha. remains out of command due to flooding and water logging. The available command is thus reduced to 2.4 lakh ha. which will restrict the irrigation potential to 2.75 lakh ha. Thus, even though full potential is now created, the potential is deemed to have been restricted to 2.75 lakh ha. against the originally anticipated figure of 5.80 lakh ha.

Drainage measures are now being formulated to reclaim water logged areas and various other proposals are stated to be under examination for bringing in the high patches also under irrigation. It has, however, been considered by the State Government that all these measures would enable the irrigation potential to go up to 4.34 lakh ha only.

In Kosi project the utilisation of the created (reduced) potential is far from satisfactory. The maximum utilisation so far had been 1.30 lakh ha. against the created potential of 2.75 lakh ha. i.e. less than 50%.

The original project provided for construction of distribution system up to 5 cusec limit. As the main problem in the Kosi command, as indeed in most others, related to the delay in construction of field channels by the cultivators, the State Govt. decided in 1965 to construct the system up to one cusec limit work on which has also been completed. The field channels below one cusec limit (40 ha.) will have to be constructed by the cultivators at their own cost. The Field Channels Act makes it binding on their part to do this and on their failure the same could be done by the Government and cost recovered.

The causes for the lag in the utilisation could be briefly stated as under :

(a) *Non coordination in completion of different components :*

The Kosi hydro power station is sited on the Main Canal and the delay in the completion of the power station caused practical difficulties in running the canal for irrigation till bye-pass channels could be built.

(b) *Inadequate field channels :*

The progress of construction in field channels is far from satisfactory inspite of the powers of Govt. to have it done by their own Agency at the cost of cultivators. The present method may have to be improved,

(c) *Lack of demand for irrigation :*

The cultivators being new to irrigation have not yet either realised the immense potentials of irrigated agriculture or been educated sufficiently to the tasks before them. Intensive agricultural extension and demonstration thus forms an important part of command development particularly in new areas. There has been inadequate extension and demonstration services so far.

(d) *Work of land shaping & land levelling have lagged behind :*

It has been estimated that about 1.3 lakh ha. (3.24 lakh acres) need micro land levelling but no substantial progress has been made so far. This work was estimated to cost around Rs. 4 crores. Adequate credit facilities to the cultivators and assistance in this work would need to be organised.

(e) *Non-development of crop patterns as envisaged :*

The crop pattern as envisaged in the project has not developed in the command so far. In fact, the Project Authorities seem to be having no powers to ensure that the envisaged crop pattern is adhered to.

The question of ensuring the most suited crop pattern in fact deserves close consideration. Portions which can be irrigated during the various crop seasons may have to be earmarked by the authorities and the people informed as is being done under the localisation of ayacut'.

(f) *Drainage problems :*

Even though there was provision in the project for tackling the drainage problem in the command, nothing substantial has been done as yet in this regard. The works have commenced only recently. In the context of the drainage needs of the command and the position that considerable areas are on uncommanded higher patches the use of tubewells for tackling both situations needs to be examined. This would ensure an integrated use of surface and ground waters.

(g) *Ayacut development programme :*

The ayacut development programme of the entire Kosi command needs to be carefully evolved and urgently implemented.

(h) *Silt problem of Kosi canals :*

The Kosi river is well known for the large quantity of silt it brings down from its hilly catchment. Large quantity of this silt gets into the canals inspite of regulation at the barrage to the extent possible and in silt excluders.

Between 1964 when the Kosi Eastern Canal was opened and 1971 over 200 million cft. of silt was estimated to have been deposited in the Kosi canal. Partial removal of silt has already been done. A second silt ejector was also under consideration. However, measures like adequate soil conservation in the hilly catchment of Kosi, construction of storage dam across the Kosi, etc. need to be considered. The construction of check dams and other soil conservation measures that were

contemplated at the time Kosi project was taken up have not materialised so far. The irrigation Commission has also drawn attention to the serious problem posed by silt in the Kosi canals. The Govt. of India have set up an Expert Committee in December, 1972 to look into the serious problem of silting in Kosi canals.

(i) Satta System

Under the Satta System, the farmers have to apply for irrigation water either for a year or for a period of years. Usually there is a tendency with the cultivators to wait for the monsoons rains before deciding to apply. Unless this State System is done away with, the tempo of irrigation will continue to be low. During the 1972 Kharif season, Bihar Govt. temporarily suspended the System to boost the utilisation and it was greatly helpful in ensuring utilisation. Making compulsory collection of a certain part of water charge on those notified to be within the command also needs to be examined.

Rajpur Canal

4.9.4. Work on Rajpur canal which takes off from the Kosi Eastern Main Canal was started in 1961 and is in an advanced stage of execution. Partial irrigation potential was created from 1968. The ultimate irrigation potential as per the original scheme is 157.64 th. ha. of which a potential of 89.03 th. ha. had been created. The utilisation was however only 11.85 th. ha. or 13% of created potential. Since the Rajpur canal is a part of the Eastern Kosi System, the facilities made available and the problems faced in development are similar. In Rajpur canal also it has been now reported that out of the original CCA of 1.32 lakh ha., an area of 0.186 lakh ha. lies in higher patches and another 0.10 lakh ha. lies in low pockets subject to flooding and water logging thus restricting the effective CCA to about 1 lakh ha.

The various reasons for the lag in the utilisation of created potential are similar to those under the Kosi Eastern canal discussed earlier. The masking of the head regulator by silt deposition is an added problem here.

Gandak Barrage Project

4.9.5. The Gandak project comprises a diversion barrage at Valmikinagar with two main canals known as the main Eastern and Main Western canals taking off on either side. In addition, the Nepal Western Canals and the Nepal Eastern Canal would serve areas in Nepal. The ultimate irrigation potential in India will be 11.51 lakh ha. in Bihar and 3.08 lakh ha. in Uttar Pradesh.

The Barrage works have been completed by 1970. The first 130 km. of the Main Western Canal and 225 km. of Main Eastern Canal have been nearly completed.

The irrigation potential created in Bihar by March '72 was 157.83 th. ha. and the utilisation stood at 50.55 th. ha. i.e. 32% of the created potential. The potential was created for the first time in 1968-69 and the Project Authorities have considered the present utilisation as satisfactory, considering that the Project envisaged that irrigation will be fully developed in five years commencing from the next year after the creation of potential, in successive steps of 20% every year.

The slow rate of development of irrigation is due to the following principal reasons :

- (a) There is significant reluctance on the part of the cultivators for kharif irrigation. As long as timely and sufficient rainfall occurs, the cultivators do not ask for irrigation. Also, the prevalence of 'satta' system enables the cultivators an option not to seek irrigation water. Unless the satta system is abolished and a compulsory levy of water charges or a part there of is introduced in the localised command, utilisation will be low.
- (b) In a number of cases some gaps are left in the sub-distributaries, minors or water courses due to land acquisition difficulties or obstruction by cultivators to press for additional bridges.
- (c) The construction of various embankments in the region and inadequate appreciation of the need for undertaking adequate drainage works in the command right from the early days has led to the flooding of the local depressions and water logging of other areas in the command. This already appears to be a major problem and unless adequate attention is given to the Drainage system this may assume serious proportions soon. A beginning has just been made on drainage works.
- (d) The Project provides water courses upto 2 cusec. The cultivators have to execute the field channels. The Field channels act of 1965 empowers the district Magistrates to get these field channels executed where there is inadequate response. However the pace of construction of field channels is not satisfactory.

- (e) There has been some non-coordination of requisite activities prior to irrigation. For instance, it is learnt that certain areas in the command can develop only after flood control measures are undertaken.
- (f) A coordinated ayacut programme is yet to be implemented. In its absence works on land shaping, levelling, agricultural inputs etc. are suffering for want of both agricultural credit and agency to assist the cultivators.

In December, 1971, the Government of Bihar strengthened the Gandak Technical Committee *inter alia* with a view to assessing the measures that may be necessary to ensure optimum utilisation of irrigation potential created by the project. The report of the Committee is however still awaited.

Sone High Level Canal

4.9.6 Under the new Sone Barrage (in place of the old weir) in addition to the remodelled Sone Canal Command, new areas will come under irrigation through the new Sone High Level Canals. Work on Sone High Level Canals is expected to be completed by 1975. The ultimate irrigation potential is 121.46 th.ha. of which a potential of 12.15 th.ha. had been created by March '72. The utilisation had been 4.05 th.ha. only. No reason for the lag are available.

Chandan Reservoir

4.9.7 The Chandan Reservoir Project comprises an earthen dam across the river Chandan and a canal system ultimately to irrigate 40.43 th.ha. A potential of 2024 th.ha. had been created. The project started in 1962 is expected to be completed by 1974. The utilisation up to March 1972 was 12.14 th.ha. only i.e. 60% of created potential. No reasons have been given for this lag.

Medium Irrigation Projects

4.10 As already indicated, 48 medium irrigation projects were taken up in the period, of which 9 had not created any potential by March 1972. Of the remaining, 36 had been completed and three were continuing with partially created potential as on March 1972. The total potential created by medium schemes was 4.23 lack ha. and the corresponding utilisation was 3.89 lack ha. i.e. 92% of the created potential. Schemewise details of these projects including reasons for lag are given in annexure II.4.2.

TABLE 5.1

Land Utilisation Statistics—Gujarat

<i>Category</i>	<i>Area/m.ha.</i>
1. Geographical area	19.60
2. Area under forests	1.64
3. Area not available for cultivation	4.97
4. Net area sown	9.59
5. Total cropped area	10.18
6. Net irrigated area	1.15
7. Gross irrigated area	1.24

5.3.2 The cropping pattern is characterised by the pre-dominance of kharif cash crops, millets and pulses. Groundnuts and cotton form a large extent of the crops grown.

5.3.3 The soils can be classified into five groups, (i) shallow residual soil, (ii) medium black soil, (iii) deep black soil, (iv) sandy loam and (v) coastal alluvium. Bajra and groundnut are grown in the light soils and cotton on heavy soils.

Water resources

5.4 The major rivers contributing to the surface water resources of the State are the Tapi, the Narmada, the Mahi and the Sabarmati. In addition, there are a number of smaller rivers. The mean annual run off of the major rivers of the State has been assessed as about 92 milliard cu.m. The usable surface water resources of the State are, however, yet to be finalised. Sub-soil water is available at varying depths and in varying quantities. No firm estimates of ground water potential are available.

Ultimate Irrigation Potential

5.5.1 The ultimate irrigation potential of the State from surface waters, as tentatively assessed, is put at 1.89 m.ha. (1.4 from major and medium schemes and 0.49 from minor schemes) excluding that of Narmada. Khosla Committee assessed the potential of Gujarat from Narmada as 1.85 m.ha.

5.5.2 Irrigation potential from ground water resources is put at 1.22 m.ha.

Pre-Plan period

5.6 In the pre-Plan period only two or three weir schemes were executed. By March, 1951, the potential from major and medium schemes stood at 32.8 th.ha. with full utilisation.

Plan Projects

5.7 During the Plan period from April'51 up to March'72, Gujarat undertook 10 major and 50 medium projects with the contemplated ultimate potential of 0.99 m.ha. Of these, 5 major and 4 medium projects with a total ultimate potential of 0.3 m.ha. were yet to create any potential by March, 1972. The remaining 5 major and 46 medium projects had by March'72 created a potential of 0.57 m.ha., 60% of which i.e. 0.34 m.ha. had been utilised by March'72. The categorywise break-up is given in Table 5.2.

TABLE 5.2
Plan Projects in Gujarat
(Area in th.ha.)

Category	No. of schemes	Potential		
		Ultimate	Created	Utilised
I. Major				
(a) Completed	3	106.58	104.66	53.95
(b) Continuing with some potential	2	414.30	321.99	137.89
(c) Continuing without any potential	5	316.27	—	—
II. Medium				
(a) Completed	43	137.17	133.45	149.66
(b) Continuing with some potential	3	18.97	5.21	0.45
(c) Continuing without any potential	4	7.87	—	—
Total	60	991.16	567.31	341.95

Major Projects

5.8 The particulars of major irrigation projects that had fully or partially created potential are at annexure II.5.1. The created potential by major schemes was 428.65 th.ha. Of this, 191.84 th.ha. or 44.8% were being utilised by March'72. The lag in utilisation by major projects was largely due to the lag in the Kakrapar and Mahi projects.

Gujarat

General

5.1.1 Gujarat State has a geographical area of 195,984 sq. km. and according to the 1971 census a population of 26.7 millions. The density of Population varies from nil in the Rann of Kutch to 340 per sq. km. in Kaira District with an average of 136 per sq. km.

5.1.2 The State can be divided into three geographical units viz. the Gujarat main land, Gujarat peninsula and Kutch.

Climate

5.2 The climate varies from region to region. The west coast is moist but the eastern parts are dry. Summer is generally very hot in most parts of the State though winter is generally mild, except in the north. The average rainfall varies from 33 to 152 cm. mostly received from south-west monsoon between June and September. Based on the coefficient of variability of rainfall, the Irrigation Commission (1972) has categorised over 99% of the State area as "unsatisfactory" from the point of rainfall. Thus, rainfall in the entire State can be taken as unreliable.

Land and Soils

5.3.1 According to the land utilisation statistics of 1969-70 (the latest year for which details are available), the pattern of land use is as given in Table 5.1

Banas (Dantiwada Reservoir Project)

5.8.1 The scheme comprises a storage reservoir across the river Banas near village Dantiwada and a canal system to irrigate ultimately 44.55 th.ha. The work was started in 1958 and completed by 1969. The irrigation potential created by March '72 is 42.63 th.ha. and the corresponding utilisation stood at 19.41 th.ha. or 45.5% of created potential.

The principal reason for the under utilisation of the created potential is inadequate replenishment in the reservoir. The reservoir was never filled up to the maximum level so far and no carry over storage is allowed. The other reasons for the lag are : reluctance on the part of the cultivators to take irrigation water at night, poor response to irrigation in kharif seasons and losses in the unlined canals. The project authorities are proposing to line the canals and to undertake a revision of the crop pattern.

Hathmathi Reservoir Project

5.8.2. The project comprises reservoirs across Hathmathi and Indrasi rivers with a pick up weir at Himatnagar. The irrigation system, spread over in four different zones, will ultimately cover 27.20 th.ha. Full potential had been created by March '72 but the utilisation stood at 15.15 th.ha. or 55.7% of the created potential.

The reasons for the lag in utilisation are : non-construction of field channels, lack of demand from cultivators for kharif irrigation, reluctance to take irrigation water at night, heavy seepage losses in the canals and heavy losses in transit to irrigate one of the four zones which lies 70 to 80 miles away from the reservoir. The project authorities intend to line the canals and the distributaries up to 25 cusecs to minimise the losses.

Shetrunji Irrigation Project

5.8.3 The scheme envisages a storage reservoir across the river Shetrunji in Palitana taluk and a canal system ultimately to irrigate 34.83 th.ha. The potential was fully developed by 1963 but the utilisation by March '72 stood at 19.39 th.ha. or about 56% of the created potential. The reasons for the lag in utilisation are : high losses in the canals which are unlined, the need for a realistic reassessment of the irrigation potential, lack of field channels, lack of demand for irrigation in kharif season and lack of adequate C.C.A. The project authorities intend to reappraise the irrigation potential of the project.

Kakrapar Project

5.8.4 The Kakrapar project comprises a weir across the river Tapi with a canal system ultimately to irrigate 264.8 th.ha. This is, however, possible only after the completion of the storage dam on the river upstream at Ukai. Pending the creation of the storage which has been made possible only after March'72, the irrigation potential from the weir was 228 th.ha. The scheme was approved in 1949 and the work is still continuing, with the target date of June, 1975 for completion. The potential created by March'72 was 202.81 th.ha. while the corresponding utilisation stood at 73.18 th.ha. or 35% of the created potential.

The principal reasons for under utilisation are as follows :

- (a) Lack of demand for irrigation during kharif season for the traditional varieties of cotton and jowar.
- (b) The uncertainty, prior to 1972, of the requisite water during rabi and hot weather as also early kharif period because of non-creation of storage. The anticipated crop pattern has not yet developed.
- (c) Gross inadequacy of field channels.
- (d) Absence of drainage facilities.
- (e) Absence of block system.
- (f) Necessity for levelling and land shaping.
- (g) Training-cum-demonstration farms and agricultural extension agency need to be strengthened.
- (h) Absence of adequate agricultural support programme including an area development scheme.

Mahi Right Bank Canal Project (Stage I)

5.8.5 The Mahi project comprises a pick-up weir across the river Mahi at Wanakbori in Kaira district and a canal system on the right bank with ultimate irrigation potential of 121.18 th.ha, had been created, of which 64.71 th.ha. or 53.4% of created potential were being utilised.

The principal reasons attributed for the under utilisation are as under .

- (a) Assumption of unworkable command, cropping pattern and water requirements in the project.

- (b) Unwillingness of cultivators to take to irrigated rabi in Cambay and Matur areas.
- (c) Inadequate field channels.
- (d) Lack of demand during kharif and reluctance to take night irrigation.
- (e) Losses due to seepage in canals.
- (f) Varying river flows in the absence of a storage structure upstream.

The following remedial steps are being adopted or proposed to be undertaken by the project authorities for improving the utilisation :

- (a) A reappraisal of the cropping pattern and irrigation potential under this project is being under-taken on the basis of a detailed study on the hydrology of the river, water requirements of crops assessed on a scientific basis as well as the recommendations of the Agronomist. The crop pattern is expected to undergo revision once again when the Mahi Right Bank Canal starts getting perennial supply on completion of Kadana dam in Stage II.
- (b) At present, channels are provided by the Government up to the outlet of 1 to 1.5 cusec for block of 40 to 80 ha. Construction and maintenance of field channels within the block is the responsibility of the cultivators. When the cultivators do not come forward to do this work, action was taken previously to construct them through Govt. agency under the Bombay Irrigation (Gujarat Amendment) Act 1962 which involved a cumbersome procedure. Hence recourse is now being taken to the Bombay Land Improvement Schemes Act 1942 which makes the implementation quicker. It is proposed to cover the entire command by 1977.
- (c) In order to reduce seepage losses, the Right Bank Main Canal has been provided with lining in threefourths of its length. A proposal to line the smaller channels as also the field channels is under consideration.

The Project is reported to have suffered from financial difficulties for about 8 years up to 1970. However, from 1970 onwards, the progress on the project has gained considerable momentum with an IDA loan.

Medium Schemes

5.9.1 During the Plan period up to March '72, 50 medium schemes having an ultimate irrigation potential of 164.01 th. ha. were undertaken. Of these, 4 schemes having an ultimate potential of 7.87 th. ha. had not created any potential under them.

Under the remaining 46 schemes having an ultimate potential of 156.14 th. ha. a potential of 138.66 th. ha. had been created and 150.11 th. ha. had been utilised by March '72. The particulars of these medium schemes with reasons for lag, if any, are at Annexure II. 5.2.

5.9.2 It is noted that the total potential created under the medium schemes by March '72 was being more than fully utilised. The lag in utilisation noticed in some individual projects was generally due to lack of yield, lack of field channels, lack of demand in kharif, reluctance to do night irrigation by the cultivators and heavy seepage in canals.

Land and Soils

6.3.1 According to the land utilisation statistics (1969-70) the pattern of land use in Haryana is as given in Table 6.1 :

TABLE 6.1

Land utilisation statistics of Haryana

<i>Category</i>	<i>area in m ha.</i>
1. Geographical Area	4.42
2. Area under forests	0.09
3. Area not available for cultivation	0.49
4. Net area sown	3.55
5. Total cropped area	4.94
6. Net irrigated area	1.41
7. Gross irrigated area	2.16

6.3.2 The soil in the State is largely alluvial. The Indo-Gangetic alluvial plain lies between the Himalayas in the North and Rajputana desert in the South. Unconsolidated clay, silt, sand and gravel compose the alluvium, deposited layer after layer by the Yamuna and many other small sub-mountainous torrents.

Water Resources

6.4.1 The principal river in the State is the Yamuna. The other important river is Ghaggar which is non-perennial and flashy. The Dohan, Krishnawati, Sahibi and Lendoh are also small flashy streams in the State rising in the Aravallis.

6.4.2 The annual surface water resources in the State from the major streams has been assessed as about 125 milliard Cu. m. Groundwater explorations have so far covered only a part of the State.

Ultimate Irrigation Potential

6.5 The ultimate irrigation potential by major and medium surface water schemes of undivided Punjab (including Haryana) was tentatively assessed at 4.92 m. ha. The up-to-date and separate figures for Haryana are not available.

Pre-Plan Achievement

6.6 In the pre-plan period, undivided Punjab (including Haryana) had a created potential by major and medium irrigation projects of 1.656 m. ha. which was fully being utilised. Separate figures for Haryana are not available.

Plan Projects

6.7 In the plan period from April 1951 to March 1972 Haryana undertook 5 major and 6 medium projects with an ultimate irrigation potential of 1.372 m. ha. of these 2 major schemes with an ultimate potential of 0.258 m. ha. had not yet created any potential. The remaining schemes created a potential of 0.965 m. ha. by March 1972. The corresponding utilisation stood at 0.922 m. ha. Schemewise details are at annexures II. 6.1 and II. 6.2. The category-wise details are given in Table 6.2.

TABLE 6.2
Plan Projects in Haryana

(Area in th. ha.)

Category	No. of schemes	Potential		
		Ultimate	Created	Utilised
<i>I Major</i>				
(a) Completed	1	676.25	676.25	676.25
(b) Continuing with some potential	2	328.90	218.54	194.25
(c) Continuing with no potential	2	258.00	...	...
<i>II Medium</i>				
(a) Completed	2	36.42	36.42	36.42
(b) Continuing with some potential	4	73.13	33.60	15.35
(c) Continuing with no potential	...	...	...	...
Total	11	1372.70	964.81	922.27

Haryana

General

6.1.1 Haryana State has a geographical area of 44,220 sq. km. According to the 1971 census it had a population of 9.97 millions, nearly 82% of whom live in villages with agriculture as their mainstay.

6.1.2 Haryana falls into two broad natural divisions viz. the Sub-Himalayan and the Indo-Gangetic plain which run in south-eastern direction almost parallel to each other.

Climate

6.2.1 The climate is of the continental type viz. very hot in summer and markedly cold in winter. The average temperature recorded in the months of May and June is 40°C whereas it falls to 2 to 3°C in January.

6.2.2 There are two well marked seasons of rainfall in the State (i) monsoon period lasting from the middle of June till September and (ii) the winter rains which occur from December to February. The rainfall in the State is scanty and erratic. It is highest (about 217 cms.) in the foothills and the lowest (25 cm. to 38 cms.) in the south. About 80% of the total rainfall occurs in the monsoon period.

6.2.3 In Haryana the chronically drought affected areas measure 7,770 sq. kms. They are located in a belt contiguous to Rajasthan in the Mohindragarh, Rohtak, Hissar and Gurgaon districts.

Major Projects

6.8 Of the 5 major projects undertaken, 2 have not created any potential till March 1972. The remaining 3 schemes with an ultimate potential of 1005.15 th. ha., had created a potential of 894.79 th. ha. while the utilisation stood at 870.50 th. ha. or 97% of created potential. Their particulars are given in annexure II. 6.1. Details of these schemes are briefly as follows :

Bhakra Nangal

6.8.1 The project consists of the Bhakra Dam, and Nangal Barrage and a canal system, ultimately to irrigate 676.25 th. ha. in Haryana. The full potential had been created and was being fully utilised.

Western Yamuna Canal-Remodelling

6.8.2 The scheme provides for the remodelling of the Western Yamuna Canal system which takes off from Tajewala Headworks. The ultimate additional irrigation potential will be 247.96 th. ha. The created irrigation potential by March 1972 was 184.14 th. ha. and was being fully utilised.

Gurgaon Canal Project

6.8.3 This project comprises a branch canal taking off from Agra Canal near Okhla to extend irrigation ultimately to 80.94 th. ha. The major portion of the main canal and the distribution system have already been completed. The work of remodelling the Okhla Head works has not commenced.

The potential created up to March 1972 was 34.40 th. ha. and the corresponding utilisation was 10.11 th. ha. The State Government have informed that the lag in utilisation was mainly because of the non-construction of the new Okhla Barrage and short supplies on account of non-availability of Ravi-Beas waters.

Medium Schemes

6.9.1 Haryana has undertaken 6 medium irrigation schemes in the plan period from April 1951 to March 1972. These will ultimately add 109.55 th. ha. to the irrigation potential. The created potential by March 1972 was only 70.02 th. ha. and the corresponding utilisation was 51.77 th. ha. or 73.9% of created potential.

6.9.2 Schemewise details including reasons for lag are given in annexure II.6.2.

Jammu and Kashmir

General

7.1.1 The State Jammu and Kashmir had a geographical area of 222,236 sq. km. of which 125,308 sq. km. is under illegal occupation. All data presented here relate only to the area other than under illegal occupation. The population as per 1971 census was 4.62 millions out of which two-thirds are dependent on agriculture.

7.1.2 The State consists of a series of hill ranges. There is just a fringe of level land along the Punjab frontier, bordered by a plinth of low hilly country sparsely wooded, broken and irregular. Then come the three ranges of mountains drained by the Chenab, the Jhelum and the Indus. The three natural physical divisions of the State are the Jammu region, Kashmir valley and the Ladakh plateau.

Climate

7.2 Precipitation varies widely over the State. It is received during two periods, the cold season from December to April and the south-west monsoon period from June to September. In the valley and the mountain ranges to the north and east, the chief precipitation of the year is in winter. The average annual depth of snowfall in the valley is about 2 metres. The average rainfall in Jammu region is about 114 cm. Wettest months are July, August and September. In the Kashmir valley, the annual precipitation is between 50 to 75 cms. Ladakh gets about 8 cm. of rainfall per annum. Winter precipitation is most important. Like rainfall, the temperature also varies widely. The maximum temperature in Jammu is around 43°C in June and in the Kashmir valley, it is nearly in thirties. Near Leh in Ladakh,

it is cool in the shade but blistering in the sun. The minimum temperature is of the order of 10°C in Jammu and well below the freezing point in the Valley.

River Systems

7.3 The main rivers draining the State are the Indus, Jhelum and Chenab, with their tributaries. These are perennial rivers and the flows are subject to variations. Total surface water resources in the State are abundant but the utilisation is controlled by the terms of Indus Water Treaty (1960) signed by India and Pakistan. There are numerous springs in the State on the fringes of the alluvial tract towards the encircling mountain ranges. Ground water is available in the Jhelum alluvium near surface. Further systematic studies are necessary to assess the ground water resources.

Soils

7.4.1 Soils in Jammu region are deficient in organic matter and nitrogen. In the plains they have formed from the alluvium of Ravi, Tawi and Chenab. They are deep and vary in texture from loam to silt loam. In the mountainous regions the soils are shallow and vary in texture from clay, clay loam to loam.

7.4.2 The cropping pattern in the State is predominantly made up of food crops, which account for nearly 90% of the total cropped area in the State. Among food grains, the main crops are rice, wheat and maize which account for three-fourths of the total cropped area.

Land Use

7.5 Out of the total area of the State of 22.22 m. ha., apart from the portion under illegal occupation, some portions lie in high altitude and are yet to be classified. Land utilisation (1959-70) in the remaining area is given in Table 7.1

TABLE 7.1

Land utilisation statistics—Jammu & Kashmir

<i>Category</i>	<i>Area in m. ha.</i>
1. Geographical area	22.22
2. Reporting area	4.52
3. Area under forests	2.78
4. Area not available for cultivation	0.54
5. Net area sown	0.70
6. Total cropped area	0.87
7. Net irrigated area	0.28
8. Gross irrigated area	0.34

Pre-Plan Achievement

7.7 Irrigation potential created from major and medium irrigation projects prior to Plan period (April'51) was 42 th. ha. which was completely utilised.

Ultimate Potential

7.8 The ultimate irrigation potential from major and medium projects in the State has been presently tentatively assessed as 98 th. ha.

Plan Projects

7.8.1 During the Plan period from April'51 to March'72, the State undertook one major irrigation project and eight medium projects. Of these, the major project and three medium schemes had not progressed to the extent to create any potential under them by March'72. The remaining five medium projects, which have all been completed, had created an irrigation potential of 23.66 th. ha. of which 20.49 th. ha. were being utilised. The categorywise details are given in Table 7.2.

TABLE 7.2
Plan Projects in Jammu and Kashmir

Category	No. of schemes	Potential (Area in Th. ha.)		
		Ultimate	Created	Utilisation
I. Major				
(a) Completed	—	—	—	—
(b) Continuing with some potential	—	—	—	—
(c) Continuing with no potential	1	13.66	—	—
II. Medium				
(a) Completed	5	23.66	23.66	20.49
(b) Continuing with some potential	—	—	—	—
(c) Continuing with no potential	3	4.09	—	—
Total	9	41.41	23.66	20.49

7.8.2 The schemewise details of the projects including reasons for under utilisation are at annexures II. 7.1 & II. 7.2 It is seen that of the five completed medium irrigation schemes that had created potential, three had recorded full utilisation. Utilisation under one scheme was affected by the Indo-Pakistan war. In the remaining scheme, land levelling and preparation had lagged behind.

Quilon	—	Sand in the coastal tract and clayey, alluvial and loamy inland
Extreme Southern Region	—	Black clay loam in highlands, loamy-clay with sand in the valleys and sandy in coastal strips.

Land use

8.4 According to the land utilisation statistics (1969-70) the pattern of land use in Kerala is as given in Table 8.1.

TABLE 8.1

Land utilisation statistics-Kerala

<i>Category</i>	<i>Area m. ha.</i>
1. Geographical area	3.89
2. Area under forests	1.06
3. Land not available for cultivation	0.34
4. Net area sown	2.17
5. Total cropped	2.92
6. Net irrigated area	0.42
7. Gross irrigated area	0.59

Water Resources

8.5 Since Kerala gets rain both from South West and North-East monsoons, the rivers carry enough water between June and December. The average annual run off is estimated at about 70 milliard cubic metres. Very little has been so far done to assess the ground water potential.

Ultimate irrigation potential

8.6 The ultimate irrigation potential of Kerala from major and medium projects has been tentatively assessed as 1. m. ha.

Pre-Plan achievements

8.7 The irrigation potential created by pre-plan schemes amounted to 0.158 m. ha., all of which was being fully utilised.

Plan Projects

8.8.1 During the plan period from April 1951 up to March 1972, 8 major and 11 medium irrigation projects were under-taken in Kerala with a total ultimate potential

of 507 th. ha. Of these, 6 major projects having an ultimate potential of 271 th. ha. had not created any potential by March 1972. The remaining 2 major and 11 medium projects had created 203 th. ha. of potential which had been fully utilised by March 1972.

8.8.2 The categorywise break-up of all the major and medium projects undertaken up to March 1972 is given in Table 8.2.

TABLE 8.2.
Plan Projects in Kerala

(Area in Th. ha.)

Category	No. of Schemes	Potential		
		ultimate	created	utilised
<i>I Major</i>				
(a) Completed	1	42.12	40.47	40.47
(b) Continuing with some potential	1	56.90	28.33	28.33
(c) Continuing without any potential	6	271.31	..	..
<i>II Medium</i>				
(a) Completed	11	136.53	132.79	132.79
(b) Continuing with some potential	—	—	—	—
(c) Continuing without any potential	—	—	—	—
Total	19	506.86	201.59	201.59

Major Plan Projects

8.9 There are only two major plan projects which had created potential under them viz. Malgmpuzha and periyar Valley schemes. Of these, Malampuzha project had been completed and Periyar Valley project was under execution. These two projects had together created a potential of 68.80 th. ha. by March 1972 which had been fully utilised vide Annexure II.8.1. The features of these projects are briefly described below :

Kerala

General

8.1.1 Kerala, located in the extreme South West of the peninsula, has a geographical area of 38,864 sq. km. The population according to 1971 census is 21.28 millions giving a density as high as 548 people/sq. km. against the All India average density of 182.

8.1.2 The state can be divided into three distinct regions (a) the narrow coastal belt on the West (b) the middle plains and (c) the densely forested hills to the east of western ghats.

Climate

8.2 Because of the differences in topography and physical characteristics, the different regions have varying climatic features. Kerala is one of the heavy rainfall areas of the country with a range of 150 cm to 510 cm and an average of 305 cm. The two monsoons account for 90 per cent of the precipitation.

Soils

8.3 The predominant soils in the different regions of Kerala are of varying nature as under :

Cannanore, Kozhikode and Palghat	—	Red loams
Trichur	—	Red ferruginous soil
Kottayam	—	Swampy and peaty soils

Malampuzha Project

8.9.1 The Malampuzha Project comprises a dam across the river Malampuzha in Palghat Taluk with a canal system to irrigate an ultimate area of 42.12 th ha. The project was completed by 1967 and almost full potential of 40.47 th. ha. had already been created and fully utilised by March 1972.

Periyar Valley Project

8.9.2 The Periyar Valley Project comprises a masonry barrage across the river Periyar in Ernakulam District of Kerala State and a canal system for irrigating an area of 55.9 th. ha. The project started in 1956 is expected to be completed by 1974. Only half (28.33 th. ha.) of the ultimate potential envisaged under this project had been created by March 1972 and the created potential had been fully utilised.

Medium Plan Projects

8.10 All the medium plan projects undertaken in the State during the Plan-period from April 1951 to March 1972 have been completed. The total ultimate potential of 136.53 th. ha. of all these projects had been almost fully created. The created potential was being fully utilised. Schemewise details are in Annexure II. 8.2

Madhya Pradesh

General

9.1 Madhya Pradesh State is the largest State in the Indian Union with a geographical area of 442, 341 sq.km. The population of the State, as per 1971 census was 41.65 millions. The State can be broadly divided into various physical regions such as, Giri region, Malwa Plateau, Narmada Valley, Satpura, Ridge, Chattisgarh Plains and the Vindhya Range.

Climate and Rainfall

9.2 The annual rainfall varies from 76 cm. to 152 cm. which however varies from region to region. The rainfall mostly occurs in the period from June to October and is caused by the south-west monsoon while the winter rains contribute 12 to 15% of the total rainfall.

Land and Soils

9.3 The Main soil types which are found in Madhya Pradesh are alluvial in nature, deep black, medium black, light black, red and black mixed, red and yellow mixed and of gravel type. The black soils cover about half of the State mostly in the area of Malwa Plateau, Narmada Valley and the Satpura Ridge with their depth varying from a couple of metres to several metres. A number of districts in the Malwa Plateau have medium black soil. The eastern part of the Grid region contains mixed red and black soils. The most common form of this soil is sandy clay and it varies in depth and fertility and produce a wide variety of crops under irrigation. Mixed red and yellow soils occur in Chattisgarh plains.

Land Utilisation Statistics

9.4 According to (1969-70) land utilisation statistics, the area under different categories is as indicated in Table 9.1

TABLE 9.1

Land Utilisation Statistics—Madhya Pradesh

<i>Category</i>	<i>Area in m.ha.</i>
1. Total geographical area	44.28
2. Area under forests	14.44
3. Area not available for cultivation	4.43
4. Net area sown	18.38
5. Total cropped area	20.40
6. Net irrigated area	1.43
7. Gross irrigated area	1.47

River systems

9.5 The State has a network of rivers flow in all directions. The main rivers are Chambal, Betwa, Sone, Narmada, Tapi, Mahanadi and Indrawati. In other words, it may be said that all the major rivers and their tributaries which rise in Central India have a part of their catchments in Madhya Pradesh. Practically all the rivers in the State are rainfed and the major run-off is during the monsoon period from June to October. The average annual surface water run-off of the major rivers in Madhya Pradesh has been assessed as 183 milliard cu m. Considerable ground water potential also exists.

Ultimate Irrigation Potential for Major and Medium Schemes

9.6 The ultimate irrigation Potential from various major and medium projects has been assessed tentatively as 5.625 m.ha.

Pre-Plan Achievements

9.7 An irrigation potential of 510 th.ha. was created by major and medium irrigation schemes up to March'51 and this was being fully utilised.

Plan Projects

9.8 Since April'51 and up to March'72, Madhya Pradesh had undertaken six major and forty-nine medium projects which would ultimately create a potential of 1 m.ha. Of these, three major schemes and nineteen medium schemes with an ultimate poten-

tial of 0.52 m.ha. are in early stages of execution and have not so far yielded any potential under them.

The remaining three major and thirty medium schemes had created a potential 0.42 m.ha. while the corresponding utilisation stood at 0.29 m.ha. i.e. 69% of the created potential. Schemewise details of the potential and utilisation are given in Annexures II.9.1 and II.9.2 and the categorywise details are given in Table 9.2.

TABLE 9.2
Plan Projects in Madhya Pradesh

(Area in th. ha.)				
Category	No. of schemes	Ultimate potential	Created potential	Utilisation
I Major				
(a) Completed	—	—	—	—
(b) Continuing with some potential	3	327.81	279.21	150.88
(c) Continuing with no potential	3	436.85	—	—
II. Medium				
(a) Completed	28	142.48	140.65	137.08
(b) Continuing with some potential	2	13.92	0.72	0.41
(c) Continuing with no potential	19	84.71	—	—
Total	55	1005.57	420.58	288.37

Major Projects

9.9 There are 3 major projects (all continuing) in Madhya Pradesh which had created some potential by March '72 (see also annexure II.9.1). The position in respect of each is discussed in brief below.

Bhander Cannal Project

9.9.1 Bhander Cannal Project is a part of the Matatila project which has since been completed by Uttar Pradesh. However, the Bhander canal system has not so far

been completed as it was involved in certain inter-State issues between Uttar Pradesh and Madhya Pradesh. A decision was taken some years back that the Madhya Pradesh Government will take up all the remaining works on the canal system but the financial implication of this decision is under discussion between Uttar Pradesh and Madhya Pradesh. Consequently, only a part of the potential had been created by March 72. However; there had been full utilisation of the created potential. The ultimate potential under the scheme is 44.5 th.ha and the created potential 20.2 th.ha. This was being more than fully utilised.

In this project, originally the water courses were expected to be built by the cultivators themselves but as the response from the cultivators was not satisfactory, a decision was taken in 1968 to complete the water courses departmentally and recover the cost from the cultivators.

Chambal Project (Stages I & II)

9.9.2 The Chambal Project, which is a joint venture of Madhya Pradesh and Rajasthan, comprises three storage dams; a barrage and canal system which would serve Madhya Pradesh and Rajasthan equally. The irrigation command lies in an elongated basin in the Chambal plains. The scheme, as approved, envisages irrigation of 445 th.ha. on the completion of the first stage and 567 th.ha. on the completion of the second stage. Half of this area would lie in Rajasthan and Madhya Pradesh respectively. The canal was opened for irrigation in 1960. Since then all project works relevant to irrigation have been substantially completed. The culturable commanded area under the project in Madhya Pradesh is 463 th.ha. The ultimate irrigation potential envisaged is 283 th.ha. The potential created by March '72 was 259 th.ha., but the corresponding utilisation stood at 129 th.ha. i.e. only about 50% of the created potential.

An "Ayacut Development Committee of Madhya Pradesh" had proposed a revised cropping pattern for the project under which an ultimate irrigation potential of only 226 th.ha. would be achieved to utilise about 1.85 MAF of water in Madhya Pradesh. Further, even this irrigation potential will have to be reduced to 147 th. ha. if the utilisable share of water of Madhya Pradesh be limited to 1.35 MAF, as was stated to have been indicated by a Committee constituted by the Chambal Control Board for the reformulation of the pattern of discharges for irrigation. In this context, it is also learnt that the full utilisation of the storage provided in the dams is not likely to be made due to certain constraints. For instance, it was indicated that a reduced live storage was maintained in the Gandhi Sagar reservoir in order to provide for a greater flood cushion than designed for originally and that a similar reduced live storage is maintained in the Rana Pratap Sagar reservoir also.

The project was designed on the basis of a duty at field for wheat of 248 acres/cusec on the basis of the experience in Punjab and Uttar Pradesh. The duty actually being achieved in Madhya Pradesh is indicated to be 135 acres/cusec only and the reasons attributed for this are (a) loss in canal being higher than normal, (b) no night irrigation, (c) land being undulating higher field losses and (d) lack of experience of cultivators in irrigation.

Among the reasons given for under utilisation of the created potential in Chambal project (in Madhya Pradesh) are the alleged non-receipt of due share of water and/or irregular supply of water in the canal system at the Madhya Pradesh-Rajasthan border, closure of canal for one to three months duration every year, the tendency of the cultivators not to grow rice due to the absence of infrastructure facilities like storage, transportation, etc., inadequate field channels, non-development of the crop pattern as envisaged, lack of an ayacut development programme till recently and problems of water logging and impeded drainage due to inadequate drainage arrangements as well as seepage and misuse of water.

Medium Projects

9.10.1 Of the 30 medium projects which have created some potential under them, 28 had been completed and only 2 were under execution as of March '72. The potential created stood at 141 th.ha. and the utilisation at 137 th.ha.

9.10.2 The project-wise position of these schemes including reasons for lag are indicated in Annexure II.9.2

9.10.3 It can be noted that the position of utilisation through medium irrigation projects in Madhya Pradesh is satisfactory. While the reasons for the lag under medium schemes vary from area to area and scheme to scheme. The following points emerge as the principal causes :

- (a) Lack of anticipated yield from the catchment which necessitates a careful re-examination of the potential.
- (b) Non-development of crop pattern as envisaged, the predominant tendency being to neglect irrigated kharif crops in preference to nonirrigated kharif.
- (c) Water requirements as actually taken being in excess of the project figures; indicating the possibility of wastage of water by the cultivators or excess losses in canals and fields which need ameliorative action such as lining, etc.

Land

10.3 According to the land use statistics of 1969-70 (the latest year for which details are available), the utilisation of land is as given in Table 10.1.

TABLE 10.1

Land utilisations statistics—Maharashtra

<i>Category</i>	<i>Area/m. ha.</i>
1. Geographical area	30.78
2. Area under forests	5.41
3. Area not available for cultivation	2.46
4. Net area sown	18.46
5. Total cropped area	19.41
6. Net irrigated area	1.43
7. Gross irrigated area	1.62

Soils

10.4.1. A major portion of the State is underlain by Deccan trap of volcanic origin of fairly uniform composition. The alluvial soils of west coast are impregnated with salts to varying degrees. Satara, Sangli, Nasik, Kolhapur, Ratnagiri, etc. have lateritic soils while red soils predominate in Chanda and Bhandara. Shallow medium and deep black soils with high clay content form the predominant soils of Maharashtra.

10.4.2. Over most of the State, the physical characteristics of the soils are determined by topography.

Crops

10.5. About 70% of the cropped area is under food crops. Cotton, groundnuts and sugarcane are also other important crops grown. The principal food crops are jowar, bajra, paddy and wheat.

River systems and Water Resources

10.6.1. The three major rivers flowing through Maharashtra are the Krishna, Godavari and the Tapi. In addition, there are a number of small west flowing rivers like Tansa, Vaitarna, etc. which carry high discharges in monsoon.

10.6.2. The estimated average flows in the major rivers have been assessed as 148 milliard cubic metre of which 42 milliard cubic metre is accounted for by west flowing rivers.

Ultimate irrigation potential

10.7. The ultimate irrigation potential of Maharashtra from major and medium irrigation projects has been tentatively assessed as 2.35 m. ha.

Pre-Plan irrigation

10.8.1. No significant irrigation works were taken up in the pre-plan period in the vulnerable Marathwada region of the State. However, some works were executed in the Vidharbha region.

10.8.2. The pre-Plan irrigation potential from major and medium irrigation projects was 0.279 m. ha., which was being fully utilised.

Plan Projects

10.9.1. In the Plan period since April, 1951 and up to March 1972, 17 major and 67 medium irrigation projects with a total ultimate potential of 1,315.82 th. ha. were taken up in the State. Of these, 6 major and 5 medium projects did not create any potential under them till March 1972. The remaining 73 schemes created a potential by March 1972 of 424.62 th. ha., the corresponding utilisation being 202.20 th. ha. or 47.7%. The categorywise details are given in Table 10.2.

TABLE 10.2.
Plan projects of Maharashtra

Category	No. of schemes	Potential (area in th. ha.)		
		Ultimate	Created	Utilised
<i>I. Major Schemes</i>				
a. Completed	4	159.46	150.81	81.79
b. Continuing with some potential	7	369.07	71.60	19.63
c. Continuing with no potential	6	497.89	...	...
<i>II. Medium Schemes</i>				
a. Completed	51	170.95	162.66	98.07
b. Continuing with some potential	11	76.95	39.55	2.71
c. Continuing with no potential	5	41.50	...	...
Total	84	1315.82	424.62	202.20

10.9.2. The schemewise details are at annexures II-10 and II-10.2

Major Projects

10.10.1 The particulars of major plan projects that had created full or partial potential by March, 1972 are at annexure II.10.1. 11 major projects of Maharashtra had created some potential under each of them. Their ultimate potential is 528.53 th.ha. The potential created by March '72 was 222.41 th.ha. and corresponding utilisation was 101.42 th.ha. or 46%

Brief particulars of these projects are as under :

Ghod

10.1.01 The Ghod project comprises a storage dam across river Ghod with a canal system ultimately to irrigate 24.60 th.ha. Work commenced in 1954 and was completed in 1961. The potential had been fully created and the utilisation by March '72 was 20.21 th.ha. i.e. about 82%

The principal reason for the lag in utilisation was that the cultivators did not utilise water in kharif season as envisaged in the scheme. Also water courses cover only about two third of the command. Efforts to introduce a short duration kharif crop and planned propaganda and demonstration in this respect are suggested for consideration.

Girna

10.10.2 The scheme comprises a storage dam across river Girna and a canal system ultimately to irrigate 57.21 th.ha. Work commenced in 1956 and was completed by 1969. The potential created by March '72 was 48.56 th.ha. and the corresponding utilisation stood at 23.35 th.ha. or 48%

The reasons for lag in utilisation are as follows :

- (a) During kharif season there is a lack of demand for irrigation. Similarly, the area under perennial crops is also not upto expectations.
- (b) Work of land shaping and land development has not been synchronised with the project works.
- (c) Inadequate infra-structure facilities for agricultural development.

Purna

10.10.3 The multi purpose scheme comprises of two storage dams across Purna one at Yeldari and other at Sidheswar (downstream) with a canal system ultimately to irrigate 61.54 th.ha. Work commenced in 1957 and was completed by 1963. Full potential had been created but the utilisation by March '72 stood at 25.63 th.ha. or 41.7%

The main reasons for the lag in utilisation are as under : -

- (a) Work on field channels and land shaping are yet to be completed.
- (b). Organisation for command area development formed late.
- (c) Adequate agricultural demonstration farms and agricultural credit facilities are lacking.
- (d) Infra-structure facilities for agricultural development are lacking.

Vir

10.10.4 The Vir project comprises a storage dam and a canal system to add an irrigation potential of 16.11 th. ha. in addition to stabilising some existing irrigation under Nira canals. The potential had been fully created. The utilisation by March 1972 stood at 12.6 th. ha. or 78.2% of created potential.

Pus (Vasantsagar)

10.10.5 The Pus project envisages a storage dam a pick-up weir and a canal system ultimately to irrigate 9.37 th. ha. Work commenced in 1964 and is scheduled for completion by 1973. Creation of partial potential commenced from 1968. The potential created by March 1972 was 8.66 th. ha. and the corresponding utilisation was only 0.47 th. ha. or 5.4%.

The State considers that it will be too early to analyse the causes for under utilisation as irrigation has commenced only recently. The reasons for the lag are, however, briefly as follows :

- (a) Inadequate field channels.
- (b) Work on land levelling and shaping have lagged behind.
- (c) Being a new scheme, cultivators have yet to adopt the irrigated crop pattern proposed under the project.

Tulshi Project

10.10.6 The Tulshi Project envisages an ultimate irrigation potential of 3.60 th. ha. Very nominal potential was created for the first in 1971. The potential created by March 1972 was only 0.19 th. ha. and the corresponding utilisation was nil. The State Government feels that it is too early to assess the reasons for the lag in utilisation.

Maharashtra

General

10.1.1. The State of Maharashtra has an area of 307, 760 sq. km. The population according to 1971 census was 50.34 millions giving a density of 164 per sq. km.

10.1.2. The State can be divided into three natural divisions, (i) the Konkan coast, (ii) the Krishna, Godavari basins and (iii) the Tapi basin. Broadly speaking, the western part of the State from the sea to about 65 km. east is hilly and undulating.

Climate

10.2.1. The climate is of tropical monsoon type. Based on temperature, the four climatic divisions are, (a) Konkan coast where seasonal variations are small, (b) Poona, Satara, Kolhapur and parts of Nasik where temperatures are low during monsoon and winter, (c) Osmanabad, Aurangabad, Bhir, Sholapur, Ahmednagar and Sangli districts which are rain shadow regions of the Western 'Ghats with high summer and low winter temperatures and (d) Vidharba and other areas where there is no marked change in temperature.

10.2.2. Both south-west monsoon and north-east monsoon bring rain to the State. The average annual precipitation is about 107 cm., with wide variations. East of Sabyadri, the decrease in rainfall is marked. Large areas are drought prone and periodic crop failures are common because of erratic monsoon or its failure.

Kadakvasla

10.10.7 The scheme envisages two storage dams one at Panshet and the other at Warasgaon. Work on Panshet dam is almost complete. The ultimate irrigation potential will be 31.16 th. ha. A potential of 16.46 th. ha. had been created by March 1972 and the corresponding utilisation was 11.99 th. ha. or 72.8%.

Mula

10.10.8 The project envisages a dam across river Mula and a canal system ultimately to irrigate 72.08 th. ha. Partial irrigation has commenced from 1971. The created potential by March 1972 was 20.23 th. ha. with a corresponding utilisation of 4.04 th. ha. or 20%. The State Government considers that it is too early to analyse the causes for the lag in utilisation.

Bhima

10.10.9 The Project envisages construction of two storage dams (Pawana and Ujjani) with a canal system ultimately to irrigate 173.05 th. ha. The Pawana dam has been completed and potential was created in 1971. There is no flow irrigation on this dam but lift irrigation was contemplated to serve the created potential of 5.3 th. ha. This has not yet materialised and hence the utilisation was nil.

Bagh

10.10.10 This inter-State project envisages a storage dam, a pick up weir and a canal system ultimately to irrigate 33.67 th. ha. in Maharashtra. The pick up weir is complete and partial potential of 7.21 th. ha had been created by March 1972. The corresponding utilisation was 2.05 th. ha. or 28.4%. State Government feels that it is too early to analyse the causes for lag as irrigation commenced from 1969 only.

Itiadh

10.10.11 The scheme envisages a storage dam across Garvi river and a canal to irrigate ultimately 46.14 th. ha. Work was still in progress and a partial potential of 13.55 th. ha. had been created by March 1972. The corresponding utilisation was 1.08 th. ha. or 8%. The State Government feels that it is too early to analyse the causes for the lag in Utilisation as irrigation commenced from 1970 only.

Medium Schemes

10.11.1 Out of 67 medium irrigation schemes taken up in the Plan period with an ultimate irrigation potential of 289.4 th. ha., only 62 schemes had created some potential each. These 62 schemes will have an ultimate potential of 247.90 th. ha. The potential created by March 1972 was 202.21 th. ha. and the corresponding utilisation 100.78 th. ha. about 50%.

10.11.2 Schemewise details including reasons for lag are given in annexure II. 10.2. It is seen that the most usual causes for under utilisation in medium schemes are as follows :

- (a) Lack of demand for irrigation in kharif season.
- (b) Lack of inflow.
- (c) Field channels lacking or inadequate.
- (d) Farmers need to be educated on irrigated cultivation.

11.4.2 Because the plateau areas of the State are underlain by cystalline rocks, conditions for the creation of ground-water aquired are generally poor.

Land use

11.5 According to the land utilisation statistics for 1969-70, the pattern of land use in Mysore is as given in Table 11.1

TABLE 11.1

Land utilisation statistics—Mysore

<i>Category</i>	<i>Area in m. ha.</i>
1. Geographical area	19.18
2. Area under Forests	2.87
3. Area not available for cultivation	1.78
4. Net area sown	10.20
5. Total cropped area	10.79
6. Net irrigated area	1.14
7. Gross irrigated area	1.40

Ultimate irrigation potential

11.6 Based on the tentative studies made some years back the ultimate irrigation potential by major and medium surface water irrigation projects was indicated as 1.78 m. ha. The final picture can emerge with greater reliability after the quantum of water available for use in Mysore gets delineated.

Pre-plan irrigation

11.7 The major and medium irrigation projects under taken in the pre-plan period (prior to April 1951) created an irrigation potential of 0.307 m. ha. which was being fully utilised.

Plan Project

11.8.1 During the plan period from April 1951 to March 1972, 9 major and 23 medium irrigation schemes were undertaken in Mysore State. Their ultimate irrigation potential would be 1308.29 th.ha. Of these, 3 major and 6 medium schemes with a total ultimate potential of 688 th.ha. were yet to create any potential by March 1972. The remaining 23 schemes had created a potential of 526.7 th.ha. of which 447.8 th.ha. or 85% were being utilised.

11.8.2 The categorywise breakup of all the plan schemes in Mysore State is as given in Table 11.2

TABLE 11 2
Plan projects in Mysore

(area in th.ha.)

Category	No- of schemes	Potential		
		Ultimate	Created	Utilised
<i>I. Major</i>				
(a) Completed	1	272.10	271.73	229.67
(b) Continuing with some potential	5	300.38	210.05	177.04
(c) Continuing without any potential	3	670.68	—	—
<i>II. Medium</i>				
(a) Completed	13	38.29	37.68	36.70
(b) Continuing with some potential	4	9.69	7.24	4.40
(c) Continuing without any potential	6	17.25	—	—
Total	32	1308.29	526.70	447.81

Major Plan Projects

11.9. Up to March 1972, nine major projects were undertaken in the State, their ultimate potential totalling 1243.06 th.ha. Of these, 3 projects having an ultimate potential of 670.68 th.ha. were yet to create any potential under them by March 1972. The remaining 6 major projects (comprising 1 completed 5 continuing projects) account for an ultimate potential of 572.38 th.ha, and had by March 1972 created a total potential of 481.78 th.ha. Their total utilisation stood at 406.71 th.ha. i.e. 84.4 per cent. The particulars of the created potential and the utilisation of individual projects are at Annexure II.11.1. The features of these major projects are briefly described below :

Mysore

General

11.1 The State of Mysore has an area of 1,91,773 sq. km. According to 1971 census the population was 29.26 millions. The State consists of four distinct regions (i) the Coastal between the Western Ghats and the Arabian Sea (ii) Malnad to the east of the Western Ghats (iii) the northern plateau (iv) the southern plateau.

Climate

11.2 The climate of the State is essentially of the tropical monsoon type. The south-west monsoon prevails from June to September and the north-east monsoon from October till December. The average annual rainfall is 119 cm. but it varies from as high as 762 cm. in the Western Ghats to as low as 38 cm. in the eastern and northern parts of the State. There are great variations not only in the intensity of rainfall but also in its distribution. Mysore is exposed to a high degree of risk from drought, with over 75% of the area having a coefficient of variability of rainfall of more than 30%.

Soils

11.3 Three distinct groups of soils are found in the State viz. (i) black soils (ii) red soils including red loams, red sandy soils and red sandy-alluvial soils (iii) laterites and lateritic soils.

River System

11.4.1 The principal rivers serving the State are the Krishna, Pennar, Cauvery, Godavari all flowing east and the Netravati, Sharavathi, Kalinadi etc flowing west.

Tungabhadra Project

11.9.1 Tungabhadra Project is an inter-state project of Mysore and Andhra and comprises a masonry dam across river Tungabhadra at Mallapuram village in Beilary district. There are 3 canal systems viz. (i) Left Bank Canal (ii) Low Level Canal and (iii) High Level Canal. Further, the High Level Canal is being executed in two stages. The features of these canals are as under:—

(a) Tungabhadra Left Bank Canal

This canal taking off from the main dam lies wholly in Mysore State and has an ultimate irrigation potential of 234.7 th.ha. Full potential had already been created; the utilisation by March 1972 stood at 197.9 th.ha. or 84.3%. The principal reason for nondevelopment of full potential were indicated to be inadequate water supply due to assumptions of unworkable duties, inadequate canal capacity for full discharge needed and non-development of infrastructure facilities.

(b) Tungabhadra Low Level Canal

This canal taking off from the right bank benefits both Andhra and Mysore States. The ultimate potential of 37.37 th.ha. contemplated under this canal in Mysore State had already been created and the utilisation stood at 31.77 th.ha. or about 86 per cent. The project authorities consider that the balance area cannot be developed for want of water.

(c) Tungabhadra High level Canal

The High Level Canal takes off from the high level sluices on the right flank of the main dam. This canal with a capacity of 1400 cusec runs for about 110 km. in Mysore State before entering Andhra. Work on the High Level Canal started in 1959 and is being executed in two stages.

Stage I: Full potential of 40.27 th.ha. envisaged under Stage II of the High Level Canal had already been created. However, the utilisation by March 1972 was only 19.18 th.ha. or 47.6% of the created potential.

Stage II: The ultimate potential envisaged under Stage I of the High Level Canal is also 40.27 th.ha. By March 1972, 12.12 th.ha. of potential were created, one third of which i.e. 4.05 th.ha. was being utilised.

The reasons for under-utilisation as reported by the Project Authorities for the High Level Canal were :

- (a) Absentee Land Lordship and excess holdings.

- (b) Irrigation being done in patches, there was wastage of water and tailend lands did not receive adequate supply.
- (c) Lack of land levelling.

It was also made known by the Project Authorities that steps for providing the following facilities were being taken to speed up the utilisation under the High Level Canal system :

- (a) Extension of field channels up to last sub-division of last survey number at the cost of Government.
- (b) Land levelling.
- (c) Credit facilities.
- (d) Warehouses.
- (e) Communication facilities.
- (f) Workshops and
- (g) Mechanisation.

Ghataprabha Project

11.9.2 The Ghataprabha project comprises a weir across the river Ghataprabha near Dhupdal in Belgaum district and a dam across the same river near Hidkal village about 19 km. upstream of the weir. This project is being executed in two stages, Stage I comprising the weir and canal system and Stage II, the dam at Hidkal and extension of the Canal.

Stage I : Work on the Stage I of the Ghataprabha project started in 1949 and is still continuing. Of the ultimate potential of 74.11 th.ha. only 48.58 th.ha. were created up to March 1972 and the utilisation stood at 47.25 th.ha. or 97.3% of the created potential.

Stage II: The Stage II project started in 1959 envisages additional irrigation potential of 46.54 th.ha. under the Left Bank Canal. By March 1972, only 11.45 th.ha of potential were created of which 8.96 th.ha. or 78.3% were being utilised.

The reasons attributed for the under-utilisation of created potential was non-coordination of different components of the project. Due to the uncertainty of the programme of Hidkal Dam it was not possible to develop rabi irrigation in the command. However, a programme has now been drawn for the completion of all the remaining works under the Left Bank Canal simultaneously with the completion of the Hidkal Dam by 1975-76.

Bhadra Project

11.9.3 The Bhadra Project comprises a masonry dam across the river Bhadra with canal system to ultimately create an irrigation potential of 99.09 th.ha. The work commenced in 1947 and is still continuing. The potential created up to March 1972 was 97.6 th.ha which was being utilised fully.

Medium Plan Projects

11.10.1 Twenty three medium plan projects were undertaken in Mysore State during the plan period from April 1951 up to March 1972. Their total ultimate potential is 65.23 th.ha. Of these 6 projects having an ultimate potential of 17.25 th.ha had not created any potential under them by March, 1972. The remaining 17 projects of which 13 were already completed had created a potential of 44.92 th.ha. up to March 1972. The corresponding utilisation had been 41.10 th.ha. or 91.5 per cent of the created potential. The particulars of individual schemes alongwith reasons for lag are at Annexure II.11.2.

11.10.2 It is observed that by and large full utilisation had been recorded in completed schemes.

11.10.3 The lag in utilisation under the continuing medium schemes was due to lack of field channels, inadequate storage in reservoir and slow Ayacut development,

Orissa

General

12.1 The State of Orissa has a geographical area of 155, 842 sq. km. The population of the State according to 1971 census is 21.94 millions. The State comprises an extensive plateau region sloping gently into the coastal plains. The Mahanadi flowing from west to east cuts the plateau into two well-defined parts. The area north of the river is an extension of the Chhotanagpur plateau and the area south of it is covered with Eastern Ghats.

Climate and Rainfall

12.2 The climate of Orissa is characterised by high temperatures and medium to high rainfall. The mean annual temperature is 33°C rising to 38°C in April and May, falling to 35°C in July and to about 27°C in January. The mean annual rainfall of the State varies from 140 cm. to 160 cm. About 81% of precipitation is received during June to September mainly from south west monsoon.

Land and Soils

12.3 The coastal plain is formed of alluvial soils and is, agriculturally, most important. The Central table land includes number of erosional plains and river basins. The Northern plateau is hilly, heavily forested and unsuitable for agriculture. The Eastern Ghats region has laterite soils.

Land Utilisation

12.4 According to the land utilisation statistics of 1969-70, the pattern of land use is as given in the Table 12.1

TABLE 12.1
Land Utilisation Statistics-Orissa

<i>Category</i>	<i>Area in m ha</i>
1. Geographical area	15.58
2. Area under forests	4.96
3. Area not available for cultivation	1.80
4. Net area sown	6.09
5. Total cropped area	8.38
6. Net irrigated area	1.03
7. Gross irrigated area	1.42

River Systems and Water Resources

12.5 Orissa is served by many rivers, most of them being rainfed. The main rivers are, Mahanadi, Baitarani, Brahmani and Vamsadhara. A portion of the Godavari basin also lies in the State. The average annual run off of the principal rivers in Orissa has been assessed as 166 milliard cu.m.

Ultimate Irrigation Potential

12.6 Pending further studies, the ultimate irrigation potential of Orissa by major and medium surface water schemes has been tentatively assessed as 3.6 m.ha.

Pre-Plan Projects

12.7 Prior commencement of the Plans in April, 1951, the irrigation potential from major and medium irrigation schemes was 0.455 m.ha. which was being fully utilised. The important projects are the Orissa Canal System and the Rushi Kulya Canal System.

Plan Projects

11.8 Since the commencement of planned development in April, 1951 and up to March, 1972, Orissa initiated work on 3 major and 12 medium irrigation schemes with an ultimate irrigation potential of 1.1 m.ha. Of these, 5 medium projects with an ultimate potential of 31.5 th.ha. had not so far created any potential. The remaining 3 major and 7 medium project which will have an ultimate potential of 1021 th.ha had up to march, 72 created a potential of 723 th.ha and the corresponding utilisation was 706 th.ha or 8% of created potential. Schemewise details are at annexures II.12.1 and II.12.2 and categorywise summary is given in table 12.2.

TABLE 12.2
Plan Projects in Orissa

(Area in th. ha.)

Category	No. of schemes	Potential		
		Ultimate	Created	Utilised
I. Major				
(a) Completed	1	253.75	247.67	244.43
(b) Continuing with some potential	2	751.38	422.90	408.53
(c) Continuing with no potential	...	...	...	...
II. Medium				
(a) Completed	3	14.29	14.29	14.29
(b) Continuing with some potential	4	51.60	38.09	38.09
(c) Continuing with no potential	5	31.50	...	...
Total:	15	1102.52	722.95	706.34

Major Projects

12.9 Orissa undertook 3 major projects since April, 1951 of which one has been completed. The ultimate irrigation potential of the 3 schemes will be 1.m.ha. The potential created up to March' 72 was 0.67 m.ha. and the corresponding utilisation was 0.65 m.ha. or 97%. Schemewise details are at annexure II.12.1. These are briefly described below.

Hirakud Dam Project

12.9.1 The Hirakud dam Project has been completed. The ultimate potential of the scheme is 253.75 th.ha. of which 247.67 th.ha. of potential had already been created. With the completion of remaining work in two small distributaries, full potential would be created. The utilisation was 244.43 th.ha. which is satisfactory.

Mahanadi Delta Project

12.9.2 The Mahanadi Delta Scheme comprises a diversion weir across the Mahanadi at Mundali, remodelling of existing anicuts at Jobra and Birupa and the old canal system and construction of new canals for extending irrigation. The ultimate irrigation potential is 684.0 th.ha. Approved in 1953, construction on the scheme commenced in 1957 and has been going on in a slow pace.

Up to march, 1972, a potential of 373.93 th.ha. had been created and the corresponding utilisation was 360.56 th.ha. It was indicated that the kharif utilisation is full but during rabi season utilisation falls short.

The construction of field channels is left to the cultivators and past experience indicates that there is considerable wastage of water due to field to field irrigation. Lack of field channels and ayacut development programme stand in the way of development.

Salandi Project

12.9.3 The Salandi Irrigation Project comprises a storage dam and a barrage across the river Salandi with a canal system taking off from the barrage ultimately to irrigate 67.4 th. ha.

The dam, except for the bridge over the masonry portion and the radial crest-gates, has been completed. The barrage is also completed and the entire canal system is nearing completion.

The potential created up to March, 1972 was 49.0 th. ha. and this was being fully utilised. When the crest gates are installed full potential will be created.

Medium Projects

12.10 The created potential, under the seven medium schemes, of 52.58 th ha. was being fully utilised which is very satisfactory. Schemewise details are given in Annexure II. 12.2

Land Utilisation

13.4 According to the land utilisation statistics (of 1969-70), the pattern of land use is as given in table 13.1.

TABLE 13.1

Land Utilisation Statistics—Punjab

<i>Category</i>	<i>Area in m. ha.</i>
1. Geographical area	5.04
2. Area under forests	0.12
3. Area not available for cultivation	0.64
4. Net area sown	4.03
5. Total cropped area	5.50
6. Net irrigated area	2.84
7. Gross irrigated area	4.08

Ultimate irrigation Potential

13.5 Tentative studies on ultimate irrigation potential of the combined Punjab State (including Haryana) put the ultimate irrigation potential from major and medium irrigation schemes at 4.92 m. ha. Separate figures for Punjab are not available. The Irrigation Commission, however, indicated this figure to be about 2.48 m. ha.

Pre-Plan Irrigation.

13.6 Punjab has some of the oldest irrigation systems of India, such as the Upper Bari Doab Canal, Sirhind Canal, etc. The pre-Plan (1951) irrigation potential by major and medium irrigation schemes for combined Punjab and Haryana was 1.656 m. ha. The break-up is, however, not available.

Plan Projects :

13.7 During the Plan period from April'51 and up to March'72, Punjab undertook some of the big irrigation projects of India. Altogether, 4 major and 6 medium projects were undertaken which have a total ultimate irrigation potential of 1151.38 th.ha. in Punjab. Of these, 2 major schemes with an ultimate potential of 483 th.ha. had not created any potential by March'72. The remaining 2 major and 6 medium schemes all of which had been completed, had created a potential of 668.38 th.ha.

which had been fully utilised. Schemewise details of potential created and utilisation are at Annexures II.13.1 and II.13.2 The categorywise position is given in Table 13.2

TABLE 13.2
Plan Projects in Punjab

(Area in th.ba.)

Category	No. of Projects	Potential		
		Ultimate	Created	Utilisation
<i>I. Major</i>				
(a) Completed	2	566.35	566.35	566.35
(b) Continuing with some potential	—	—	—	—
(c) Continuing with no potential	2	483.00	—	—
<i>II. Medium</i>				
(a) Completed	6	102.03	102.03	102.03
(b) Continuing with some potential	—	—	—	—
(c) Continuing with no potential	—	—	—	—
Total :	10	1151.38	668.38	668.38

Major Projects :

13.8 In the Plan period up to March '72 Punjab took up 4 major projects with an ultimate irrigation potential of 1049.35 th.ba. Of these, 2 schemes with an ultimate potential of 483 th.ba. had not created any potential, by March '72. The remaining 2 schemes had created a potential of 566.35 th.ba. all of which was fully being utilised.

Details of these are in Annexure II.13.1. Brief particulars of major schemes are as follows :

Bhakra-Nangal

13.8.1 The Bhakra-Nangal Project comprises Bhakra dam and the Nangal barrage across the Sutlej with a canal system ultimately to irrigate 552.46 th.ha. in Punjab. The ultimate potential had been created and was being fully utilised by March'72.

Harike Project (Makhu Canal)

13.8.2 The Harike project comprises a barrage at Harike across the Sutlej and a canal ultimately to irrigate 13.89 th.ha. The ultimate potential had been created and was being fully utilised by March'72.

Medium Projects

13.9 Punjab undertook 6 medium irrigation schemes between April'51 and March'72, all of which had been completed. Their ultimate irrigation potential is 102.03 th.ha. The full potential had been created and was being fully utilised by March'72.

Schemewise details are at Annexure II,13.2.

Rajasthan

General

14.1.1 Rajasthan is the second largest State in the Indian Union with an area of 342,214 sq. km.

14.1.2 The population of Rajasthan according to the 1971 census is 25.7 millions with a density of population of 75 per sq. km. against the all India figure of 182 per sq. km.

14.1.3 The State can be divided into the following four physiographic divisions :

1. Aravalli Range and the Hill Region,
2. Western Sandy Plains,
3. Eastern Plains, and
4. South-Eastern Pathar (Hadoti Plateau).

Climate

14.2 The State has three major seasons viz. (i) the hot weather (March to mid-June) (ii) the rainy season (mid-June to September) and (iii) the cold weather (October to February). The climate of Rajasthan, west of the Aravallies, as of other desert and semi-desert regions, is characterised by great extremes of temperatures and long periods of severe drought. Winter is quite cold and at places the temperature sometimes falls below freezing point. The heat during the summer is intense touching 48°C. In the east and south of the Aravallies there is considerable variation in the amount of rainfall and range

Punjab

General

13.1 The State of Punjab has a geographical area of 50,360 sq. km. The population according to the 1971 census was 13.47 millions. The State has two major physiographical divisions, viz. the sub-montane tract and the alluvial plains. The plains are part of the Indo-Gangetic Plain.

Climate

13.2.1 Punjab experiences hot weather from April to June, has the rainy season from July to September and has cold weather from October to March. In summer, the temperature goes up to 43°C but in winter it goes down to 4°C or even below.

13.2.2 The south-west monsoon gives the principal precipitation which varies from 40 cm. to 80 cm. in the plains and from 80 cm. to 115 cm. in the sub-montane tract.

River Systems

13.3.1 The three principal snowfed rivers in the State are the Sutlej, the Beas and the Ravi. The Ghaggar river flows for some distance along its boundary. There are some other small hill torrents. The Indus Waters Treaty governs the use of the flows in the Indus system.

13.3.2 Punjab possesses large resources of ground water. A programme of ground water studies has been recently initiated.

of temperature. Climatically Rajasthan is the driest State of India with a large extent of chronically drought affected area. The 50 cm. isohyetal line which runs along the western edge of the Aravalli range divides the State into two parts. To the east and south of this line, the rainfall gradually increases, whereas to the west it rapidly decreases. On an average, the State receives 53.6 cm. of rainfall but there are wide variations in its distribution.

Soils

14.3 The desert soil occupies the largest area of Rajasthan. West of the Aravallis is covered by sand dunes. There are also regions with grey, brown, red and black soils as also some alluvial belt.

Land Use

14.4 According to land utilisation statistics (1969-70), the pattern of land use in Rajasthan is as given in Table 14.1

TABLE 14.1

Land Utilisation Statistics-Rajasthan

<i>Category</i>	<i>Area in m.ha.</i>
1. Geographical area	34.22
2. Area under forests	1.34
3. Area not available for cultivation	5.88
4. Net area sown	13.10
5. Total cropped area	14.27
6. Net irrigated area	2.06
7. Gross irrigated area	2.42

River Systems and Water Resources

14.5 Broadly speaking there are three main drainage systems :

- (i) The Luni System,
- (ii) The Mahi and Sabarmati Rivers, and
- (iii) The Chambal river and its tributaries.

The average annual flow in the Rajasthan rivers has been roughly assessed as about 21 milliard cu. m.

Ultimate Irrigation Potential

14.6 According to a tentative study, the ultimate irrigation potential by major and medium projects in Rajasthan has been assessed as 3,156 m. ha.

Pre-Plan Achievement

14.7 In the pre-Plan period, the irrigation potential created by major and medium irrigation projects was 323.76 th. ha, which was being fully utilised.

Plan projects

14.8. During the Plan period i.e. April '51 to March '72, Rajasthan took up 7 major and 50 medium irrigation projects with a total ultimate irrigation potential of 1,345 th. ha. Of these, 3 major and 5 medium schemes with a total potential of 89.8 th. ha. had not created any potential under them by March '72. The remaining 4 major and 45 medium schemes created a potential of 806.9 th. ha. by March '72 and the corresponding utilisation stood at 712.2 th. ha. or 88.3%. Details are in annexures II. 14.1 and II. 14.2 and category wise position is given in table 14.2.

TABLE 14.2
Plan Projects in Rajasthan

(Area in th. ha.)

Category	No. of Projects	Potential		
		Ultimate	Created	Utilised
<i>I. Major</i>				
(a) Completed	1	230.7	230.7	239.6
(b) Continuing with some potential	3	880.3	431.0	335.5
(c) Continuing with no potential	3	67.5	—	—
<i>II. Medium</i>				
(a) Completed	44	137.1	137.1	137.1
(b) Continuing with some potential	1	8.1	8.1	—
(c) Continuing with no potential	5	22.3	—	—
Total	57	1346.0	806.9	712.2

Major Projects

14.9 7 major projects were taken up between April '51 and March '72 with an ultimate irrigation potential of 1178.5 th. ha. 3 of these with an ultimate potential of 67.5 th. ha. had not created any potential by March '72. The remaining schemes had created a potential of 661.70 th. ha. The corresponding utilisation stood at 575.10 th. ha. or 87%. Schemewise particulars of these are in annexure II. 14.1. Brief particulars about these schemes are as under :

Bhakra-Nangal

14.9.1 This is an inter-State project already briefly discussed under Haryana and Punjab. The ultimate potential in Rajasthan under the scheme is 230.7 th. ha. which had been fully created. The potential was being more than fully utilised.

Chambal Project (Stages I & II)

14.9.2 The Chambal Project is also an inter-State project with Madhya Pradesh sharing the costs and benefits equally. Brief details of the scheme have been discussed under Madhya Pradesh.

The ultimate irrigation potential of the project was 567 th. ha. to be equally shared by Rajasthan and Madhya Pradesh. The full potential possible had been created with the substantial completion of all works relevant to irrigation. The actual performance of the scheme has not come up to original expectations.

According to the original project, the culturable command of the scheme in Rajasthan was taken as 370 th. ha. (9.22 Lakh acres) and the annual intensity of irrigation 76% of the C.C.A. (21% in kharif and 55% in rabi). The ultimate irrigation potential was taken as 283 th. ha. (7 lakh acres).

The culturable command has, however, been since scaled down on the basis of village Shajra sheets to 342 th. ha. (8.45 lakh acres), and even this is divided as under :

1. Area coming under flow command	229 th. ha. (5.66 lakh acres)
2. Area under ravines	73 (1.80)
3. Area under lift command	40 (0.99)
	<hr/>
Total	342 (8.45)
	<hr/>

Thus, the present canal system, as executed, can serve by flow irrigation a C.C.A. of 229 th. ha. till a "ravines reclamation scheme" is executed and/or "a lift project" is undertaken.

On a consideration of all relevant factors, a revised cropping pattern (112% annual intensity suggested by a UNDP Project in the command) has been proposed by Rajasthan. However, for the present, the "potential created" has been considered as the reduced C.C.A. under flow irrigation multiplied by original annual intensity of of irrigation i.e. 229 th. ha. $\times \frac{76}{100}$ or 174 th. ha.

The figure will ultimately go up to 283 th. ha.

The irrigation utilisation has not been satisfactory. The utilisation by March '72 was only 152.75 th. ha. which was 88% of the "reduced created potential" or 60% of the "proposed ultimate potential". The shortfall is largely attributed to non-development of kharif irrigation. Irrigation during kharif is stated to have been handicapped primarily due to the long closure of the canal system for removal of weeds.

The Chambal command started facing serious problems of impeded drainage and salinity in large areas within the few years of the commencement of irrigation. Water leakage and seepage from the canal system and field water courses, lack of suitable pre-irrigation extension/demonstration programme coupled with the present unsatisfactory land and water management practices adopted by the farmers as also the inadequate facilities so far made for drainage have all combined to give rise to these problems.

Rajasthan Canal (Phase I)

14.9.3 The Rajasthan Canal takes off at Harike and enters Rajasthan in Ganganagar district to bring irrigation to its desert lands. The command area generally lies to the west of the canal up to Indo-Pakistan border. The ultimate irrigation potential (in Stage I) in Rajasthan is 597.0 th. ha. The potential created by March '72 was 257.0 th. ha and the corresponding utilisation stood at 182.0 th. ha or 70.8%.

The State authorities have considered that the utilisation is in accordance with the pace of development anticipated in the project report (in the non-perennial stage) viz, for channels taking off upstream of 22nd km. a development period of 6 years and for the remaining channels a development period of 10 years. (The development period in the perennial irrigation stage is taken as 14 years).

The full utilisation of the irrigation potential under the project has its own problems because of the peculiarity of the project area. The task of colonisation is also formidable. It is, however, considered that the pace of utilisation can be faster if intensive ayacut development works are taken up on a systematic basis. Rajasthan Govt. have recently prepared a project for this purpose. It has also been held that allotment of land on permanent basis should be taken up on a priority basis to accelerate the pace of development.

Medium Irrigation Projects

14.10.1 Between April'51 and March'72, 50 medium irrigation schemes were taken up with an ultimate irrigation potential of 167.5 th.ha. Of these, 5 schemes with an ultimate potential of 22.3 th.ha had not created any potential. The remaining 45 schemes had created a potential of 145.2 th.ha. The corresponding utilisation was 137.1 th.ha.

14.10.2 Of these 45 schemes, 44 have been completed and one viz. Kalisindh is under execution. The Kalisindh scheme (Harishchandra Sagar) is one of restoration after a breach due to which the potential created under that scheme remained unutilised.

The remaining 44 completed schemes had recorded full utilisation.

14.10.3 Details of these schemes with reasons for lag are at annexure II.14.2. In Rajasthan, the medium irrigation works are by and large storage schemes to impound monsoon run off of seasonal streams for irrigation in the ensuing rabi season. The annual fluctuations in inflows account for the annual changes in utilisation ; otherwise there was no under utilisation.

Tamil Nadu

General

15.1.1 The southern State of Tamil Nadu has a geographical area of 130,357 sq km. with a population of 41.1-Million in 1971, it had a density of population of 316 persons per sq.km. About 70 % of the people live in the rural areas and over 60% of the people are employed in agriculture.

15.1.2 There are four main physiographic regions viz. (i) coastal plains, (ii) Eastern Ghats, (iii) Central Plateau and (iv) Western Ghats.

Climate

15.2.1 The State has a tropical climate, with the maximum seldom exceeding 44°C or going below 18°C.

15.2.2 Although both south-west and north-east monsoons bring rain to the State, a large territory lies in the rain shadow of Western Ghats with a rainfall of 50 to 100 cm. The average monsoon rainfall over the State is around 100 cm.

River Systems

15.3.1 Cauvery is the most important river of Tamil Nadu. Other important rivers are the Vaigai, Tambraparani, Palar, Ponnaiyar and Vellar. While the Cauvery and Tambraparani have a small extent of flow during summer, the other rivers completely dry up in the hot season.

15.3.2 The available surface flows of the State have been estimated at 19.7 milliard cubic meter and the utilisation around 17.8 milliard cubic meter. With about 90% of its waters harnessed for irrigation, Cauvery is one of the best regulated and fully used rivers of India, the most ancient work across which is reported to have been built in the first Century A.D. Since the other rivers are not of great importance, it can be taken that most of the surface water potential has already been harnessed.

Land and Soils

15.4.1 The soils of Tamil Nadu could be grouped as under :

- | | |
|----------------------------|--|
| (i) Red and laterite soils | (Almost in every district but predominantly in Madurai, North Arcot, Chingleput, Salem, Coimbatore etc.) |
| (ii) Black soils | (Ramanathapuram, Thanjavaur, Tiruchi, South Arcot) |
| (iii) Alluvium | (Cauvery delta in Thanjavur and Tiruchi) |
| (iv) Forest & Hill soils | (Nilgiri and Kanyakumari districts) |

15.4.2 According to the land utilisation statistics for 1969-70, the pattern of land use in Tamil Nadu is as given in Table 15.1

TABLE 15.1

Land utilisation statistics—Tamil Nadu

<i>Category</i>	<i>Area in m.ha.</i>
1. Geographical area	13.01
2. Area under forests	2.02
3. Area not available for cultivation	2.33
4. Net area sown	6.07
5. Total cropped area	7.16
6. Net irrigated area	2.51
7. Gross irrigated area	3.27

15.4.3 As nearly half the cultivated area is irrigated, Tamil Nadu occupies a predominant position in agriculture. Rice is the most important crop, the others being jowar, small millets, groundnut, sugarcane and cotton.

Ultimate irrigation potential

15.5 The ultimate irrigation potential of Tamil Nadu has been tentatively estimated as about 3.7 m.ha. as under :

	m.ha.
1. Major & medium surface water works	1.61
2. Minor works (including ground water sources)	2.13
	3.74

Pre-Plan achievements

15.6 In the pre-plan period upto April 1951 the irrigation potential created by major and medium schemes was 1.14 m.ha. which was being fully utilised.

Plan projects

15.7 During the Plan period from April 1951 upto March 1972, Tamil Nadu undertook 5 major and 24 medium irrigation projects with an ultimate potential of 287.41 th.ha. The potential created by March 1972 was 232.96 th. ha. and the corresponding utilisation stood at 196.24 th. ha. The details are at annexures II.15.1 & II.15.2.

The category-wise picture is given in table 15.2.

TABLE 15.2
Plan Projects in Tamil Nadu

Category	No. of schemes	Potential (area in th.ha.)		
		Ultimate	Created	Utilised
I. Major				
(a) Completed	3	100.09	100.09	93.39
(b) Continuing with some potential	1	97.13	57.06	30.13
(c) Continuing with no potential	1	5.63	—	—
II. Medium				
(a) Completed	13	76.22	75.81	72.72
(b) Continuing with some potential	—	—	—	—
(c) Continuing with no potential	11	8.34	—	—
Total	29	287.41	232.96	196.24

Major Projects

15.8 Of the five major projects with an ultimate irrigation potential of 202.85 th.ha. which were taken up, one scheme had not created any potential by March 1972. Of the remaining four, three with an ultimate irrigation potential of 100.09 th.ha. had been completed. One more scheme which would ultimately irrigate 97.13 th. ha. is under construction with partial potential. The total potential created by the major schemes by March 1972 amounted to 157.15 th. ha. with a corresponding utilisation of 123.52 th.ha. Particulars of the schemes are at annexure II.15.1.

Lower Bhavani

15.8.1 The Lower Bhavani Project completed in 1956 comprises a storage dam across the Bhavani with a canal system to irrigate ultimately 78.92 th.ha. The full potential had been created and was being fully utilised.

Manimuthar Dam

15.8.2 The Manimuthar scheme completed in 1958 comprises a storage dam across Manimuthar, a tributary of the Tambraparni, with a canal system to irrigate ultimately 8.09 th.ha. of new area in addition to stabilisation of previous irrigation. The new potential had been fully created and was being fully utilised.

Chittar-Pattanamkal

15.8.3 This project will comprise of increasing the storage in an existing dam, construction of two new earthen dam across the two Chittar rivers above their confluence with Kodayar and a canal system, which will irrigate 19 th.ha., of which 13.1 th.ha. will be new area (and 5.9 th.ha. stabilisation of old areas). All major works have been physically completed except for fixing up shutters and cranes, etc. The entire potential under the scheme had been just created by March 1972 and the corresponding utilisation stood at 6.38 th.ha. or 49% of created potential.

The Project Authorities consider that it would be too early to analyse the reasons for the shortfall in utilisation as partial utilisation started only in November, 1970 and full potential has been just created.

Parambikulam-Aliyar Project

15.8.4 Parambikulam-Aliyar project is a multi-purpose, multi-valley project which contemplates utilisation of water and power resources of the inter-State rivers on the Western Ghats for the benefit of Tamil Nadu and Kerala. The available cultivable command is 202 th.ha. but on the basis of water availability the irrigation potential in Tamil Nadu is limited to 97.13 th.ha. in addition to stabilisation of existing irrigation.

The ayacut under the project will be mainly irrigated dry, wet cultivation being confined to low lying, seepage-affected pockets up to a maximum of 20% of the total ayacut. By March 1972, the execution of the various project components were completed except for the Nirar Dam and Nirar weir at an upper site. Owing to the non-completion of the Nirar complex, the full irrigation potential of 97.13 th.ha. could not be created so far. An irrigation potential of 57 th.ha. had been created. However, the corresponding utilisation achieved by March 1972 was 30.13 th.ha. i.e. about 53%.

The main reason given for this lag is that due to the partial potential created, water is being given to the cultivators only in alternate years by turn, due to which the cultivators are unwilling to develop the land till they are assured of water every year. The State Government expects to add a further potential of 31 th.ha. on the completion of the Upper Nirar weir. The balance 9 th.ha. potential can be created only after the lower Nirar dam is commissioned which matter is linked with inter-State issues.

The Parambikulam Aliyar project is in many ways an unique scheme. Under the scheme the main canals, distributaries and minors up to 20 ha. limit have been fully lined. Also excavation of field channels up to 10 ha. has been done at Government cost and for the excavation of field channels below 10 ha. and up to 2 ha., help is rendered by the Government to the cultivators. The Project Utilisation Team headed by a Special Officer of the rank of a Collector is functioning in the project under the guidance of a Coordinating Board with a Member of the Board of Revenue as Chairman. A scheme for credit facilities for land reclamation purchase of seeds, fertilisers, etc. is also being implemented.

Medium Schemes

15.9 Of the 24 medium schemes taken up in the Plan period, 11 had not created any potential. The remaining 13 schemes, all of which have been completed have created a potential of 75.81 th. ha, with the corresponding utilisation of 72.72 th. ha. or 96% of created potential. Schemewise details including reasons for lag are given in annexure II.15.2.

monsoon period. The southern plains consisting of parts of Allahabad, Banda and Varanasi, and the whole of Mirzapur district are low rainfall areas and frequently suffers from drought.

Land and Soils

16.3.1. A wide variety of soils is met with in different parts of the State. The soils in the northern mountainous part are generally red loams, brown forest soils, pod soils and meadows soils. The soils in the Gangetic plains fall into two categories i.e. (i) Older alluvium (Bangar) and (ii) newer alluvium (khadar). The main soils occurring in the eastern parts are sandy loams to loams. The southern part of the state consists of mixed red and black soils.

16.3.2. According to the land utilisation statistics for the year 1969-70 (which is the latest year for which details are available) the pattern of land use is as given in table 16.1.

TABLE 16.1
Land utilisation statistics—U.P.

Category	Area in m. ha.
1. Geographical area	29.44
2. Area under forests	4.01
3. Area not available for cultivation	4.49
4. Net area cultivated	17.48
5. Total cropped area	22.88
6. Net irrigated area	6.82
7. Gross irrigated area	7.93

River systems and Water Resources

16.4. The three main rivers Yamuna, Ganga and Ghaghara and their tributaries serve the state. Though no proper survey has yet been undertaken, it is estimated that the total water resources of the Ganga basin are about 432 milliard cubic metres out of which about 308 milliard cubic metres pass through the state.

Ultimate irrigation potential

16.5. According to a tentative assessment the ultimate irrigation potential from major and medium irrigation projects in Uttar Pradesh was put at 11.2 m.ba.

Pre Plan achievement

16.6. The irrigation potential created by major and medium schemes in the preplan period was 1.99 m. ha. which was being fully utilised.

Plan Projects

16.7. In Uttar Pradesh 12 major and 44 medium Projects with a total ultimate potential of 2738 th. ha. were undertaken during the plan period from April 1951 to March 1972. Of these 1 major and 6 medium projects having a total ultimate potential of 714.45 th. ha. had not created any potential under them by March 1972. The remaining ones of which 9 major and 37 medium projects were already completed, had created a total potential of 1186.27 th. ha. by March 1972. The corresponding utilisation was 1045.60 th. ha. The categoriwise particulars of the projects are given in Table 16.2.

TABLE 16.2.
Plan Projects in Uttar Pradesh

(Area in th. ha.)

Category	No. of schemes	Potential		
		Ultimate	Created	Utilised
<i>I. Major</i>				
(a) Completed	9	334.53	334.53	313.59
(b) Continuing projects with some potential	2	967.19	155.80	118.45
(c) Continuing projects without any potential	1	621.18	...	...
<i>II. Medium</i>				
(a) Completed projects	37	670.04	670.04	597.37
(b) Continuing projects with some potential	1	52.61	25.90	16.19
(c) Continuing projects without any potential	6	92.97	...	...
Total	56	2738.52	1186.27	1045.60

Major Plan Projects

16.8. During the Plan period from April 1951 to March 1972, Uttar Pradesh had undertaken 12 major projects envisaging a total ultimate potential of 1922.90 th. ha. Their particulars are at annexure II-16.1. Except the Sarda Sahayak Pariyojana Stage-1, which has an ultimate potential of 621.18 th. ha. and had not created any potential by March, 1972, the other major projects had totally created a potential of 490.33 th. ha. by March 1972 and their corresponding total utilisation was 432.04 th. ha. 6 of the 11 projects which had created some potential under them work on only two projects viz, Ramganga and Gandak was still continuing.

The features of the 11 major projects with some potential are briefly described below:—

Gandak Project

16.8.1 The Gandak Project is an interstate project of Uttar Pradesh and Bihar built with the cooperation of Nepal. The features of this project are already described under Bihar state.

The western Gandak canal project which is the portion of the Gandak project pertaining to Uttar Pradesh, contemplates to irrigate ultimately 308.37 th. ha. in the Gorakhpur and Deoria districts. The project started in 1961 had created a potential of 66.77 th. ha. upto March 1972 and the corresponding utilisation stood at 29.42 th. ha.

The state authorities have considered that the utilisation of created potential in U.F. is as per the targets already drawn and that there is no under utilisation. The earlier utilisation targets set for the years 1969-70 and 1970-71 could not be achieved which led to the preparation of a revised schedule. In order to ensure quick utilisation of created potential the following steps could be taken.

- (a) Expeditious land shaping and construction of field channels.
- (b) Consolidation of land holdings.
- (c) Proper crop planning, Agricultural demonstration and extension services
- (d) Organising agricultural inputs, including credit.
- (e) Ayacut development programme

Ramganga Project

16.8.2 The Ramganga project is a multipurpose river valley project comprising of a dam across river Ramganga near Kalagarh. a pickup barrage at Hareoli about 26 km. down stream of the dam with a 82 km. long feeder channel, remodelling of the barrage at Narora and construction of a new and remodelling of the existing canal systems for irrigating an ultimate area of 658.82 th. ha. in 12 districts of Uttar Pradesh extending from Saharanpur to Allahabad.

This project was started in 1962 and is expected to be completed by 1975-76.

The irrigation potential created upto March 1972 under this project was 89.03 th. ha. which was being fully utilised.

Matatila Project

16.8.3 Matatila project comprises the storage dam across river Betwa, 56 km. south-west of Jhansi with a canal system to irrigate an ultimate area of 120.43 th. ha. This project started in 1952 and was completed in 1966. It had created the full potential contemplated and the utilisation was also 100%.

Sarda Sagar Project Stage II:—

16.8.4 The stage II of Sarda Sagar Project comprises a dam across the river Chuka, a tributary of the Ghagra River with a canal system to irrigate an area of 74.95 th. ha. This project started in 1957-58 was completed in 1962. The ultimate potential envisaged under this projects had already been created and fully utilised also.

Balmiki (Ohen) Sarowar:—

16.8.5 This scheme envisages ultimate irrigation to 6.27 th. ha. The full potential had been created and the utilisation is also full.

Jirgo Reservoir:—

16.8.6 The Jirgo reservoir scheme envisages ultimate irrigation of 25.9 th. ha. in Mirzapur. The scheme was completed by 1952 and full potential created. The utilisation was only 20.29 th. ha. i.e. 78%. The reasons for lag are lack of sufficient field channels, non-achievement of desired crop pattern and lack of agricultural extension service.

Kwano pumped canal:—

16.8.7 This scheme envisages ultimate irrigation of 8.59 th. ha. in Basti Dt. It was completed by 1965 and full potential has been created. The utilisation was however only 4.71 th. ha. or 55%. The reasons for the lag are similar to those for Jirgo reservoir.

Meja reservoir:—

16.8.8. The Meja reservoir envisages ultimate irrigation to 21.20 th. ha. The full potential had been created but the utilisation was only 15.37 th. ha. or 73%. The reasons for lag are similar to those for Jirgo reservoir.

Uttar Pradesh

General

16.1.1. Uttar Pradesh has an area of 294,413 sq. km. The state's population is 88.37 millions as per 1971 census/which makes it the most populated state of India. Agriculture is the predominant occupation of the people with 75 percent of working population depending on it for livelihood.

16.1.2. The state has three main physical divisions, i.e. the mountainous Himalayan region in the north, the Gangetic plain in the centre and the low hills and plateau land in the south.

Climate

16.2.1. The state has a tropical climate, but there are great variations of temperature on account of altitude. The Himalayan region has a very cold climate except in valleys where the cold is less intense and the summers are warm. Snow is precipitated from December to March and some peaks remain under perpetual snow. In the plains the average temperature varies from a minimum of about 3-4° C in January to a maximum of 43-45° C in May and June.

16.2.2. The annual rainfall in the state varies from region to region. It is roughly 100-200 cm. in the Himalayan region, about 100 cm. in the sub-Himalayan belts, about 60-100 cm. in the West and Central Gangetic plain and between 100-200 cm. in the eastern plain. The southern hills and plateau get a rainfall of over 100 cm. but portions of the Jhansi and Banda districts and the whole of the Jalaun and Hamirpur districts get less. Nearly 87 percent of the annual rainfall is received during the

Nanaksagar:—

16.8.9. The scheme envisages ultimate irrigation to 53.71 th. ha. The full potential had been created and the utilisation was also 100%.

Tumaria reservoir:—

16.8.10. The scheme envisages ultimate irrigation to 16.19 th. ha. in Nainital Dt. Full potential had been created by 1966 but utilisation was 11.74 th. ha. or 73%. The reasons for lag are similar to those for Jirgo reservoir.

Upper Khajuri:—

16.8.11. The scheme envisages irrigation of 7.29 th.ha. in Mirzapur and was completed by 1962. Full potential had been created and utilisation was 6.12 th.ha. or 84%. Reasons for lag are similar to those of Jirgo reservoir.

Medium Projects

16.9.1 During the plan period from April 1951 to March 1972, 44 medium projects with a total ultimate potential of 815.62 th.ha. had been undertaken in Uttar Pradesh, of which 6 projects with an ultimate potential of 92.97 th.ha. had not created any potential under them. Of the remaining 38 projects, except Tons pumped canal, all other projects had been completed by March 1972. The ultimate potential contemplated under these 38 projects was 722.65 th.ha. of which a total potential of 695.94 th.ha. had been created by March 1972. The corresponding utilisation was 613.56 th.ha. The details of these 38 medium schemes including reasons for lag are at Annexure II-16.2.

16.9.2. It is observed that the utilisation in respect of medium completed schemes is by and large satisfactory. In those few projects where the utilisation is lagging, the reasons for the same are generally as under:

- (a) Lack of field channels,
- (b) Desired crop-pattern not achieved, and
- (c) Lack of extension and demonstration services.

In the case of Bhopali, Dalmau and Zamania pumped canals, these projects were completed only recently and the utilisation is yet to pick up momentum.

West Bengal

General

17.1 West Bengal has a geographical area of 87,676 sq. km. According to 1971 census the population was 44.44 millions with a population density of 507 against the average of 182 per sq. km. for India.

Climate

17.2.1 The climate of West Bengal is generally of tropical nature except that the temperature in the Himalayan districts ranges from below 0°C in winter to over 27° C in summer. The summer temperature in the plains ranges from 27° C to 43° C. Due to the proximity of the sea there are no extremes.

17.2.2 The average rainfall in the State is about 175 cm. The rainfall occurring during the monsoon months (June to September) is 125 cm. However, there are wide regional variations. The Himalayan region receives the heaviest rainfall ranging from 250 cm to over 500 cm., while the plains districts receive an average rainfall of 112.5 cm to 187.5 cm. Among the plains districts Jalpaiguri receives the highest rainfall (390 cm) and Bankura the lowest (117.5 cm.). Due to these wide variations the State frequently suffers both from drought and floods.

Land use

17.3 According to the land utilisation statistics for 1964-65 (which is the latest year for which details are available) the pattern of land use is as given in table 17.1.

TABLE 17.1

I and utilisation statistics-West Bengal

<i>Category</i>	<i>Area in m. ha.</i>
1. Geographical area	8.79
2. Area under Forests	1.11
3. Land not available for cultivation	1.29
4. Net sown area	5.57
5. Total cropped area	7.05
6. Net irrigated area	1.48
7. Gross irrigated area	1.50

Soils

17.4 The soils in West Bengal can be broadly classified into four principal types.

- (a) The brown podsolic soil (in sub-Himalayan districts of Darjeeling, Jalpaiguri and Cooch Behar).
- (b) Red laterite soil (in districts of Midnapore Bankura, Burdwan, Birbhum and Purulia).
- (c) Alluvial soil (in north and south plains of the state covered by the Gangetic Plain).
- (d) The mangrove soils (in the estuarine swamps of the south 24-Paraganas and Midnapore districts).

River Systems

17.5 The principal rivers of West Bengal are broadly grouped into four systems (1) The northern system (consisting of perennial rivers Tista, Torsa, Jaldhaka) (2) Central System (The Bhagirathi-Hooghly-an arm of the Ganga) which enters the State near Farakka and flowing north-south falls in the Bay of Bengal; (3) The Western System comprises the Mayurakshi, Ajoy, Damodar, Kangsabati and Dwarka which join Bhagirathi; and (4) Tidal and estuarine rivers of Sunderbans. Except for the Ganga (Bhagirathi-Hooghly), the Tista and some of their tributaries which are snow fed, the remaining rivers are all rain fed.

Ultimate Irrigation Potential

17.6 According to tentative studies carried out so far, the ultimate irrigation potential from major and medium irrigation schemes have been put at 2.3 m. ha.

Pre-Plan Projects

17.7 In the pre-plan period prior to 1951 there were three important canal systems in West Bengal i.e. the Damodar Canal, The Midnapore Canal and the Eden Canal. The pre-plan irrigation potential was 439.5 th. ha. which was being fully utilised.

Plan Projects

17.8 In the Plan period from April 1951 to March 1972 West Bengal took up 3 major and 5 medium projects with an ultimate potential of 1.04 m. ha. Two of these schemes had not created any potential by March 1972. The remaining schemes had created a potential of 0.816 m. ha. by March 1972 while the corresponding utilisation stood at 0.717 m. ha. The Categorywise details are given in Table 17.2

TABLE 17.2
Plan projects in West Bengal

Category	No of schemes	Potential (Area in Th. ha.)		
		Ultimate	Created	Utilised
<i>I. Major</i>				
(a) Completed	—	—	—	—
(b) Continuing with some potential	3	1013.01	801.43	707.68
(c) Continuing with no potential	—	—	—	—
<i>II. Medium</i>				
(a) Completed	2	11.25	11.33	6.17
(b) Continuing with some potential	1	4.86	3.24	3.24
(c) Continuing with no potential	2	15.16	—	—
Total	8	1044.28	816.00	717.09

Schemewise details are at annexures II-17.1 and II-17.2

Major Projects

17.9 West Bengal took up 3 major irrigation projects with an ultimate potential of 1013.01 th. ha. since April 1951 and all of them are continuing even though two of

them viz. Damodar Valley Corporation and Mayurakshi are completed except for extensions and improvements mainly on water courses.

The total potential created by the major schemes was 801.43 th. ha. and the utilisation 707.68 th. ha. Schemewise details are at annexure II-17.1.

Brief details of the major schemes are as follows :

Damodar Valley Projects

17.9.1 The Damodar Valley system comprises of four dams at Maithon, Panchet Hill, Tilaiya and Konar the Durgapur barrage and a canal system.

The ultimate irrigation potential of the system is 364.50 th. ha. The created potential upto March 1972 was 360.08 and utilisation was 340 th. ha. or 94% of the created potential which is satisfactory.

Mayurakshi Project

17.9.2 The Mayurakshi project comprises a masonry dam at Massanjore, and a barrage downstream at Tilpara across the river Mayurakshi. The canal system would create an ultimate irrigation potential of 247.05 th. ha. The potential created upto March 1972 was 239.0 th. ha. with utilisation at 236.15 th. ha. or 99% which is satisfactory.

Kangsabati Project:—

17.9.3. The Kangsabati project comprises of two conjugate dams one across the river Kangsabati and the other on the river Kumari with a canal system ultimately to irrigate 401.46 th.ha. The dam across the Kangsabati has been completed while that on river Kumari is under construction. The construction of canals is progressing.

The irrigation potential created by March 72 was 202.35 th.ha. while the corresponding utilisation was 131.53 th.ha. i.e. 65%.

The principal reason attributed for the lag is the fact that only a small percentage of field channels had been excavated by the cultivators so far. The project authorities have excavated channels upto 2 cusec.

Medium Irrigation Schemes:—

17.10.1 Out of five medium irrigation schemes taken up by the State Government during the Plan period, two have been completed three are continuing out of which one had created potential and the remaining two had not yet created any potential till March 1972.

17.10.2 The total ultimate irrigation potential of these medium schemes is 31.27 th.ha. out of which the potential created till March 1972 was 14.57 th.ha. The corresponding utilisation was 9.41 which is 64% of the created potential. The main reason for underutilisation is lack of field channels. Schemewise details including reasons for lag are at annexure II-17.2,

ANNEXURES

(TO PART II)

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ANNEXURE II. 12

Plan Projects where no Potential has been created
by March 1972

(Area in Th.ha)

<i>Cumulative S. No.</i>	<i>S.No.</i>	<i>Name of Scheme</i>	<i>Date of commencement</i>	<i>Ultimate Potential</i>
1	2	3	4	5
I. Andhra Pradesh				
<i>A. Major Schemes</i>				
1	1	Vamsadhara	1972	59.89
		Sub Total		59.89
<i>B. Medium Schemes</i>				
2	2	Varaha Reservoir	1957	3.26
3	3	Swarna	1958	3.69
4	4	Thandava Reservoir	1964	18.65
5	5	Bahuda	1966	1.17
6	6	Guntur Channel	1966	10.94
7	7	Gandipalem Project	1966	3.24
8	8	Gajuladinne Project	1966	10.12
9	9	Ukachatti Vagu	1966	2.71
10	10	Pulivendula	1972	24.28
		Sub Total		78.06
		Total—Andhra Pradesh		137.95
II Assam				
<i>A. Major Projects</i>				
				Nil.
<i>B. Medium Schemes</i>				
11	1	Shukla	1962	34.40
12	2	Longa	1962	4.86
13	3	Kaliabor	1962	10.56
		Sub Total		49.82
		Total—Assam		49.82

1	2	3	4	5
III Bihar				
<i>A. Major Schemes</i>				
14	1	Bagmati Barrage	1971	103.63
15	2	Western Kosi Canal	1961	325.10
		Sub Total		<u>428.73</u>
<i>B. Medium Schemes</i>				
16	3	Paimar Barrage	1966	8.09
17	4	Baksha Dam	1966	3.04
18	5	Nakti Reservoir	1969	2.83
19	6	Sunder Reservoir	1969	8.50
20	7	Jobe Reservoir	1971	3.24
21	8	Tajna Barrage	1971	1.90
22	9	Anjanwa	1971	1.74
23	10	Janasai	1971	2.02
24	11	Budhanduba	1971	0.90
		Sub Total		<u>32.26</u>
		Total - Bihar		<u>460.99</u>

IV Gujarat*A. Major Schemes*

25	1	Mahi - Stage II		89.50
26	2	Narmada (Broach)		Scope not decided
27	3	Ukai		158.05
28	4	Sabarmati (Dhorai)		36.85
29	5	Panani		21.87
		Sub Total		<u>306.27*</u>

*excluding that of Narmada

1	2	3	
26.	II.13.2	Punjab	Medium Plan Projects
27.	II.14.1	Rajasthan	Major Plan Projects
28.	II.14.2	Rajasthan	Medium Plan Projects
29.	II.15.1	Tamil Nadu	Major Plan Projects
30.	II.15.2	Tamil Nadu	Medium Plan Projects
31.	II.16.1	Uttar Pradesh	Major Plan Projects
32.	II.16.2	Uttar Pradesh	Medium Plan Projects
33.	II.17.1	West Bengal	Major Plan Projects
34.	II.17.2	West Bengal	Medium Plan Projects

ANNEXURE II 1.1

Ultimate potential under Projects where no potential has been created
by March'72

Summary

(Area in Th.ha)

Sl No.	State	No.	Ultimate Potential				Total
			Major Schemes	No.	Medium Schemes	No.	
1	2	3	4	5	6	7	8
1	Andhra Pradesh	1	59.89	9	78.06	10	137.95
2	Assam	—	—	3	49.82	3	49.82
3	Bihar	2	428.73	9	32.26	11	460.99
4	Gujarat	5	306.27	4	7.87	9	314.14
5	Haryana	2	258.00	—	—	2	258.00
6	Jammu & Kashmir	1	13.65	3	4.09	4	17.75
7	Kerala	6	271.31	—	—	6	271.31
8	Madhya Pradesh	3	436.85	19	84.71	22	521.56
8	Maharashtra	6	497.89	5	41.50	11	539.39
10	Mysore	3	670.68	6	17.25	9	687.93
11	Orissa	—	—	5	31.50	5	31.50
12	Punjab	2	483.00	—	—	2	483.00
13	Rajasthan	3	67.50	5	22.30	8	89.80
14	Tamil Nadu	1	5.63	11	8.34	12	13.97
15	Uttar Pradesh	1	621.18	6	92.97	7	714.15
16	West Bengal	—	—	2	15.16	2	15.16
	All India Total	36	4120.59	87	485.83	123	4606.42

1	2	3	4	5
<i>B. Medium Schemes</i>				
30	6	Gajansar	1960	1.62
31	7	Dhatarwadi	1959	2.48
32	8	Kalindri	1960	1.58
33	9	Madhuvanti	1971	2.19
Sub Total				<u>7.87</u>
Total - Gujarat				<u>314.14</u>
V. Haryana				
<i>A. Major Schemes</i>				
34	1	Beas Unit I		129.00*
35	2	Beas Unit II		129.00*
Sub Total				<u>258.00</u>
<i>B. Medium Schemes</i>				
				Nil
Total - Haryana				<u>258.00</u>
VI. Jammu & Kashmir				
<i>A Major Schemes</i>				
36	1	Ravi, Tawi Lift and gravity canal system - Phase I	1969	13.66
Sub Total				<u>13.66</u>
<i>B. Medium Schemes</i>				
37	2	Kharbathang Canal		0.54
38	3	Pargwal Canal Project		1.12
39	4	Remodelling of Ranbhir Canal		2.43
Sub Total				<u>4.09</u>
Total - Jammu & Kashmir				<u>17.75</u>

*Tentative allocation.

1	2	3	4	5
VII Kerala				
<i>A. Major Schemes</i>				
40	1	Pamba	1961	46.14
41	2	Kuttiadi	1962	31.16
42	3	Chittur Puzha	1963	34.56
43	4	Puzhassy	1961	32.38
44	5	Kanhira Puzha	1961	21.85
45	6	Kallada	1962	105.22
Sub Total				271.31
<i>B. Medium Schemes</i>				
				Nil
Total—Kerala				271.31
VIII Madhya Pradesh				
46	1	Tawa	1960	331.84
47	2	Barna	1960	60.30
48	3	Hasdeo Right Bank Canal	1967	44.71
Sub Total				436.85
<i>B. Medium Schemes</i>				
49	4	Gurma Nala	1963	7.28
50	5	Akhajhiri	1963	1.98
51	6	Bhimswar	1963	2.83
52	7	Chandra Shekhar	1960	7.33
53	8	Chappi	1963	2.63
54	9	Gopalura	1966	0.81
55	10	Jassaiya	1962	4.45
56	11	Pampawati	1966	1.09
57	12	Harsi Irrigation	1961	23.86
58	13	Bagh-Right Bank Canal	1968	10.84

1	2	3	4	5
59	14	Jamini Right Bank Canal	1970	2.43
60	15	Kunwarpur	1969	4.25
61	16	Mayana	1971	1.48
62	17	Bhanskhedi	1963	1.40
63	18	Fanavi (Panna)	1962	1.94
64	19	Raigwan	1963	3.40
65	20	Jhirigiri	1966	2.02
66	21	Bargaon Nalla	1969	2.46
67	22	Putka	1970	2.23
Sub Total				84.71
Total—Madhya Pradesh				521.56

IX Maharashtra

A. Major Schemes

68	1	Upper Godavari	1967	44.27
69	2	Warna	1966	99.05
70	3	Krishna	1966	106.30
71	4	Jayakwadi—Stage I	1965	141.64
72	5	Upper Tapi	1970	55.23
73	6	Kukadi—Stage I	1968	51.40
Sub Total				497.89

B. Medium Schemes

74	7	Adhala	1968	5.75
75	8	Dina	1963	17.29
76	9	Nirguna	1968	7.89
77	10	Kudala	1968	0.58
78	11	Amba Valley	1970	9.99
Sub Total				41.50
Total—Maharashtra				539.39

1	2	3	4	5
X Mysore				
<i>A. Major Schemes</i>				
79	1	Malaprabha	1963	206.55
80	2	Upper Krishna—Stage I	1963	409.05
81	3	Kabini	1958	55.08
		Sub Total		<u>670.68</u>
<i>B. Medium Schemes</i>				
82	4	Lakshmana Thirtha	1957	2.82
83	5	Harinalla	1964	0.44
84	6	Arkavathi	1964	3.04
85	7	Manahanbela	1969	2.83
86	8	Taraka Project	1970	7.29
87	9	Sagaredoddakere Reservoir	1971	0.81
		Sub Total		<u>17.25</u>
		Total—Mysore		<u>687.93</u>
XI Orissa				
<i>A. Major Schemes</i>				
				Nil
<i>B. Medium Schemes</i>				
88	1	Godahado	1960	6.50
89	2	Pitamahal	1962	4.90
90	3	Uttei	1968	11.30
91	4	Baghua	1968	4.10
92	5	Dahuka	1968	4.70
		Sub Total		<u>31.50</u>
		Total—Orissa		<u>31.50</u>

1	2	3	4	5
XII Punjab				
<i>A. Major Schemes</i>				
93	1	Beas Unit I		191.00
94	2	Beas Unit II		292.00
		Sub Total		483.00
<i>B. Medium Schemes</i>				
				Nil
		Total—Punjab		483.00
XIII Rajasthan				
<i>A. Major Schemes</i>				
95	1	Mahi (Bajaj Sagar)	1969	30.30
96	2	Gurgaon Canal	1966	25.00
97	3	Jakham (Main)		11.70
		Sub Total		67.50
<i>B. Medium Schemes</i>				
98	4	Bhim Sagar	1954 (and again in 1970-71)	5.10
99	5	Gopalpura	1971	2.60
100	6	Jatpura	1969	2.00
101	7	Sai Diversion	1969	9.00
102	8	Meja Feeder	1971	3.60
		Sub Total		23.30
		Total—Rajasthan		89.80
XIV Tamil Nadu				
<i>A. Major Schemes</i>				
103	1	Modernising Vaigai Channel	1969	5.63
		Sub Total		5.63

1	2	3	4	5
<i>B. Medium Schemes</i>				
104	2	Gatana Reservoir	1967	0.40
105	3	Rama Nadhi	1967	0.20
106	4	Parappalar Reservoir	1971	0.36
107	5	Palar—Parandalar	1971	2.02
108	6	Ponnaniar	1970	0.74
109	7	Tbandarai Anicut Scheme	1970	0.57
110	8	Chinnar Scheme	1970	0.76
111	9	Re-excavation of Nandan Channel	1971	0.11
112	10	Pillai Vaikkal Scheme	1971	1.07
113	11	Kampanadhi Scheme	1971	1.17
114	12	Marudhanadhi Scheme	1972	0.94
Sub Total				8.34
Total—Tamil Nadu				13.93
XV Uttar Pradesh				
<i>A. Major Schemes</i>				
115	1	Sarda Sahayak Pariyojna Stage I	1968	621.18
Sub Total				621.18
<i>B. Medium Schemes</i>				
116	2	Chandrawal Dam		4.31
117	3	Jamini Dam		12.48
118	4	Kosi Irrigation		19.13
119	5	Haripur Reservoir		19.99
120	6	Narayanpur Pumped Canal		24.28
121	7	Adwa Dam		12.78
Sub Total				92.97
Total—Uttar Pradesh				714.15

1	2	3	4	5
XVI West Bengal				
	<i>A. Major Schemes</i>			Nil
	<i>B. Medium Schemes</i>			
122	1	Hinglow		12.94
123	2	Bandhu		2.22
		Sub Total		<u>15.16</u>
		Total—West Bengal		<u>15.16</u>
		Major Total—All India (36 Schemes)		4120.59
		Medium Total—All India (87 Schemes)		485.83
		Grand Total—All India (123 Schemes)		<u>4606.42</u>

STATE ANDHRA PRADESH

ANNEXURE II.2.1

Major Plan Projects

(Area in '000 ha)

Sl. No.	Name of scheme	Year of completion/commencement	Ultimate Irrigation potential	Potential created by March 72	Utilisation by March 72	Percentage
1	2	3	4	5	6	7
<i>A. Completed schemes</i>						
1.	K.C. Canal	1962	122.31	122.31	118.80	91.3
2.	Tungabhadra Low Level Canal	1957	60.29	60.29	39.78	66.0
3.	Tungabhadra High Level Canal stage I.	1968	45.40	45.40	34.29	75.5
Sub Total			228.00	228.00	192.87	84.6
<i>B. Continuing Schemes</i>						
4.	Tungabhadra High Level Canal Stage II	1966	55.66	5.47	Nil	Nil
5.	Pochampad	1964	267.10	10.00	2.91	29.1
6.	Nagarjunasagar	1960	831.24	413.00	380.41	92.1
7.	Kaddam	1965	24.00	12.28	12.28	100
Sub Total			1178.00	440.75	395.60	89.8
Grand Total			1406.00	668.75	588.47	88.00

1	2	3	4	5	6	7	8
31.	Nalla Vagu	1967	2.39	1.98	0.44	22.2	Lack of inflow. Canal not capable of passing design dis-charge.
32.	Pampa Reservoir	1970	4.86	4.86	3.72	76.5	Lack of field channels.
33.	Rajoli banda	1963	35.44	35.44	24.95	70.4	Non receipt of requisite water in the canal at the inter state border.
34.	Rama dugu	1970	2.03	1.62	1.32	81.5	Lack of inflow. Lack of field channels.
35.	Krishna Barrage (Prakasam)	1959	42.84	41.24	35.28	85.5	Not available.
36.	Seathanagram Anicut	1960	1.62	1.62	1.43	88.3	Not available.
37.	Kottipalli Vagu	1968	4.04	4.04	1.10	27.2	Lack of inflow.
38.	Lanka Sagar	1968	2.06	2.06	1.00	48.5	
	Sub Total:		187.09	184.85	150.61	81.5	
B. Continuing Schemes :							
39.	Kanupur Canal	1961	7.11	0.41	0.41	100	
40.	Vottigedda	1963	6.75	1.22	Nil	Nil	Potential created this year only.
	Sub Total:		13.86	1.63	0.41	25.2	
	Grand Total:		200.95	186.48	151.02	81.00	

State : Assam

II-3.1

MAJOR PLAN PROJECTS

(Area in '0 10 ha)

Sl. No.	Name of scheme	Year of completion/ commencement	Ultimate irrigation Potential	Potential created by 3/72	Potential utilised by 3/72	percentage
1	2	3	4	5	6	7
A. Completed Schemes :						
	Nil	Nil	Nil	Nil	Nil	Nil
	Sub Total	Nil	Nil	Nil	Nil	Nil
B. Continuing Schemes :						
	Nil	Nil	Nil	Nil	Nil	Nil
	Sub Total	Nil	Nil	Nil	Nil	Nil
	Grand Total	Nil	Nil	Nil	Nil	Nil

State : Andhra Pradesh

MEDIUM PLAN PROJECT

(Area in '000 ha.)

Sl. No.	Name of Scheme	Year of completion/ comment	Ultimate Irrigation Potential	Potential created by March 1972	Potential Utilisation by March 1972	Percentage	Reasons for lag in utilisation	Remarks	
1	2	3	4	5	6	7	8	8	
A. Completed Schemes									
1.	Bandakattu Channel	1956	1.46	1.48	1.46	98.6			
2.	Chennaraya Swamigudi	1960	0.45	0.45	0.26	57.8			
3.	Lower Sagileru	1959	3.24	3.85	3.24	84.2			
4.	Nalimadugu	1959	1.62	1.60	1.60	100			
5.	Nagavalli Right-side Channel	1960	3.64	3.64	3.24	89.0			
6.	Narayanpuram Anicut	1959	14.91	14.91	14.91	100			
7.	Romperu Drainage	1956	4.17	4.17	4.17	100			
8.	Upputeru Lower Anicut	1956	0.77	0.77	0.75	97.4			
9.	Paidigam	1963	2.00	2.00	2.01	100			
10.	Kalangi	1960	1.78	1.76	1.76	100			

11.	Rallapaddu Stage II	1959	4.45	4.45	4.86	100				
12.	Paleru Bitragunta	1962	2.23	2.23	2.18	97.8				
13.	Salivagu	1964	1.15	1.30	1.19	91.5				
14.	Gambhira gedda	1957	0.24	0.24	0.23	95.8				
15.	Koilsagar	1956	5.77	5.77	5.77	100				
16.	Vidhya Narayan Swamigudi	1956	0.08	0.08	0.08	100				
17.	Upper Pennar	1958	3.93	3.93	3.48	88.5	Lack of inflow Non-assignment of waste land, Lack of credit.			
18.	Pincha	1960	1.54	0.98	0.98	100				
19.	Bhimanapalli	1954	0.77	0.77	0.43	55.8	Lack of inflow.			
20.	Nakkalagandi	1956	0.49	0.49	0.40	81.6	Lack of inflow.			
21.	Paleru Reservoir	1956	0.59	0.59	0.51	86.4	Lack of inflow-silting of channel. Now reclamation of land.			
22.	Vegavathi Anicut	1958	2.35	2.35	1.31	55.7	Lack of inflow silting.			
23.	Sarla Sagar	1959	1.70	1.70	1.26	74.1	Lack of inflow.			
24.	Siddabagandi	1959	0.16	0.16	0.08	50.0	Lack of inflow, now reclamation of forest and steep land.			
25.	Bhairavanitippa	1961	6.89	6.89	5.94	86.2	Lack of Ayacut roads, Lack of field channels, now reclamation. New alignment of waste land.			
26.	Zureru	1963	0.93	0.93	0.58	62.4	Absentee landlordism.			
27.	Jutpalli	1965	0.99	0.99	0.59	59.6	Lack of inflow.			
28.	Lakhsapur	1966	1.05	1.05	0.59	56.2	Lack of inflow.			
29.	Torragedda Pumping	1966	5.53	5.53	3.69	66.7	Lack of field channels			
30.	Musi	1963	16.93	16.93	13.82	81.6	Lack of inflow.			

State : Assam

MEDIUM PLAN PROJECTS

(Area in 1000 ha.)

Sl. No.	Name of Scheme	Year of completion/ Commence-ment	Year of completion/ Commence-ment	Ultimate Irrigation Potential created by 3/72	Potential utilised by 3/72	Percentage in utilisation/ Remarks.	Reasons for Lag
1	2	3	4	5	6	7	8
A. Completed Schemes :							
1.	Jamuna	1969	38.75	38.75	4.30	88.5	Not available
2.	Patradisha	1968	2.43	2.43	1.48	60.9	Not available
	Sub Total		41.18	41.18	35.78	86.90	
B. Continuing Schemes :							
3.	Harauti	1958	4.05	2.89	2.89	100	
	Sub Total		4.05	2.89	2.89	100	
	Grand Total		45.23	44.07	38.67	87.7	

State : Bihar

MAJOR PLAN PROJECTS

(Area in '000 ha)

Sl. No.	Name of scheme	Year of completion/commencement	Ultimate Irrigation potential	Potential created by March 72	Potential Utilised by March 72	Percentage
1	2	3	4	5	6	7
A. Completed schemes						
1.	Badua	1966	42.50	42.50	41.41	97.4
2.	Sone Barrage & remodelling of canals.	1968	124.33	124.33	124.33	100
Sub Total			166.83	166.83	165.74	99.3
B. Continuing Schemes:						
3.	Kosi Project	1954	*580.00	275.00	110.40	47.4
4.	Rajpur Canal	1961	157.64	89.03	11.85	13.3
5.	Gandak Project	1961	1151.37	157.83	50.55	32.0
6.	Sone High Level Canal	1968	121.46	12.15	4.05	33.3
7.	Chandan Reservoir	1962	40.48	20.24	12.14	60.0
Sub Total			2050.95	554.25	208.99	37.7
Grand Total			2217.73	721.08	374.73	51.9

*Ultimate Potential of 580 th.ha is temporarily reduced to 434 th.ha.

State : Bihar

MEDIUM PLAN PROJECTS

(Area in '000 ha.)

Sl. No.	Name of Scheme	Year of completion	Ultimate Irrigation Potential	Potential created by March 1972	Potential utilised by March 1972	Percentage	Reasons for lag in utilisation	Remarks
1	2	3	4	5	6	7	8	8

A. Completed Schemes

1.	Adri	(First Plan)	4.25	4.25	4.25	100		
2.	Botane		6.68	6.68	8.52	100		
3.	Dhawa		4.25	4.25	4.25	100		
4.	Durgawati		10.53	10.53	10.53	100		
5.	Drainage of chauras & other irrigation schemes.		37.52	37.52	37.52	100		
6.	Jinjoy		3.03	3.03	2.43	80.2		
7.	Kaurihari		11.66	11.66	8.10	69.5		
8.	Kharagpur lake		5.06	5.06	5.06	100		
9.	Lilajan		22.68	22.68	19.44	85.7		

1	2	3	4	5	6	7	8
10.	Lower Morhar		14.98	14.98	11.34	75.7	
11.	Mayurakshi Left Bank Canal		10.12	10.12	8.30	82.0	
12.	Nagi Reservoir		3.03	3.03	3.34	100	
13.	Sakri Lower Valley Phase I & II		20.25	20.25	20.25	100	
14.	Irrigation by weir, Dam in Hilly Areas		15.02	15.02	15.02	100	
15.	Trebeni Canal Expansion		11.34	11.34	11.34	100	
16.	Trebeni Canal Extention		25.15	25.15	25.15	100	
17.	Emergency River Pumping Schemes		5.26	5.26	5.26	100	
18.	Upper Morhar		14.98	14.58	14.18	97.3	
19.	Kamlh Canal		15.39	15.39	15.39	100	
20.	Chako		2.33	2.33	1.93	82.8	
21.	Khajia weir)						
22.	Chandan Distribution) Second Plan system Phase-I.)		19.03	19.03	19.03	100	
23.	Kobira Dam		10.32	10.32	9.72	94.2	
24.	Lower Kuil Valley		25.92	25.92	31.59	100	
25.	Panchane phase-II		12.40	12.40	12.40	100	
26.	Sakri phase-II		5.06	5.06	5.06	100	
27.	Tortlow		2.27	2.27	1.29	56.8	
28.	Morwa		4.90	4.90	4.90	100	
29.	Banki Lift		5.87	5.87	2.43	41.4	
30.	Bijoy		2.02	2.02	1.25	61.9	
31.	Sona Weir		6.52	6.52	6.27	96.2	
32.	Kanchi Weir		18.21	18.21	14.97	82.2	

1	2	3	4	5	6	7	8
33.	Kokro Weir		384	384	344	896	
34.	Arraj		5.40	5.40	4.05	75.0	
35.	Roro		10.93	10.93	6.48	59.3	
36.	Khudia		4.73	4.73	2.23	47.1	
	Sub Total :		<u>380.93</u>	<u>380.53</u>	<u>356.71</u>	<u>937</u>	
	<i>B. Continuing Schemes :</i>						
37.	Kamla Irrigation	1963	26.31	19.24	17.20	89.40	
38.	Musa Khand	1968	11.74	4.05	2.02	49.9	
39.	Uderasthan	1962	24.89	19.02	12.95	68.1	
	Sub Total :		<u>62.94</u>	<u>42.31</u>	<u>32.17</u>	<u>76.0</u>	
	Grand Total :		<u>443.87</u>	<u>422.84</u>	<u>388.88</u>	<u>919</u>	

State : Gujarat

MAJOR PLAN PROJECTS

(Area in 000 ha)

Sl No.	Name of Scheme	Year of completion-/commencement	Ultimate Irrigation Potential	Potential created by 3/72	Potential utilised by 3/72	Percentage
1	2	3	4	5	6	7
A. Completed Schemes						
1.	Banas (Dantiwada)	1969	44.55	42.63	19.41	45.5
2.	Hathmathi	1971	27.20	27.20	15.15	55.7
3.	Shetrunji (Palitana)	1965	34.83	34.83	19.39	55.7
Sub Total			106.58	104.66	53.95	51.5
B. Continuing Schemes						
4.	Kakrapar	1949	228.00	202.81	73.18	36.1
5.	Mahi - Stage I	1948	186.30	121.18	64.71	53.4
Sub Total			414.30	323.99	137.89	42.6
Grand Total			520.83	428.65	191.84	44.8

State : Gujarat.

ANNEXURE II.5.2

MEDIUM PLAN PROJECTS

(Area in '000 ha)

Sl. No.	Name of Scheme	Year of completion/ comment	Ultimate Irrigation Potential	Potential created by 3/72	Potential utilised by 3/72	Percentage	Reasons for lag in utilisation/ Remarks
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1		3	4	5	6	7	8
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A: Completed Schemes

1.	Limbadi-Bhogavo	1963	3.23	3.23	2.53	78.3	Lack of expected response from cultivators, wastage of water by irrigators, seepage in canals
2.	Meshwa	1970	17.20	17.20	12.25	71.2	Farmers are new to irrigated agricultur, field channels lacking. No demonstration farm in the command, seepage.
3.	Niruna	1970	2.43	2.43	1.37	56.4	Lack of yield, no night irrigation. No demonstration farm, area development programme needed.

1	2	3	4	5	6	7	8
4.	Sapada	1967	0.96	0.96	0.59	61.5	Less demand for kharif, no night irrigation, seepage, wastage.
5.	Vartu	1969	2.61	2.04	0.82	40.2	Lack of water courses, demonstration and extension needed.
6.	Brahmani		3.05	3.85	13.10	100	
7.	Raval		0.45	0.45	0.38	84.4	
8.	Bhimdađ		1.15	1.15	0.74	64.3	
9.	Gajed	1960	1.15	1.15	0.83	72.2	In-adequate yield, heavy canal losses due to sandy soils.
10.	Harnav—Stage I	1965	2.67	1.92	1.03	53.6	In-adequate yield, seepage in channel and command area is grave.
11.	Machundri		0.45	0.45	0.31	68.9	
12.	Puna		1.01	0.61	0.74	100	
13.	Vit Irrigation		1.38	1.38	0.83	60.1	
14.	Chalo		3.15	3.15	2.24	71.1	
15.	Hiran		2.63	2.63	0.74	28.1	
16.	Bhogavo—I		1.54	1.67	2.47	100	
17.	Doswada Tank		0.92	0.92	1.06	100	
18.	Ghee		0.83	0.83	1.05	100	
19.	Gondli		0.94	0.94	1.18	100	
20.	Hetam (Bhandara across Haraunira)		2.23	2.11	3.92	100	
21.	Kaila		0.88	0.88	1.21	100	
22.	Machu—I		6.76	6.76	9.45	100	
23.	Moj		4.82	4.82	7.42	100	
24.	Motri Fatehwadi		12.96	12.96	20.86	100	

State : **Haryana**

II.6.1

MAJOR PLAN PROJECTS

(Area in '000 ha.)

<i>Sl. No.</i>	<i>Name of Scheme</i>	<i>Year of completion/commencement</i>	<i>Ultimate Irrigation potential</i>	<i>Potential created by 3/72</i>	<i>Potential utilised by 3/72</i>	<i>percentage</i>
1.	2.	3.	4.	5.	6.	7.
<i>A. Completed Schemes</i>						
1.	Bhakra Nangal		676.25	676.25	676.25	100
	Sub Total		676.25	676.25	676.25	100
<i>B. Continuing Schemes</i>						
2.	Western Jamuna Canal					
	Remodelling	1951-52	247.96	184.14	184.14	100
3.	Gurgaon Canal	1959-60	80.94	34.40	10.11	29.4
	Sub Total		328.90	218.54	194.25	88.9
	Grand Total		1005.15	894.79	870.50	97.3

Sl. No.	Name of Scheme	Year of completion/ comment	Ultimate Irrigation Potential by 3/72	Potential created by 3/72	Potential utilised by 3/72	Percentage	Reasons for lag in utilisation/ Remarks
1	2	3	4	5	6	7	8
A. Completed Schemes :							
1.	Raising & strengthening banks of channels		8.50	8.50	8.50	100	
2.	Spill over Schemes		27.92	27.92	27.92	100	
	Sub Total		36.42	36.42	36.42	100	
B. Continuing Schemes							
3.	Installation of 128 Nos. of Tube-wells of Western Jamuna Canal tract	1965	10.14	10.14	8.09	79.8	

1	2	3	4	5	6	7	8
25.	Patadungri		4.56	3.18	3.47	100	
26.	Rangola		3.50	3.50	5.00	100	
27.	Samandro		0.68	0.68	0.74	100	
	<i>A. Completed Scheme</i>						
28.	Sasoi		3.06	3.06	3.32	100	
29.	Manjisar		1.34	1.34	1.69	100	
30.	Bhadar		17.15	17.01	18.20	100	
31.	Demi		2.19	2.19	2.79	100	
32.	Fulzar		1.22	1.22	1.31	100	
33.	Rojiki		1.54	1.51	1.60	100	
34.	Sakroli		1.22	1.22	1.78	100	
35.	Suvi		1.24	0.98	1.46	100	
36.	Bhogavo—II (Wadhwan)		0.61	0.48	1.28	100	
37.	Kankavathi		1.56	1.56	1.47	94.2	
38.	Karod Tank		4.54	4.54	4.14	91.2	
39.	Malan		2.33	2.33	2.14	91.8	
40.	Ozat		2.39	2.39	2.10	87.9	
41.	Surajwadi		1.04	1.04	1.00	96.2	
42.	Shetrunji (Khadiyar)		7.70	7.70	7.43	96.5	
43.	Rudramata		3.00	3.00	1.62	54.0	Lack of inflow. Agri-extension demonstration and area development programme needed.
Sub Total			137.17	133.45	149.66	100	

1	2	3	4	5	6	7	8
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B Continuing Schemes

44. Goma	1966	2.52	1.62	0.32	19.8	Only in partial operation, water courses not yet completed, agricultural demonstration needed.
45. Saraswati	1961	8.75	3.47	0.13	37	
46. Machu II	1963	7.70	0.12	—	—	Scheme just partially commissioned with available storage of water.

Sub Total	18.97	5.21	0.45	8.6
Grand Total	156.14	138.66	150.11	100

1	2	3	4	5	6	7	8
4.	Rewari Lift Irrigation	1966	27.82	11.33	3.04	26.83	Floods in Sahibi River damages the channels now and then. Full development linked up with Sabibi control.
5.	Jui Lift Irrigation	1971	16.47	8.09	2.51	31.0	First year of operation linked up with the delineation of Haryana's share of surplus Ravi-Beas waters.
6.	Loharu Lift Irrigation Scheme-Stage I	1971	18.70	4.04	1.71	42.3	First year of operation linked with the delineation of Haryana's share of surplus Ravi-Beas waters.
Sub Total			73.13	33.60	15.35	45.7	
Grand Total			109.55	70.02	51.77	73.9	

State : Jammu & Kashmir

MAJOR PLATN PROJECTS

(Area in '000 ha.)

<i>Sl. No.</i>	<i>Name of Scheme</i>	<i>Year of completion/commencement</i>	<i>Ultimate Irrigation Potential</i>	<i>Potential created by 3/72</i>	<i>Potential utilised by 3/27</i>	<i>Percentage</i>
1	2	3	4	5	6	7
A. Completed Scheme						
		Nil	Nil	Nil	Nil	Nil
	Sub Total		Nil	Nil	Nil	Nil
B. Continuing Schemes						
	Nil	Nil	Nil	Nil	Nil	Nil
	Grand Total		Nil	Nil	Nil	Nil

MEDIUM PLAN PROJECTS

(Area in '000 ha.)

Sl. No.	Name of Scheme	Year of completion/ comment	Ultimate irrigation potential	Potential created by March 1972	Potential utilised by March 1972	Percentage	Reasons for lag in utilisation/ Remarks
1	2	3	4	5	6	7	8
A. Completed Schemes							
1.	Awantipur Canal	1952	1.93	1.93	2.00	100	
2.	Partap Canal	1964	10.00	10.00	7.28	72.8	Affected by war—Area lies in Chamb-Jourian sector.
3.	Remodelling of Udhampur Canal		0.40	0.40	0.40	100	
4.	Kathua Canal	1961	10.12	10.12	10.12	100	
5.	Dudhar Canal	1971	1.21	1.21	0.69	57	Levelling and therracing of land lagging behind.
	Sub Total		23.66	23.66	20.49	86.6	
B. Continuing Schemes							
	Nil	Nil	Nil	Nil	Nil	Nil	
	Sub Total		Nil	Nil	Nil	Nil	
	Grand Total		23.66	23.66	20.49	86.6	

State : Kerala

MAJOR PLAN PROJECTS

(Area in '000 ha)

Sl. No.	Name of Scheme	Year of completion/commencement	Ultimate Irrigation Potential	Potential created by 3/72	Potential utilised by 3/72	Percentage.
1	2	3	4	5	6	7
<i>A. Completed Schemes</i>						
1.	Malampuzha	1967	42.12	40.47	40.47	100
	Sub-Total		42.12	40.47	40.47	100
<i>B. Continuing Schemes</i>						
2.	Periyar Valley	1956	56.9	28.33	28.33	100
	Sub Total		56.9	28.33	28.33	100
	Grand Total		99.02	68.80	68.80	100

State : Kerala

MEDIUM PLAN PROJECT

(Area in '000. ha)

Sl. No.	Name of Scheme	Year of completion	Ultimate Irrigation Potential by March 1972	Potential created by March 1972	Potential utilised by March 1972	Percentage Reasons for lag in utilisation/Remarks
1	2	3	4	5	6	7
						8

A. Completed Schemes

1.	Chalakudi—Stage I		22.99	22.99	22.99	100
2.	Mangalam		6.88	6.88	6.88	100
3.	Neyyar—Stage I		15.38	13.80	13.80	100
4.	Peechi		28.08	28.08	28.08	100
5.	Vazhani (Vada Kancheri)		7.13	7.13	7.13	100
6.	Walayar		6.48	6.48	6.48	100
7.	Chalakudi—Stage II		16.39	16.39	16.39	100
8.	Cheerakuzhy		3.24	1.49	1.49	100
9.	Gayathri—Stage I & II (Meenkara)		10.93	10.93	10.93	100

1	2	3	4	5	6	7	8
10. Neyyar—Stage II			8.09	7.69	7.69	100	
11. Pothundy			10.94	10.93	10.93	100	
Sub Total			136.53	132.79	132.79	100	
<i>B. Continuing Schemes</i>							
			Nil	Nil	Nil	Nil	
Sub Total			Nil	Nil	Nil	Nil	
Grand Total			136.53	132.79	132.79	100	

State: Madhya Pradesh

MAJOR PLAN PROJECTS

(Area in '000 ha)

S1. Name of Scheme No.	Years of completion/commencement	Ultimate Irrigation Potential	Potential created by 3/72	Potential utilised by 3/72	Percentage	
1.	2.	3.	4.	5.	6.	7.
A. Completed Schemes						
Nil	Nil	Nil	Nil	Nil	Nil	Nil.
Sub Total			Nil	Nil	Nil	Nil
B. Continuing Schemes						
1. Bander Canal I Plan		44.52	20.24	21.72	100	
2. Chambal—Stage I)						
3. Chambal—Stage II) I Plan		283.29	258.97	129.16	49.9	
Sub Total			327.81	279.21	150.88	54.0
Grand Total			327.81	279.21	150.88	54.0

MEDIUM PLAN PROJECTS

(Area in '000 ha.)

Sl. No.	Name of Scheme	Year of completion/ comment	Ultimate Irrigation Potential by 3/72	Potential created by 3/72	Potential utilised by 3/72	Percentage	Reasons for lag in utilisation/ Remarks
1	2	3	4	5	6	7	8
A. Completed Schemes							
1.	Ari Tank	1952	4.25	4.25	4.85	100	
2.	Borodia	1959	0.91	0.91	0.09	9.9	Heavy seepage from the tank is under observation for remedial measures.
3.	Bitrigarh	1967	1.18	1.18	0.57	48.3	Lack of expected yield from catchment.
4.	Daroli	1962	1.29	1.29	1.01	78.3	Slowly developing.
5.	Dhundbar	1966	1.39	1.39	1.49	100	
6.	Dukri Kheda	1961	2.67	2.67	1.58	59.2	Lack of inflow originally expected. Water courses also lacking.

1	2	3	4	5	6	7	8
7.	Gangulpara	1960	3.45	3.45	2.09	60.6	Cultivators in a position with heavy black soil are not taking irrigation water.
8.	Gondu Tank	1957	3.08	3.08	2.30	74.70	CCA insufficient to use up the available water. Greater intensity of irrigation in existing area also not considered possible.
9.	Kulgarhi	1969	2.22	2.22	0.97	43.70	N.A.
10.	Kunda Naia	1963	1.65	1.65	0.47	28.5	Cultivators are not following crop pattern of the Project. They grow unirrigated <i>kharif</i> still Rabi is yet to be developed.
11.	Mola	1956	2.26	2.26	1.57	69.50	Cultivators are not following crop pattern of the Project. They grow un-irrigated <i>Kharif</i> . Still Rabi is yet to be developed.
12.	Morwan	1966	2.67	2.67	2.97	100	
13.	Sagarnadi	1966	1.59	1.59	1.42	89.3	
14.	Saroda	1958	7.34	7.34	7.38	100	
15.	Shivgarh Bhedli	1961	0.49	0.49	0.48	98	
16.	Sampna	1956	3.84	3.84	3.30	85.9	Main earthwork embankment chipped twice and strengthening in progress.

1	2	3	4	5	6	7	8
17. Satak		1965	3.84	3.84	1.39	36.2	Cultivators are not following crop pattern of the project. They grow un-irrigated Kharif. Still Rabi is yet to be developed.
18. Beniganj		1970	4.05	2.43	2.17	89.3	Development work to create full potential and full utilization in progress.
19. Chillar		1970	3.43	3.43	2.65	77.3	Hybrid crop grown uses double the water.
20. Development of Maniari Tank		1967	9.71	9.71	11.00	100	
<i>A. Completed Schemes</i>							
21. Devendra Nagar		1970	2.42	2.42	1.52	62.80	Hybrid crop grown uses up double the water.
22. Kedarnala		1969	4.65	4.65	4.99	100	
23. Keshwanala		1969	3.84	3.84	3.26	84.90	
24. Kharadi Tank		1960	4.05	4.05	4.12	100	
25. Nandanwara		1969	1.82	1.81	1.77	97.80	
26. Nagda Nala		1968	3.03	3.03	1.95	64.4	Hybrid crop grown uses double the water originally allowed. Thus water is fully used up with the area developed.
27. Nablesara		1966	4.51	4.51	6.15	100	
28. Remodelling of Mahanadi Canal		1968	56.65	56.65	63.51	100	
Sub Total			142.28	140.65	137.08	97.5	

1	2	3	4	5	6	7	8
<i>B. Continuing Schemes</i>							
29. Segwal		I Plan	0.97	0.32	0.05	15.62	First year of irrigation.
30. Bilandi		1960	12.95	0.40	0.36	90.00	Temporary storage of water in the pick up weir used for irrigation. Main Project going on.
Sub Total			13.92	0.72	0.41	56.94	
Grand Total			156.20	141.37	137.49	97.3	

State : Maharashtra

MAJOR PLAN PROJECTS

(Area in '000 ha)

Sl. No.	Name of Scheme	Year of Completion [Commen- cement	Ultimate Irrigation Potential	Potential Created by 3/72	Potential Utilised by 3/72	Percentage
1	2	3	4	5	6	7
<i>A. Completed Schemes</i>						
✓ 1.	Ghod	1965	24.60	24.60	20.21	82.2
2.	Vir	1957	16.11	16.11	12.60	78.2
✓ 3.	Girga	1969	57.21	43.56	23.35	48.1
✓ 4.	Purna	1968	61.54	61.54	25.63	41.7
	Sub Total		159.46	150.81	81.79	54.2
<i>B. Continuing Schemes</i>						
5.	Pus (Vasant Sagar)	1964	9.37	8.66	0.47	5.4
6.	Tulshi Project	1966	3.60	0.19	—	—
✓ 7.	Khadakvasla	1960	31.16	16.46	11.99	72.8
8.	Mula	1957	72.08	20.23	4.04	20.0
9.	Bhima	1965	173.05	5.30	—	—
10.	Bagh	1967	33.67	7.21	2.05	28.4
11.	Itiadoh	1965	46.14	13.55	1.08	8.1
	Sub Total		369.07	71.60	19.63	27.4
	Grand Total		528.53	222.41	101.42	45.6

MEDIUM PLAN PROJECTS

(Area in '000 ha.)

Sl. No.	Name of Scheme	Year of completion/Commencement	Ultimate Irrigation Potential by 3/72	Potential created by 3/72	Potential utilised by 3/72	Percentage	Reasons for lag in utilisation/Remarks.
1	2	3	4	5	6	7	8
<i>A-Completed Schemes</i>							
1.	Bendsura	1955	3.37	3.37	2.45	73.0	Lack of demand in Kharif. Revision of potential under consideration.
2.	Bhandara at Pushpavati	1956	1.63	1.63	0.67	41.1	Lack of demand in Kharif. Lack of water during Rabi.
3.	Bhandara at Urmodi	1964	1.42	1.42	0.28	19.7	Lack of demand due to timely rainfall in Kharif. Lack of water during Rabi.
4.	Budhial Tank	1953	3.24	3.24	3.05	94.1	Lack of demand from irrigators, soil murmury. All lands yet to be developed.

1	2	3	4	5	6	7	8
5.	Dheku	1962	2.71	2.71	2.13	73.6	Lack of demand in Kharif. Ayacut development lagging.
√ 6.	Gangapur (Stage I&II)		23.23	16.79	17.04	100.0	
7.	Gangapur-Stage II						
8.	Jiu	1960	2.31	2.31	1.37	59.3	Lack of demand in kharif, water courses incomplete.
9.	Kamli		0.97	0.97	0.91	93.8	Lack of demand in kharif,
10.	Khasapur	1956	3.57	3.57	3.39	95.0	Potential has now been revised to 2.15 Tb. ha, in 1972.
11.	Re-modelling & Extension of Krishna Canal.	1967	3.29	3.29	4.64	56.0	Area under sugarcane increased-Revision of potential under consideration.
12.	Mosam Weir	1967	3.15	3.15	0.50	15.9	Lack of demand in kharif, field channels land shaping and levelling lagging.
13.	Purna Anicut		0.10	0.10	0.15	100.0	
14.	Radhanagri		9.52	9.52	13.64	100.0	
15.	Ranand	1958	1.09	1.09	0.76	69.7	Lack of demand in kharif & Rabi, Lack of field channels, Agricultural extension needed.
16.	Shivna Anicut	1964	0.28	0.28	0.24	85.7	Lack of demand in kharif, field channels incomplete.

I	2	3	4	5	6	7	8
17.	Talwar	1960	0.67	0.67	0.41	61.1	Lack of demand in kharif. All water courses not completed.
18.	Bhandara at Taroli	1964	1.86	1.86	0.45	24.2	Lack of demand due to timely rainfall in Kharif. Lack of water during rabi.
19.	Bor	1968	16.20	16.19	2.24	13.8	Lack of demand in kharif, irrigation new to the area.
20.	Chandni	1966	2.02	2.02	1.61	79.7	Lack of demand in kharif, water courses are not all complete. Land shapping and landlevelling taken up.
21.	Kk Burjee	1967	2.42	2.42	1.64	67.8	Lack of demand in kharif, command Area development lagging. Extension demonstration needed.
22.	Galhati	1966	4.65	4.65	2.65	57.0	Lack of demand in kharif, water courses in complete.
23.	Harni	1966	1.66	1.66	1.55	93.4	Lack of demand in kharif, water courses, land shapping & levelling in progress.
24.	Jjurakha	1966	1.06	1.06	0.60	56.6	Lack of demand in kharif, water courses incomplete.
25.	Khelna	1966	2.43	2.43	1.98	81.5	Lack of demand in kharif, water courses incomplete.

1	2	3	4	5	6	7	8
26.	Kurnoor	1970	3.64	3.64	3.10	85.2	Lack of demand in kharif, water courses. not complete
27.	Kada	1966	1.21	1.21	1.10	90.9	Lack of demand in kharif, Lack of water courses.
28.	Mohesangir	1966	1.94	1.94	1.18	60.8	Lack of demand in kharif, water courses not complete Also extension demonstration needed.
29.	Mehekari	1966	4.05	4.05	3.51	86.7	Lack of demand in kharif, water courses not complete.
30.	Manar Stage I	1969	10.12	8.34	1.96	235	Inadequate field channels. Land development works lagging behind. Extension demonstration needed.
31.	Nalganga	1966	8.74	8.74	4.29	49.1	Lack of demand in kharif, inadequate-field channels, and shapping and levelling lagging.
32.	Pindharabodi Tank	1967	0.86	0.86	0.37	43.0	Land shapping and levelling behind.
33.	Sindh Phana		1.78	1.78	2.05	100.0	—
34.	Sukhana	1968	2.51	2.51	1.51	60.2	Less demand in kharif, water courses incomplete.
35.	Thirva	1970	2.18	2.18	1.72	78.9	Lack of demand in kharif, water courses and land development not done.

1	2	3	4	5	6	7	8
36.	Upper Dudhna	1965	3.40	3.40	2.00	58.8	Lack of demand in kharif, water courses not complete.
37.	Wan	1968	5.26	5.26	3.80	72.2	Lack of demand in kharif, water courses not completed and Ayacut development lagging.
38.	Karwand	1971	6.57	6.57	1.00	15.2	Lack of demand in kharif. Field channels and land development lagging.
39.	Wunna	1968	1.21	1.21	0.21	17.4	Lack of demand. Land development works lagging behind.
40.	Sangrampur	1970	0.97	0.97	0.52	53.6	Irrigation is new: Ayacut development measures lagging.
41.	Ghirni	1968	2.83	2.83	2.07	73.1	Lack of demand in kharif, (mainly cotton) Ayacut development lagging.
42.	Kolhi		0.47	0.47	0.49	100	Lack of development in kharif, field channels and land development works lagging.
43.	Malangaon	1970	2.26	2.26	1.37	60.6	
44.	Managarh	1970	1.70	1.70	0.94	55.3	Irrigation is new, Lack of water courses.

	1	2	3	4	5	6	7	8
45. Kadi			1971	1.10	1.10	--	--	Potential just created this year.
46. Umri				1.23	1.23	--	--	-do-
47. Bhageda				1.80	1.80	--	--	-do-
48. Kundaral				1.34	1.34	--	--	-do-
49. Saikheda			1971	3.16	3.15	0.52	16.5	Cultivators are irrigation minded, Ayacut development works needed. Non adoption of approved crop pattern, & Lack of field channels.
50. Kanholi				1.54	1.54	--	--	
51. Gadadgod				1.18	1.13	--	--	
				170.95	162.66	93.07	60.3	
<i>B-Continuing Schemes</i>								
52. Manar-Stage II			1964	14.97	9.91	1.99	20.1	Lack of field channel.
53. Katapurna River Project			1960	8.99	5.24	0.39	7.4	
54. Panzara			1966	12.17	2.28	--	--	
55. Chankapur			1967	7.01	2.43	--	--	
56. Manyad			1968	6.88	6.85	--	--	
57. Kal			1964	14.34	1.82	--	--	

1	2	3	4	5	6	7	8
58.	Padwalkarwadi	1968	0.46	0.35	—	—	—
59.	Morna	1964	15.26	4.05	0.06	14.8	—
60.	Gyanganga		4.25	4.15	—	—	—
61.	Malkhed		1.69	1.54	—	—	—
62.	Sorna		0.93	0.93	0.27	29.00	—
Sub Total			76.95	39.55	2.71	6.90	—
Grand Total			247.90	202.21	100.78	49.8	—

State : Mysore

MAJOR PLAN PROJECTS

(Area in '000 ha)

Sl No.	Name of Scheme	Year of completion- commencement	Ultimate Irrigation Potential	Potential created by 3/72	Potential utilised by 3/72	Percentage
1	2	3	4	5	6	7
A. Completed Schemes						
1.	Tunga-bhadra					
(a)	Tungabhadra Left Bank Canal	1963	234.73	234.73	197.90	84.3
(b)	Tungabhadra Low Level Canal	1955	37.37	37.00	31.77	85.9
	Sub Total		272.10	271.73	229.67	84.5
B. Continuing Schemes						
2.	Bhadra	I Plan	99.09	97.60	97.60	100
3.	Ghata Prabha Stage I	1949	74.11	48.58	47.25	97.3
4.	Ghata Prabha Stage II	1959	46.54	11.45	8.96	78.3
5.	Tungabhadra H.L.C. Stage I	1959	40.27	40.27	19.18	47.6
6.	Tungabhadra H.L.C. Stage II	1959	40.27	12.15	4.05	33.3
	Sub Total		300.28	210.05	177.04	84.3
	Grand Total		572.38	481.78	406.71	84.4

State : Mysore

MEDIUM PLAN PROJECTS

(Area in '000 ha)

Sl. No.	Name of Scheme	Year of completion/ comment	Ultimate Irrigation Potential by 3/72	Potential created by 3/72	Potential utilized by 3/72	Percentage	Reasons for lag in utilisation/ Remarks
1		3	4	5	6	7	8
A. Completed Schemes							
1.	Ramanhalli		1.94	1.94	1.94	100	
2.	Are Shanker		1.24	1.24	1.24	100	
3.	Kalaskope Tank		1.14	1.14	1.14	100	
4.	Kolchi Weir		1.28	1.28	1.15	89.8	
5.	Tunga Anicut		8.71	8.71	8.58	98.5	
6.	Nagu Reservoir		8.10	8.10	8.10	100	
7.	Ambigola		2.95	2.95	2.95	100	
8.	Dharma		6.28	5.67	5.27	93.0	
9.	Naguthana	1961	0.57	0.57	0.45	79.0	Irrigation is developing gradually.
10.	Hebbahalla		1.21	1.21	1.21	100	

	1	2	3	4	5	6	7	8	
11. Mangla				0.87	0.87	0.87	100		
12. Chickhole				1.62	1.62	1.62	100		
13. Rajolibunda				2.38	2.38	2.18	91.6		
Sub Total				38.29	37.68	36.70	97.40		
<i>B. Continuing Schemes</i>									
14. Kanka Nalla				2.06	1.96	0.70	35.7	Field channels still to be done, Irrigation new in the area.	
15. Jamatadahalla				2.43	1.54	0.43	27.9	Low storag in reservoir, ayacut development works to be done.	
16. Hagaribommanahalli				3.06	2.43	2.02	83.1	Irrigation new in the area, fields not levelled properly yet.	
17. Hathikoni				2.14	1.31	1.25	.954		
Sub Total				9.69	7.24	4.40	60.8		
Grand Total				47.98	44.92	41.10	91.5		

State : Orissa

MAJOR PLAN PROJECTS

(Area in '000 ha)

Sl. No.	Name of Scheme	Year of completion/ commen- cement	Ultimate Irriga- tion Poten- tial	Poten- tial created by 3/72	Poten- tial utilised by 3/72	Percen- tage
1.	2.	3.	4.	5.	6.	7.
<i>A. Completed Schemes</i>						
1.	Hirakud Dam Project	1971	253.75	247.67	244.43	98.7
	Sub Total		253.75	247.67	244.43	98.7
<i>B. Continuing Schemes</i>						
2.	Mahanadi delta	1951	684.0	373.93	360.56	96.4
3.	Salandi	1959	67.38	48.97	48.97	100
	Sub Total		751.38	422.90	409.53	96.8
	Grand Total		1005.13	670.57	653.96	97.5

State : Orissa

MEDIUM PLAN PROJECTS

(Area in '000 ha.)

Sl. No.	Name of Scheme	Year of completion/commence-ment	Ultimate Irrigation- Potential 3/72	Potential created by 3/72	Potential utilised by 3/72	Percentage	Reasons for Lag in utilisation
1	2	3	4	5	6	7	8
A. Completed Schemes							
1.	Budha Budiani	—	372	372	372	100	
2.	Dhanai	—	526	526	526	100	
3.	Hiradharbati	—	531	531	531	100	
	Sub Total		14.29	14.29	14.29	100	
B. Continuing Schemes							
4.	Salia	1960	10.8	3.84	3.84	100	
5.	Salki	1957	21.9	21.10	21.10	100	
6.	Darjung	1960	9.7	7.28	7.28	100	
7.	Bahuda-Stage I	1962	9.2	5.87	5.87	100	
	Sub Total		51.60	38.09	38.09	100	
	Grand Total		65.89	52.38	52.38	100	

State : Rajasthan

MAJOR PLAN PROJECTS

(Area in '000 ha)

Sl. No.	Name of scheme	Year of completion/commencement	Ultimate Irrigation potential	Potential created by March 72	Potential Utilised by March 72	Percentage
1	2	3	4	5	6	7
<i>A. Completed schemes</i>						
1.	Bhakra Nangal	1956	230.7	230.7	239.6	100.0
	Sub Total		230.7	230.7	239.6	100.0
<i>B. Continuing Schemes</i>						
2.	Chambal-Stage I	1953	283.3	174.0*	153.5	88.2
3.	Chambal-Stage II					
4.	Rajasthan Canal Stage I	1958	597.0	257.0	182.0	70.8
	Sub Total		880.3	431.0	335.5	77.84
	Grand Total		1111.0	661.7	575.1	86.91

*The potential has been fully created. But due to various reasons detailed by the state the potential created is deemed to have been reduced.

State: Punjab

MAJOR PLAN PROJECTS

(Area in' 000 ha)

Sl No.	Name of Scheme	Year of completion/commencement	Ultimate Irrigation Potential	Potential created by 3/72	Potential utilised by 3/72	Percentage
1.	2.	3.	4.	5.	6.	7.
<i>A Completed Schemes</i>						
1.	Bhakra Nangal	I Plan	552.46	552.46	552.46	100
2.	Harikhe Project (Makhu Canal)	I Plan	13.89	13.89	13.89	100
Sub Total			566.35	566.35	566.35	100
<i>B Continuing Schemes</i>						
Nil			Nil	Nil	Nil	Nil
Sub Total			Nil	Nil	Nil	Nil
Grand Total			566.35	566.35	566.35	100

MEDIUM PLAN PROJECTS

(Area in '000 ha.)

Sl. No.	Name of Scheme	Year of completion/ comment	Ultimate irrigation potential	Potential created by March 1972	Potential utilised by March 1972	Percentage	Reasons for lag in utilisation/ Remarks
1	2	3	4	5	6	7	8
A. Completed Schemes							
1.	Extension of Irrigation to arid area of Jandiala & Gurdaspur Division of U. B. D. C.		6.79	6.79	6.79	100	
2.	Extension of new distribution of Kasur Branch.		27.49	27.49	27.49	100	
3.	Kiran Nallah		7.04	7.04	7.04	100	
4.	Remodelling of Shahabhar Canal.		19.03	19.03	19.03	100	
5.	Raising & Strengthening Banks of Channels.		7.29	7.29	7.29	100	
6.	Spillover Scheme		34.39	34.39	34.39	100	
Sub Total			<u>102.03</u>	<u>102.03</u>	<u>102.03</u>	<u>100</u>	

1	2	3	4	5	6	7	8
37.	Alnia	1961	3.6	3.6	3.6	100	
38.	Bharatpur Feeder	1960	4.9	4.9	4.9	100	
39.	West Banas	1968	4.0	4.0	4.0	100	
40.	Jakham	1968	1.6	1.6	1.6	100	
41.	Berach at Badgaon	1968-69	2.5	2.5	2.5	100	
42.	Barach at Vallesh Nagar	1970	3.2	3.2	3.2	100	
43.	Orai	1969-70	3.3	3.3	3.3	100	
44.	Khari Feeder	1969-70	3.2	3.2	3.2	100	
			Sub-Total	137.1	137.1	137.1	100
B-Continuing Schemes :							
45.	Kali Sindh (Harish Chandra Sagar)	1969 (Restoration after Breach)	8.10	8.10	8.10	—	—
			Sub-Total	8.10	8.10	—	—
			Grand Total	145.20	145.20	137.1	94.42

State : **Tamil Nadu****MAJOR PLAN PROJECTS**

(Area in '000 ha.)

<i>Sl. No.</i>	<i>Name of scheme</i>	<i>Year of completion/ commencement</i>	<i>Ultimate irrigation - Potential</i>	<i>Potential created by 3/72</i>	<i>Potential utilised by 3/72</i>	<i>percentage</i>
1	2	3	4	5	6	7
A. Completed Schemes :						
1.	Lower Bhawani	1956	78.92	78.92	78.92	100
2.	Mani Muthar	1958	8.09	8.09	8.09	100
3.	Chittar-Pattanamkal	1971	13.08	13.08	6.38	48.8
Sub Total			100.09	100.09	93.39	93.3
B. Continuing Schemes :						
4.	Parambikulam-Aliyar Project	1959	97.13	57.06	30.13	52.8
Sub Total			97.13	57.06	30.13	52.8
Grand Total			197.22	157.15	123.52	78.6

State : Rajasthan

II. 14.2

MEDIUM PLAN PROJECTS

(Area in '000 ha.)

Sl. No.	Name of Scheme	Year of completion/commen-	Ultimate Irrigation Potential by 3/72	Potential created by 3/72	Potential utilised by 3/72	Percentage Reasons for lag in utilisation/Remarks	
1	2	3	4	5	6	7	8
A. Completed Schemes							
1.	Small Schemes completed upto the end of 1st Plan	1951	7.3	7.3	7.3	100	
2.	Girinola	1958	0.4	0.4	0.4	100	
3.	Bhula	1956	0.4	0.4	0.4	100	
4.	Bankli	1956	1.8	1.8	1.8	100	
5.	Raising of Nahar Sagar	1958	0.5	0.5	0.5	100	
6.	Rasing of Umed Sagar	1958	0.7	0.7	0.7	100	
7.	Raising of Himavas	1956	0.7	0.7	0.7	100	
8.	Nindar	1957	0.5	0.5	0.5	100	
9.	Jawai	1951	7.7	7.7	7.7	100	

1	2	3	4	5	6	7	8
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10.	Kantri	1956	0.2	0.2	0.2	100	
11.	Bagolia	1955	1.0	1.0	1.0	100	
12.	Atwara	1958	0.3	0.3	0.3	100	
13.	Kalabhata	1956	0.1	0.1	0.1	100	
14.	Ora	1957	2.3	2.3	2.3	100	
15.	Sateri	1957	5.3	5.3	5.3	100	
16.	Khari	1957	2.2	2.2	2.2	100	
17.	Deoria	1958	0.2	0.2	0.2	100	
18.	Paibalapur	1957	1.0	1.0	1.0	100	
19.	Meja	1956	9.7	9.7	9.7	100	
20.	Parwati	1959	12.1	12.1	12.1	100	
21.	Gudha	1958	8.1	8.1	8.1	100	
22.	Kalisl	1957	2.4	2.4	2.4	100	
23.	Juggar	1956	2.6	2.6	2.6	100	
24.	Surwal	1953	1.5	1.5	1.5	100	
25.	Morel	1954	6.6	6.6	6.6	100	
26.	Lodisar-ka-Naka	1957	1.1	1.1	1.1	100	
27.	Godola	1964	0.5	0.5	0.5	100	
28.	Sarwania	1962	1.2	1.2	1.2	100	
29.	Gambheri	1956	5.5	5.5	5.5	100	
30.	Alwar	1958	4.9	4.9	4.9	100	
31.	Namano	1957	4.5	4.5	4.5	100	
32.	Galwa	1960	5.3	5.3	5.3	100	
33.	Mashi	1960	3.6	3.6	3.6	100	
34.	Parvan	1960	4.0	4.0	4.0	100	
35.	Bundi-ka Gothra	1957	2.4	2.4	2.4	100	
36.	Narain Sagar	1968-69	2.2	2.2	2.2	100	

State . Tamil Nadu

MEDIUM PLAN PROJECTS

(area in '000 ha.)

Sl. No.	Name of Scheme	Year of completion/ comment	Ultimate Irrigation Potential	Potential created by 3/72	Potential utilised by 3/72	Percentage	Reasons for lag in utilisation/ Remarks
1	2	3	4	5	6	7	8
Completed Schemes							
1.	Amravathy		8.70	8.70	8.70	100	
2.	Krisbnagiri		3.64	3.64	3.64	100	
3.	Mettur Cannal		18.21	18.21	18.21	100	
4.	Sathanur Project Stage I		8.50	8.50	8.50	100	
5.	Uaigai Reservoir		9.24	9.24	9.24	100	
6.	Neyyar-Stage-II	1966	2.35	2.35	1.32	56.2	Lack of reclamation of Some field channels being built.
7.	New Kattalai Canal		8.34	8.34	7.55	90.5	
8.	Pullambadi Canal		8.95	8.95	8.28	92.5	
9.	Vidur		1.30	0.89	0.83	93.3	
10.	Gomukhi Nadi		2.02	2.02	1.72	85.1	

1	2	3	4	5	6	7	8
11. Improvement to Pallar Anicut & Channels	1.33	1.33	1.33	1.33	1.33	100	
12. Sathanur-Stage-II	2.02	2.02	2.02	2.02	2.02	100	
13. Mani Muktha Nadi	1.62	1.62	1.62	1.62	1.38	85.2	
Sub-Total	76.22	75.81	72.72	75.81	72.72	95.9	
B. Continuing Schemes							
	Nil	Nil	Nil	Nil	Nil	Nil	
Sub-Total	Nil	Nil	Nil	Nil	Nil	Nil	
Grand Total	76.22	75.81	72.72	75.81	72.72	95.9	

State : Uttar Pradesh

MAJOR PLAN PROJECTS

(Area in '000 ha)

Sl. No.	Name of Scheme	Year of completion/ commencement	Ultimate Irrigation potential	Potential created by 3/72	Potential utilised by 3/72	Percentage
1	2	3	4	5	6	7
<i>A. Completed Schemes</i>						
1.	Matatilla	1966	120.43	120.43	120.43	100
2.	Sarda Sagar-Stage II	1962	74.95	74.95	74.95	100
3.	Balmiki (Ohen) Sarowar		6.27	6.27	6.27	100
4.	Jirgo Reservoir	1962	25.90	25.90	20.29	78.3
5.	Kuvano Pumped Canal	1965	8.59	8.59	4.71	54.8
6.	Meja Reservoir	1966	21.20	21.20	15.37	72.5
7.	Nanak Sagar		53.71	53.71	53.71	100
8.	Tumaria Reservoir	1966	16.19	16.19	11.74	72.5
9.	Upper Khajuri	1962	7.29	7.29	6.12	84.0
	Sub Total		334.53	334.53	313.59	93.7
<i>B. Continuing Schemes</i>						
10.	Ramganga	1961	658.82	89.03	89.03	100
11.	Gandak	1961	308.37	66.77	29.42	44.1
	Sub Total		967.19	155.80	118.45	76.0
	Grand Total		1301.72	490.33	432.04	88.1

State : Uttar Pradesh

MEDIUM PLAN PROJECTS

(Area in '000 ha.)

Sl. No.	Name of Scheme	Year of comple- tion/ commen- cement	Ultimate Irrigation Potential	Potential created by March 1972	Potential utilised by March 1972	Percentage	Reasons for lag in utilisation/ Remarks
1	2	3	4	5	6	7	8

A. Completed Schemes

1.	Ahraura Dam		8.88	8.88	8.88	100	
2.	Aizalgarh Canal		4.05	4.05	3.33	82.2	Lack of field channels, non-achievement of desired crop pattern, lack of proper ex-tention service.
3.	Banganga Canal		8.90	8.90	8.90	100	
4.	Arjan Dam		10.77	10.77	10.77	100	
5.	Belan Tons Canal		41.08	41.08	37.45	91.2	
6.	Chandra Prabha Dam		14.61	14.61	14.61	100	

1	2	3	4	5	6	7	8
<i>B. Continuing Schemes</i>							
38. Tons Pumped Canal			52.61	25.90	16.19	62.5	
Sub Total			52.61	25.90	16.19	62.5	
Grand Total			722.65	695.94	613.56	88.2	

State : West Bengal

MAJOR PLAN PROJECTS

(Area in '000 ha)

Sl. No.	Name of Scheme	Year of completion/ commencement	Ultimate Irrigation potential	Potential created by 3/72	Potential utilised by 3/72	Percentage
1	2	3	4	5	6	7
<i>A. Completed Schemes</i>						
	Nil	Nil	Nil	Nil	Nil	Nil
	Sub Total		Nil	Nil	Nil	Nil
<i>B. Continuing Schemes</i>						
1.	Damodar Valley Corp.	1946	364.50	360.08	340.0	94.4
2.	Mayurakshi	1946	247.05	239.00	236.15	98.8
3.	Kangsabati	1956	401.46	202.35	131.53	65.0
	Sub Total		1013.01	801.43	707.68	88.3
	Grand Total		1013.01	801.43	707.68	88.3

1	2	3	4	5	6	7	8
7.	Dhorighat Pumped Canal		48.08	48.08	48.08	100	
8.	Increasing capacity of Upper Ganga Canal		36.02	36.02	36.02	100	
9.	Kabrai Lake		1.94	1.94	1.94	100	
10.	Lalitpur Dam		7.58	7.58	7.58	100	
11.	Naugarh Dam		34.80	34.80	34.80	100	
12.	Naraini-Gandak Pokhra Canal		23.87	23.87	23.87	100	
13.	Nagwa Dam		27.24	27.24	27.24	100	
14.	Batagarh Branch		19.19	19.19	19.19	100	
15.	Rangwan Dam		37.64	37.64	37.64	100	
16.	Re-modelling of Agra Canal		8.26	8.26	8.26	100	
17.	Re-modelling of Eastern Yamuna Canal		8.90	8.90	8.90	100	
18.	Saprar Dam		17.00	17.00	17.00	100	
19.	Sarda Sagar—Stage I		67.75	67.75	67.75	100	
20.	Shahaganj Distributary		8.07	8.07	8.07	100	
21.	Tanda Pumped Canal		27.48	27.48	25.50	92.8	
22.	Transkulyani		19.06	19.06	19.06	100	
23.	Baur Reservoir		18.90	18.90	18.90	100	
24.	Barwa Dam		5.46	5.46	5.46	100	

1	2	3	4	5	6	7	8
25.	Construction of 40 miles of channels on Dhanpur Distributary	1969	5.70	5.70	5.70	100	Lack of field channels, non-achievement of anticipated crop pattern, lack of extension service.
26.	East Baigul Reservoir		7.24	7.24	4.04	55.8	
27.	Gularia Dam		1.28	1.28	1.19	93.0	
28.	Jahangirganj Distributary		13.31	13.31	12.20	91.7	
29.	Keolari		1.47	1.47	1.47	100	-do-
30.	Musakhand Dam	1968	22.19	22.29	12.15	54.5	-do-
31.	Pilli Reservoir	1968	11.49	11.49	4.76	41.4	
32.	Extension of 5 miles of Channel on Ohen Canal		0.34	0.34	0.34	100	
33.	Project for 78 miles Channel on Ken Canal		4.28	4.28	4.28	100	
34.	Tumaria Extension	1968	18.20	18.20	9.62	52.9	-do-
35.	Bhopanli Pumped Canal		24.28	24.28	11.12	45.8	Scheme completed in 1971-72 and utilisation is expected to pick up in near future.
36.	Dalmau Pumped Canal		30.35	30.35	21.43	70.6	-do-
37.	Zamania Pumped Canal		24.28	24.28	9.87	40.7	-do-
Sub Total						597.37	89.2

State : West Bengal

MEDIUM PLAN PROJECTS

(area in '000 ha.)

Sl. No.	Name of Scheme	Year of completion/ comment- cement	Ultimate Irrigation Potential	Potential created by March 1972	Potential utilised by March 1972	Percentage	Reasons for lag in utilisation/ Remarks
1	2	3	4	5	6	7	8
A. Completed Schemes							
1.	Suvankar Danra	1958	2.43	2.43	1.72	70.8	Irrigation is governed by Bengal Irrigation Act instead of Bengal Development Act.
2.	Karatoya	1969	8.82	8.90	4.45	50.0	Field channels yet to be excavated fully - cultivators are less interested in Rabi cultivation.
Sub Total			11.25	11.33	6.17	54.5	
B. Continuing Schemes							
3.	Saharajore		4.86	3.24	3.24	100	
Sub Total			4.86	3.24	3.24	100	
Grand Total			16.11	14.57	9.41	64.6	

E R R A T A

Page No.	Para No.	Line No. in the Para	For	Read
PART I				
6	1.61	3	backgroundd	background
8	2.31	last	March 72	March '71
9	Table 2.2	S. No. 2	55.40	5.40
		Col. No. 8		
9	Table 2,2	S. No. 4	5667.31	567.31
		Col. No. 5		
10	2.61	2	25 m.ha	2.5 m.ha
11	2.70	2	still	still
13	3.12	2	utilsation	utilisation
13	3.13	2	Allyar	Aliyar
14	3.14	3	Allyar	Aliyar
14	3.23	3	36% stage II	36%. Stage II
15	3.24	1	reason	reasons
16	3.26 (b)	1	linning	lining
16	3.31	3	western	western
17	3.33	1	4.3 lakh ha	8.3 lakh ha
17	3.33 (c)	2	Station	stations
19	3.44	2	253 lakh ha	2.53 lakh ha
20	3.52	6	342 km	242 km
21	3.54 (d)	heading	3.54 (d)	3.54 (b)
21	3.54 (d)	5	owing limited	owing to limited
23	3.62	1	70 m	740 m
23	3.62	6	Gorankhpur	Gorakhpur
24	3.64 (c)	7	However ;	However,
25	3.71	6	sedimants	sediments
31	5.10	3	Controlling	Controlling
32	5.23	1	ptovide	provide
32	5.23	8	field	failed
33	5.25	1	follow	follows
34	5.33	4	draing	drains
35	5.34 (II)	2	or drainage	of drainage
35	5.40	Title	irrigated	irrigated
36	5.42 (i)	2	Governmentts	Governments
37	5.52	2	rainfalls	rainfall
37	5.52	7	State	state
38	5.53 (ii)	2	lake of	lack of
40	5.81	9	as these are	as they are
44	5.114	8,9 of the page	The head of Govern- ment say, as secretary etc.	The head of the unit should himself be given the powers of Governmentsay, as Secretary etc. A.B. Datar
50	Mysore	S. No. 4	A.R. Ratar	A.B. Datar
PART II				
59	Title		project	projects
60	1.4	4	created utilisation	created, utilisation
68	2.8.5	4	Howeve,	However,
77	Table 4.2	II Medium (a) Completed	3:0.93	380.93
78	4.9.3	4	Cannal	Canal
79	4.9.3	7th line of the page	1. : 0 lakh ha	1 30 lakh ha.
81	4.9.3 (i)	line 3	state system	satta system
81	4.9.5	3	Nepal Western Canals	Nepal Western Canal
83	4.9.5 (e)	1	requisito	requisite
83	4.10	4	lack ha.	lakh ha.
89	5.8.5	2 & 3	with ultimate irrigation potential of 121.18 th ha	with ultimate irrigation potential of 186.3 th. ha. An irrigation potential of 121.18 th.ha.
95	6.7	3	2 major scheme	2 major schemes
98	7.4.1	2	plans	plains
102	Table 8 1	item 5	Total cropped	Total cropped area
103	Table 8.2	(C)	271.33 "	271.33 -----
103	8.9	2	Malgmpuzba	Malampuzha
105	9.1	3	Giri	Gird
105	9.3	5	couples	couple

Page No.	Para No.	Line No. in the para	For	Read
105	9.3	6	Grid	Gird
105	9.3	8	irriagation	irrigation
105	Table 9.1	item 6	irrigated	irrigated
106	9.5	1	rivers flow	rivers which flow
103	9.9.1	6	However;	However,
108	9.9.2	15	185 MAF	1.85 MAF
109	9.10.3	3	Scheme. The	Scheme, the
109	9.10.3 (C)	2	figures;	figures,
111	10.2.2	4	monsoon	monsoon
112	10.6.1	3	Vaitargna	Vaitarna
114	10.9.2	1	II-10	II-10.1
115	10.10.6	2	first in	first time in
115	10.10.6	4	Government	Government
119	Chapter	Heading	CHAPTER 11	CHAPTER 11
120	11.4.2	1	Cystalline	crystalline
120	11.4.2	2	aquifer	aquifer
120	11.8.1	heading	Plan Project	Plan Projects
122	11.9.1 (C)	5	under stage II of	under stage I of
122	11.9.1 (C)	8	under stage I of	under stage II of
126	12.7	1	Prior Commencement	Prior to Commencement
127	11.8	1	11.8	12.8
127	11.8	5	medium project	medium projects
127	11.8	5	1021 th.ha.	1071 th.ha.
128	12.9.2	1	she	The
131	13.1	2	stake	State
139	14.9.3	1	Rajsthan	Rajasthan
139	14.9.3	15	Ir	It
142	15.4.1 (ii)		Thanjavaur	Thanjavur
150	16.8	7	6 of the	Of the 6 of the
153	17.2.2	5	planis	plains
155	17.7	1	was	were
156	17.9.1	4	360.08	360.08 th.ha.
156	17.10.2	3	utilisaion	utilisation
156	17.10.2	3	9.41	9.41 th.ha.

ANNEXURES TO PART II

Page No.	Annexure No.	Sl. No.	Col. No.	For	Read
170	II. 2.2		Heading	Medium Plan Project	Medium Plan Projects
170	II. 2.2	4	2	Nalimadugu	Malimadugu
171	II. 2.2	21	8	Now reclamation	Non-reclamation
171	-do-	25	8	-do-	-do-
171	-do-	25	8	Newalignment	non assignment.
174	II. 3.2	3	2	Harauti	Harguti
181	II. 5.2	10	8	gravely	gravelly
182	II. 5.2	between 27 & 28		A. Completed Scheme	—
188	II. 7.2	5	8	therracing	terracing
190	II. 8.2		Heading	Medium Plan Project	Medium Plan Projects
194	II. 9.2	7	8	Cultivators in a position with	Cultvators with
194	II. 9.2	8	2	Gondu	Gondli
194	II. 9.2	16	8	chipped	slipped
195	II. 9.2	between 20 & 21		A. Completed Schemes	—
197	II.10.1	3	2	Girva	Girna
198	II.10.2	4	8	murmury	murummy
200	II.10.2	21	2	Kk Burjee	Ek Burjee
201	II.10.2	31	8	and shapping	land shaping
201	II.10.2	32	8	shapping and levell- ing behind	shaping and leve- lling lagging behind
201	II.10.2	35	2	Thirva	Thirna
202	II.10.2	43	8.	development	demand
203	II.10.2	49	8	are irrigation	are not irrigation
207	II.11.2	15	8	storag	storage
214	II.14.2	6	2	Rasing	Raising
218	II.15.2	3	2	cannal	canal
218	II.15.2	5	2	Uaigai	Vaigai
218	II.15.2	6	8	Some field channels	some strips. Field channels